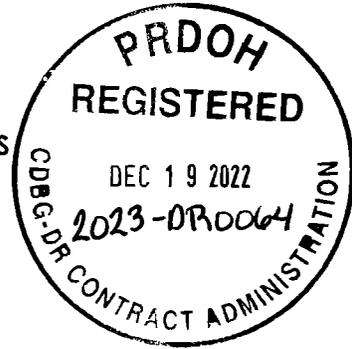




**COMMUNITY DEVELOPMENT BLOCK GRANT – DISASTER RECOVERY (CDBG-DR) /  
MITIGATION (CDBG-MIT)**

**AGREEMENT FOR  
INCREASE CAPACITY PV SYSTEM, WATER STORAGE SYSTEM  
ACQUISITION, AND INSTALLATION SERVICES  
FOR COMMUNITY ENERGY AND WATER RESILIENCE INSTALLATIONS  
PROGRAM (CEWRI)  
BETWEEN THE  
PUERTO RICO DEPARTMENT OF HOUSING  
AND  
VENEGAS CONSTRUCTION CORPORATION**



**THIS AGREEMENT FOR INCREASE CAPACITY PV SYSTEM, WATER STORAGE SYSTEM ACQUISITION, AND INSTALLATION SERVICES** (hereinafter referred to as "**Agreement**") is entered into in San Juan, Puerto Rico, this 19 of December, 2022, by and between the **PUERTO RICO DEPARTMENT OF HOUSING** (hereinafter, "**PRDOH**"), a public agency created under Law No. 97 of June 10, 1972, as amended, 3 L.P.R.A. § 441 *et seq.*, known as the "Department of Housing Governing Act" ("Organic Act") with principal offices at 606 Barbosa Avenue, San Juan, Puerto Rico, herein represented by William O. Rodríguez Rodríguez, attorney, of legal age, single, and resident of San Juan, Puerto Rico, in his capacity as Secretary; and **VENEGAS CONSTRUCTION CORPORATION** (hereinafter, "**CONTRACTOR**"), with principal offices in 472 Ave. Tito Castro, Suite 201, Ponce, Puerto Rico, 00716, herein represented by Emilio R. Venegas, in his capacity as Vice-President, of legal age, married, and resident of Ponce, Puerto Rico, duly authorized by Resolution by the CONTRACTOR.

**WHEREAS**, on September 2017, Hurricanes Irma and María made landfall in Puerto Rico causing catastrophic island wide damage, knocking out power, water, and telecommunications for the entire island and its island municipalities. Hurricane María caused major structure and infrastructure damage to family homes, businesses and government facilities triggering the displacement of thousands of residents of the Island from their homes and jobs.

**WHEREAS**, under the Continuing Appropriations Act, 2018 and Supplemental Appropriations for Disaster Relief Requirements Act, 2017, signed into law September 8, 2017 (Pub. L. 115-56), \$1.5 billion were allocated by the U.S. Department of Housing and Urban Development (HUD) for disaster recovery assistance to the Government of Puerto Rico under the CDBG-DR. These funds are intended to provide financial assistance to address unmet needs that arise and that are not covered by other sources of financial aid.

**WHEREAS**, on February 9, 2018, a Notice was published in the Federal Register, Vol. 83, No. 28 (83 FR 5844), that allocated \$1.5 billion for disaster recovery assistance to the Government of Puerto Rico.

**WHEREAS**, under the Bipartisan Budget Act of 2018, signed into law February 9, 2018 (Pub. L. 115-123), an additional \$8.22 billion were allocated by HUD for disaster recovery assistance to the Government of Puerto Rico under CDBG-DR.

**WHEREAS**, pursuant to a letter dated February 23, 2018 sent by the former Governor of Puerto Rico to the Secretary of HUD, the PRDOH is the governmental agency designated as grantee of the CDBG-DR funds allocated to the Government of Puerto Rico.

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**WHEREAS**, on August 14, 2018, a Notice was published in the Federal Register Vol. 83, No. 157, (83 FR 40314) that made an additional allocation to Puerto Rico of \$8.22 billion for recovery. With these allocations of funding, the PRDOH aims to lead a transparent, comprehensive recovery to benefit the residents of Puerto Rico. PRDOH holds accountability and is committed to the responsible, efficient, and transparent administration of CDBG-DR grant funding.

**WHEREAS**, On September 20, 2018, the Governor of Puerto Rico and the Secretary of HUD signed the Grant Agreement.

**WHEREAS**, under the Further Additional Supplemental Appropriations Act for Disaster Relief Requirements Act, 2018, (Division B, Subdivision 1 of the Bipartisan Budget Act of 2018, Pub. L. 115-123, approved February 9, 2018), \$8.285 billion were allocated by the U.S. Department of Housing and Urban Development (HUD) for mitigation activities and assistance to the Government of Puerto Rico under the Community Development Block Grant – Mitigation (CDBG-MIT) Program. These funds are intended to provide financial assistance in areas impacted by recent disasters. Moreover, CDBG-MIT funds represent a unique and significant opportunity for Puerto Rico to carry out strategic and high-impact activities to mitigate disaster risks and reduce future losses.

**WHEREAS**, on August 30, 2019, a Notice was published in the Federal Register, Vol. 84, No. 169, (84 Fed. Reg. 45838), which described the grant requirements and procedures applicable to future allocations of CDBG-MIT funds to the Government of Puerto Rico.

**WHEREAS**, on May 12, 2021, the PRDOH Secretary and the Secretary of HUD signed Grant Agreement Number B-18-DP-72-0002; allowing PRDOH access to \$8,285,284,000 in CDBG-MIT funding, obligated under Pub. L. 115-123, as amended.

**WHEREAS**, the PRDOH is the government agency designated as grantee of the CDBG-MIT funds allocated to the Government of Puerto Rico.

**WHEREAS**, the PRDOH is interested in contracting a qualified vendor to assist PRDOH with Photovoltaic Systems (**PV Systems**) and Water Storage system acquisition and installation Services for the Community Energy and Water Resilience Installation (**CEWRI**) Program under the CDBG-DR Program. These activities are specifically intended for the equipment and installation of PV Systems and Water Storage systems or homes that have been repaired or reconstructed under the Home Repair, Reconstruction, or Relocation Program (**R3**) and Social Interest Housing Program (**SHI**). This firm will support PRDOH's objectives of ensuring compliance with all CDBG-DR/MIT, HUD and applicable federal and local requirements, rules and regulations, as well as in PRDOH's objectives of the Action Plan, as amended, and adequately coordinating and monitoring all CDBG-DR related activities.

**WHEREAS**, on January 21, 2022 the PRDOH issued an Invitation for Bid (**IFB**) No. CDBG-DR-IFB-2022-03 for "**Increase Capacity PV System, Water Storage System Acquisition, And Installation Services**" with CDBG-DR and CDBG-MIT funds. This request was placed through the CDBG-DR website and the "Registro Único de Subastas" ("**RUS**", by its Spanish acronym). Afterwards, PRDOH requested Quotations or Proposals from qualified Proposers therein registered. Through this procurement process, PRDOH was able to reach **twelve (12)** qualified firms listed for their capacity and experience with federal grants to deliver qualified services.

**WHEREAS**, on March 18, 2022, the CONTRACTOR submitted a proposal (hereinafter referred to as the "Proposal"), which fully complied with the requirements set forth by the PRDOH.

**WHEREAS**, on August 23, 2022, **VENEGAS CONSTRUCTION CORPORATION** was chosen to perform the required services at a reasonable proposed cost to assist PRDOH in the Puerto Rico's recovery efforts according to the award criteria established in the IFB.

**WHEREAS**, the PRDOH desires to enter into an agreement with **VENEGAS CONSTRUCTION CORPORATION** to secure its services and accepts the CONTRACTOR's Proposal and costs, and the CONTRACTOR by its acceptance of the terms and conditions of this Agreement is ready, willing and able to provide the requested services contemplated under this Agreement.

**NOW THEREFORE**, in consideration of the mutual promises and the terms and conditions set forth herein, the PRDOH and the CONTRACTOR agree as follows:

### I. TYPE OF CONTRACT

**Contract Type:** This is a unit and system price contract. Under this Agreement, CONTRACTOR shall submit monthly invoices to the PRDOH based on the Cost Form (**Attachment C**) and as the services are rendered. Any and all changes and/or modifications to this Agreement shall be in writing and must be signed by both parties.

**Attachments Incorporated:** The following attachments are incorporated into this Agreement by reference and are hereby made part of this Agreement:

<b>Attachment A</b>	Proposal
<b>Attachment B</b>	Scope of Work
<b>Attachment C</b>	Cost Form
<b>Attachment D</b>	Performance Requirements
<b>Attachment E</b>	Insurance Requirements
<b>Attachment F</b>	HUD General Provisions
<b>Attachment G</b>	Contractor Certification Requirement
<b>Attachment H</b>	Labor Agreement
<b>Attachment I</b>	HUD Form 4010 (English and Spanish version)
<b>Attachment J</b>	SAM Wage Determination
<b>Attachment K</b>	Non-Conflict of Interest Certification

All Attachments hereto are fully incorporated herewith such that the terms and conditions of the Attachments shall be as binding as any terms and conditions of this executed written Agreement. Should any inconsistency appear between the Attachments and this Agreement, the Agreement shall prevail.

### II. TERM OF AGREEMENT

- A.** This Agreement shall be in effect and enforceable between the parties from the date of its execution. The Term of this Agreement will be for a performance period of **twenty-four (24) months**, ending on December, 19, 2024.
- B. Contract Extensions:** PRDOH may, at its sole discretion, extend the Agreement's term for **one (1) additional term of twelve (12) months**, or expressed in days, **three hundred sixty-five (365) days** upon mutual written agreement of the parties.

- C. The term of this Agreement shall not exceed the lifetime of the initial Grant Agreement between PRDOH and HUD, unless the term of the initial Grant Agreement is extended by HUD, in which case the Agreement shall not exceed said extended period.

### III. SCOPE OF WORK

The CONTRACTOR will provide the services described in **Attachment B** of the Agreement. The parties agree that the CONTRACTOR shall furnish all permits, consents, licenses, equipment, software and supplies necessary to perform the Services, at CONTRACTOR's sole cost.

### IV. COMPENSATION AND PAYMENT

- A. The PRDOH agrees to pay the CONTRACTOR for allowable Services rendered under this Agreement in accordance with the rates and amounts described in **Attachment C** of this Agreement.
- B. The PRDOH will pay the CONTRACTOR, for allowable services performed during the term of this Agreement, a maximum amount not to exceed **TWENTY-SIX MILLION TWO HUNDRED NINETY-NINE THOUSAND FIVE HUNDRED SEVENTY-FIVE DOLLARS (\$26,299,575.00); Account Number R02H14HER-DOH-LM 6090-01-000.**
- C. Such payment shall be compensation for all allowable services required, performed and accepted under this Agreement included in **Attachment C** and **Attachment D**.
- D. Any additional funds to complete the services requested by the PRDOH to the CONTRACTOR will be subject to evaluation before acceptance as well as funds availability and will require an amendment to this Agreement.
- E. The CONTRACTOR shall submit an invoice to PRDOH on a monthly basis. Said invoice must be submitted including all required invoice supporting documents, including but not limited to monthly reports, timesheets, invoice and photos evidence, expense plan and/or work projections. If PRDOH determines that the submitted invoice and supporting documents are acceptable, then the invoice will be approved for payment.
- F. The services rendered under the Agreement, shall be payable within forty-five (45) business days from the date the invoice is received and approved by a PRDOH representative for payment. If PRDOH raises any objections, PRDOH will return the invoice for corrections and the CONTRACTOR shall modify the invoice and return it within five (5) business days. Once the CONTRACTOR returns the modified invoice, the PRDOH shall resume and conclude the payment process within the next forty-five (45) business days.
- G. An authorized representative of the PRDOH will review each invoice and, if adequate, will approve and process its payment. Payments to the CONTRACTOR shall be made by electronic funds transfer (EFT). PRDOH reserves the right to conduct any audits it deems necessary. The CONTRACTOR agrees to cooperate fully with any such audit or audits.

- H. While providing the services under this Agreement, the CONTRACTOR must adhere to applicable requirements of the CDBG-DR grant. If the CONTRACTOR performs ineligible activities under the CDBG-DR grant or program, the CONTRACTOR cannot include them in the invoice for payment to the CONTRACTOR.
- I. CONTRACTOR shall be liable to the PRDOH for any costs disallowed pursuant to financial and/or compliance audit(s) of funds received under this Agreement. CONTRACTOR shall reimburse such disallowed costs from funds other than those CONTRACTOR received under this Agreement.
- J. The CONTRACTOR acknowledges and agrees to repay any CDBG-DR funds used for ineligible costs.
- K. Extended overhead costs is an Ineligible cost under this Agreement and shall not be reimbursable.
- L. In order for the CONTRACTOR to receive payment for any work performed hereunder, the following certification must be included in each application for payment or invoice submitted to the PRDOH for payment:

**“Under penalty of absolute nullity, I hereby certify that no public servant of the government entity is a party to or has an interest of any kind in the profits or benefits to be obtained under the contract which is the basis of this invoice, and should he be a party to, or have an interest in, the profits or benefits to be obtained under the contract, a waiver has been previously issued. The only consideration to provide the contracted goods or services under the contract is the payment agreed upon with the authorized representative of the government entity. The amount that appears in the invoice is fair and correct. The work has been performed, the goods have been delivered, and the services have been rendered, and no payment has been received therefor.”**

#### **V. REIMBURSABLE EXPENSES**

The PRDOH will not reimburse any costs incurred by the CONTRACTOR not included in the approved Proposal or in an executed written amendment.

#### **VI. ADDITIONAL SERVICES**

Should additional services be needed by the PRDOH, such additional services shall be agreed upon by the parties in a written document signed by both parties, prior to the issuance of a notice to proceed with the performance of such additional services.

#### **VII. OWNERSHIP AND USE OF DOCUMENTS**

- A. With the exception of the CONTRACTOR's working papers, the CONTRACTOR acknowledges the PRDOH's ownership of all information, drafts, documents, reports, papers, and other materials developed and prepared by the CONTRACTOR, its agents or representatives, for purposes of performing key obligations hereunder. In the event of any termination, the CONTRACTOR shall deliver such information, drafts, reports, papers and other materials to the PRDOH, in document form or as computer program data, and the CONTRACTOR recognizes the PRDOH's right to request such

documentation or computer program data. If the CONTRACTOR fails to deliver said information, the PRDOH may seek a judicial order to enforce its rights.

- B. Proof of expenditures incurred by the CONTRACTOR on behalf of PRDOH shall be made available to PRDOH. The CONTRACTOR agrees to maintain accurate records and files of all contract documents, correspondence, book estimates, bills, and other information related to the CONTRACTOR account. These documents shall be open for the PRDOH examination at all reasonable times during the term of this Agreement, and up to **five (5) years** from closeout of the grant to the state, or the period required by other local applicable laws and regulations.

#### VIII. DOCUMENTATION AND RECORDKEEPING

- A. **Records to be Maintained:** The CONTRACTOR shall maintain records of the state and units of general local government, including supporting documentation, which shall be retained for the greater of **five (5) years** from closeout of the grant to the state, or the period required by other local applicable laws and regulations. Such records include but are not limited to: Records providing a full description of each activity undertaken; Records demonstrating that each activity undertaken meets one of the National Objectives of the CDBG-DR and CDBG-MIT program; Records required to determine the eligibility of activities; Records required to document the acquisition, improvement, use or disposition of real property acquired or improved with CDBG-DR assistance; Records documenting compliance with the fair housing and equal opportunity requirements of the CDBG-DR program regulations; Financial records as required by 24 C.F.R. § 570.506, and 2 C.F.R. part 200, including records necessary to demonstrate compliance with all applicable procurement requirements; and other records necessary to document compliance with this agreement, any other applicable Federal statutes and regulations, and the terms and conditions of PRDOH's Federal award.
- B. **Access to Records:** The CONTRACTOR shall permit the PRDOH and auditors to have access to the CONTRACTOR's records and financial statements as necessary for the PRDOH to meet its audit requirements under the Federal award.
- C. **Record Retention and Transmission of Records to the PRDOH:** Prior to close out of this Agreement, the CONTRACTOR must transmit to the PRDOH records sufficient for the PRDOH to demonstrate that all costs under this Agreement met the requirements of the Federal award.
- D. **CONTRACTOR's Data and Privileged Information:** The CONTRACTOR is required to maintain confidential data demonstrating client eligibility for activities provided under this Agreement. Such data may include, but not be limited to, client name, address, income level or other basis for determining eligibility, and description of activities provided.
- E. **PII Policy:** The CONTRACTOR must comply with the PRDOH CDBG-DR Personal Identifiable Information Policy, as found in the CDBG-DR Website ([www.cdbg-dr.pr.gov](http://www.cdbg-dr.pr.gov)), which is herein included and made integral part of this Agreement, as it may be updated from time to time.

## IX. ACCESS TO RECORDS

- A. The CONTRACTOR agrees to provide the Government of Puerto Rico, PRDOH, HUD's Secretary, the Comptroller General of the United States, or any of their authorized representative's access to any books, documents, papers, and records of the CONTRACTOR which are directly pertinent to this Agreement for the purposes of making audits, examinations, excerpts, and transcriptions.
- B. The CONTRACTOR agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

## X. NON-DISCLOSURE AND CONFIDENTIALITY

- A. **Confidential Information; Definition:** The term Confidential Information as used throughout this Section, means any information concerning PRDOH operations and that of its CONTRACTOR (e.g., the projects, computer processing systems, object and source codes and other PRDOH business and financial affairs). The term Confidential Information shall also deem to include all notes, analysis, compilation, studies and interpretation or other documents prepared by CONTRACTOR, its agents or representatives, in connection with PRDOH operations.
- B. **Non-Disclosure:** CONTRACTOR agrees to take all reasonable steps or measures to keep confidential all Confidential Information and will not, at any time, present or future, without PRDOH express written authorization, signed by the Secretary of the PRDOH, use or sell, market or disclose any Confidential Information to any third party, contractor, corporation, or association for any purpose whatsoever. CONTRACTOR further agrees that, except as they relate to the normal course of the service, the CONTRACTOR will not make copies of the Confidential Information except upon PRDOH express written authorization, signed by an authorized representative of PRDOH, and will not remove any copy or sample of Confidential Information without prior written authorization from PRDOH. CONTRACTOR retains the right to control its work papers subject to these confidentiality provisions.
- C. **Return Documents:** Upon receipt of written request from the PRDOH, CONTRACTOR will return to PRDOH all copies or samples of Confidential Information which, at the time of the notice are in CONTRACTOR's or its agent's possession. CONTRACTOR reserves the right to retain a set of its work papers.
- D. **Equitable Relief:** The CONTRACTOR acknowledges and agrees that a breach of the provision of subparagraph B and C of this Section will cause PRDOH to suffer irreparable damage that could not be remedied or compensated adequately only by mere monetary retribution. The CONTRACTOR further agrees that money damages may not be a sufficient remedy for any breach of this Section. Accordingly, the CONTRACTOR agrees that PRDOH shall have the right to seek injunctive relief and the specific performance of the provisions of this Section to enjoin a breach or attempted breach of the provision hereof, such right being in addition to any and all other rights and remedies that are available to PRDOH by law, equity, or otherwise.

## XI. PERFORMANCE WARRANTY

- (a) CONTRACTOR warrants that it will perform all work and provide all Deliverables under this Contract in a manner consistent with the degree of care and skill

ordinarily exercised by members of the same profession currently practicing under similar circumstances.

- (b) CONTRACTOR warrants that all Deliverables it completes under this Contract shall: meet or exceed the standards of CONTRACTOR's trade, profession, or industry; meet or exceed the specifications set forth in the Attachments to this Agreement; and be fit for ordinary use, of good quality, and with no material defects.
- (c) If CONTRACTOR submits Deliverables that do not meet specifications, fails to complete Deliverables timely, or fails to perform its obligation under this Contract, PRDOH may require CONTRACTOR, at its sole expense, to:
1. repair or replace Deliverables that do not meet specifications;
  2. refund payment for Deliverables that do not meet specifications and accept the return of such Deliverables;
  3. pay liquidated damages for any past due Deliverable; and
  4. take necessary action to ensure that future performance and Deliverables meet specifications and conform to the Contract.

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## XII. TERMINATION

- A. Termination for Cause or Default:** The PRDOH may terminate this Agreement, in whole or in part, because of CONTRACTOR's failure to fulfill any of its obligations. The PRDOH shall terminate this Agreement by delivering to the CONTRACTOR a **thirty (30) calendar day** notice of termination specifying the extent to which the performance of the service under this Agreement is terminated, the reason therefor and the effective date of termination. CONTRACTOR shall, upon written notice, be provided a **ten (10) calendar day** opportunity to cure the alleged defect that resulted in the perceived default. If the defect is not cured within that period of time, CONTRACTOR shall immediately discontinue all such services being terminated and deliver to the PRDOH all information, notes, drafts, documents, analysis, reports, compilations, studies and other materials accumulated or generated in performing the services contemplated in this Agreement, whether completed or in process. Notwithstanding the above, the CONTRACTOR shall not be relieved of liability to the PRDOH for damage sustained to PRDOH CDBG-DR Program by virtue of any breach of the Agreement by the CONTRACTOR. The PRDOH may withhold any payments to the CONTRACTOR, for the purpose of off-set or partial payment, as the case may be, of amounts owed to the PRDOH by the CONTRACTOR. PRDOH shall make payment, in accordance with the terms of this Agreement, of any amounts due to CONTRACTOR for allowable services rendered prior to the termination notice.
- B. Termination for Convenience:** The PRDOH may terminate this Agreement, in whole or in part, whenever the PRDOH determines that such termination is necessary or convenient to the Agency. The PRDOH will terminate this Agreement by delivering to the CONTRACTOR a **thirty (30) calendar day** notice of termination specifying the extent to which the performance of the work under this Agreement is terminated, and the effective date of termination. Upon receipt of such notice, the CONTRACTOR shall immediately discontinue all services affected and deliver to the PRDOH all information, studies and other materials property of the PRDOH. In the event of a termination by Notice, the PRDOH shall be liable only for payment of services rendered up to and including the effective date of termination. PRDOH shall make payment, in accordance with the terms of this Agreement, of any amounts due to CONTRACTOR for allowable services rendered prior to the termination notice.
- C. Termination by Unilateral Abandonment:** The PRDOH will consider this Agreement immediately terminated, in the event that the CONTRACTOR unilaterally and without

prior notice, chooses to abandon (in any shape, form or fashion) cease and desist in the specific performance of its general and particular duties and responsibilities as agreed in this Agreement. Upon the knowledge of such event, the PRDOH will not be held liable and will immediately, automatically and retroactively deduct from any future reimbursement, all funds from the day such unilateral abandonment took place. The PRDOH will not be compelled to continue the performance of the Agreement, should the CONTRACTOR breach the Agreement by unilateral abandonment. For the purposes of this Section, Abandonment shall mean that CONTRACTOR voluntarily and intentionally disavows its contractual duties in a manner that is overt and without question a relinquishment of said contractual duties.

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- D. Unilateral Termination:** The PRDOH may terminate this Agreement, in whole or in part, at PRDOH's sole discretion, with or without cause, at any time. The PRDOH will terminate this Agreement by delivering to the CONTRACTOR a **thirty (30) calendar day** notice of termination specifying the extent to which the performance of the work under this Agreement is terminated, and the effective date of termination. Upon receipt of such notice, the CONTRACTOR shall immediately discontinue all services affected and deliver to the PRDOH all information, studies and other materials property of the PRDOH. In the event of a termination by Notice, the PRDOH shall be liable only for payment of services rendered up to and including the effective date of termination.
- E. Suspension:** The PRDOH may suspend this Agreement in whole or in part at any time for the PRDOH's convenience. The PRDOH shall give the CONTRACTOR **five (5) business days'** written notice of such suspension. Upon receipt of said notice the CONTRACTOR shall immediately discontinue all Services affected.
- F. Immediate Termination:** In the event the CONTRACTOR is subjected to a criminal or civil action, suit, proceeding, inquiry or court of applicable jurisdiction, or any governmental agency, or the CONTRACTOR shall be subject to an order, judgment, or opinion, issued by any federal or local authority, a court of applicable jurisdiction, or any governmental agency, in connection with the execution, delivery, and performance by the CONTRACTOR of this Agreement or the CONTRACTOR of this Agreement has been noncompliant, breach, inaccuracy of any representation, warranties, covenants, or the certifications provided herein, whether the noncompliance, breach or inaccuracy takes place before or after the execution of this Agreement, the PRDOH shall have the right to the immediate termination of this Agreement notwithstanding, any provisions to the contrary herein. This Section will apply in the event of any judgment that may obligate the PRDOH to terminate the Agreement pursuant to Act Number 2 of January 2, 2018, as amended, known as the Anti-Corruption Code for the New Puerto Rico.
- G. Period of Transition:** Upon termination of this Agreement, and for **ninety (90) consecutive calendar days** thereafter (the Transition Period), CONTRACTOR agrees to make himself available to assist the PRDOH with the transition of services assigned to CONTRACTOR by the PRDOH. CONTRACTOR shall provide to the PRDOH the assistance reasonably requested to facilitate the orderly transfer of responsibility for performance of the Services to the PRDOH or a third party designated by the PRDOH. PRDOH reserves the right to provide for the execution of a Transition Services Agreement for the Transition Period. In such instance, the CONTRACTOR will be paid at a reasonable, agreed upon, hourly rate for any work performed for the PRDOH during the Transition Period. Moreover, during that Transition Period, all finished or

unfinished records (files, data, work product) connected with this Agreement will be turned over to PRDOH.

**XIII. PENALTIES AND LIQUIDATED DAMAGES**

**A. Penalties**

1. In the event the CONTRACTOR is determined to have engaged in any proscribed conduct or otherwise is in default as to any applicable term, condition, or requirement of this Agreement, at any time following the Effective Date of the Agreement, the CONTRACTOR agrees that, PRDOH may impose sanctions against the CONTRACTOR for any default in accordance with **Attachment B** and **Attachment D** and this Section. Refer to all required provisions set forth at 2 C.F.R. § 200.326 and 24 C.F.R. § 570.489(g), if applicable, and the Contract and Subrecipient Agreement Manual, Section 2, Subsection 2.4.1(a), as found in the CDBG-DR Website (www.cdbg-dr.pr.gov) which is herein included and made integral part of this Agreement, as it may be updated from time to time.
  
2. If the CONTRACTOR fails to comply with federal statutes, regulations or the terms and conditions of the Agreement, PRDOH may take one or more of the following actions:
  - i. Temporarily withhold cash payments pending correction of the deficiency by the CONTRACTOR.
  - ii. Disallow all or part of the cost of the activity or action not in compliance.
  - iii. Initiate suspension or debarment proceedings as authorized under 2 C.F.R. part 180.
  - iv. Withhold further Federal awards for the project or program.
  - v. Take other remedies that may be legally available.

**B. Liquidated damages**

The CONTRACTOR shall pay to PRDOH, as liquidated damages, as related to their timeframes of performance. The PRDOH and the CONTRACTOR will agree on the timetable for the deliverable of each task. The CONTRACTOR shall pay to PRDOH, as liquidated damages, the amount established below for each calendar day that a deliverable required is late until deemed in compliance subject to a maximum of amount as established below.

Type of Work	Liquidated Damages for each calendar day	Maximum Amount of Liquidated Damages per occurrence, deliverable and task.
PV System Equipment, Installation, and related services	\$500.00	\$5,000.00
WSS Equipment, Installation, and related services	\$100.00	\$1,000.00

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Said sum, in view of the difficulty of accurately ascertaining the loss which PRDOH will suffer by reason of delay in the completion of the Work hereunder, is hereby fixed and agreed as the liquidated damages that PRDOH will suffer by reason of such delay. Liquidated damages received hereunder are not intended to be nor shall they be treated as either a partial or full waiver or discharge of the PRDOH's right to indemnification, or the CONTRACTOR's obligation to indemnify the PRDOH pursuant to this Contract, or to any other remedy provided for in this Contract or by Law. Liquidated damages may be assessed at the sole discretion of PRDOH. For the purpose of applying and calculating such liquidated damages, a grace period of **ten (10) business days** shall be observed. The PRDOH may deduct and retain out of the monies which may become due hereunder, the amount of any such liquidated damages; and in case the amount which may become due hereunder shall be less than the amount of liquidated damages due to the PRDOH per the formula above, the CONTRACTOR shall be liable to pay the difference.

#### **XIV. LIABILITY**

In no event, the PRDOH shall be liable for any indirect, incidental, special or consequential damages, or damages for loss of profits, revenue, data or use, incurred by either party or any third party, whether in an action in contract or tort, even if the other party or any person has been advised of the possibility of such damages. Third parties operating under this program, with their agency, will have their own general civil and criminal liability imposed by law towards the PRDOH, the CONTRACTOR and any citizen.

The CONTRACTOR shall carry the insurances as are required by law (if applicable), as set forth below. The CONTRACTOR shall furnish PRDOH certificates of insurance.

#### **XV. INSURANCE**

##### **A. Required Coverage**

The CONTRACTOR shall keep in force and effect for the period beginning from the execution of the Agreement and ending at the completion of all services to be provided hereunder, insurance policies in compliance with the Insurance Requirements, attached hereto and made an integral part hereof as **Attachment E**. The CONTRACTOR shall meet all other insurance requirements as may be imposed by PRDOH from time to time.

PRDOH will execute this Agreement conditioned to the submission, within thirty **(30)** days of the signing of this Agreement, of the following insurance policies:

- State Insurance Fund
- Commercial General Liability
- Auto Liability
- Professional Liability
- Umbrella
- Employment Practices Liability
- Pollution
- Builder's Risk
- Payment & Performance Bond

Failure to comply with the submission of the aforementioned insurance may result in the termination of the Agreement.

Upon the execution of this Agreement, the CONTRACTOR shall furnish PRDOH with original and two (2) certified copies of the insurance policies described in **Attachment E** and any other evidence PRDOH may request as to the policies' full force and effect.

Any deductible amount, under any of the policies, will be assumed in whole by the CONTRACTOR for any and all losses, claims, expenses, suits, damages, costs, demands or liabilities, joint and several of whatever kind and nature arising from the Agreement resulting from this solicitation by and between the CONTRACTOR and PRDOH.

The PRDOH shall not be held responsible under any circumstances for payments of any nature regarding deductibles of any Commercial Liability Policies for the aforementioned Agreement.

## **B. Endorsements**

Each insurance policy maintained by the CONTRACTOR must be endorsed as follows:

1. PRDOH, Government of Puerto Rico, HUD and its officers, agents and employees are named as additional insured (except Worker's Compensation) but only with respect to liability arising out of tasks performed for such insured by or on behalf of the named insured.
2. To provide waiver of subrogation coverage for all insurance policies provided or herein in favor of PRDOH and its respective officers, agents and employees.
3. The insurer shall be required to give PRDOH written notice at least **thirty (30) days** in advance of any cancellation in any such policies.

The CONTRACTOR shall furnish to PRDOH, prior to commencement of the work, certificates of insurance from insurers with a rating by the A.M. Best Co. of B+ and five (5) or over on all policies, reflecting policies in force, and shall also provide certificates evidencing all renewals of such policies. Insurers shall retain an A.M. Best Co. rating of B+ and five (5) or over on all policies throughout the term of this Agreement and all policy periods required herein. The insurance company must be authorized to do business in Puerto Rico and be in good standing.

## **C. Related Requirements**

The CONTRACTOR shall furnish original Certificates of Insurance evidencing the required coverage to be in force on the Effective Date of Agreement. In the case of Payment and Performance Bond, Certificate of Authority, Power of Attorney and Power of Attorney License issued by the Commissioner of Insurance shall be furnished. THE REQUIRED DOCUMENTATION MUST BE RECEIVED PRIOR TO THE CONTRACTOR COMMENCING WORK. NO CONTRACTOR OR ITS AUTHORIZED REPRESENTATIVES ARE TO BEGIN THEIR RESPONSIBILITIES UNDER THE AGREEMENT PRIOR TO FULL COMPLIANCE WITH THIS REQUIREMENT AND NOTIFICATION FROM PRDOH TO PROCEED.

Renewal Certificates of Insurance or such similar evidence is to be received by the Contract Administration of the Legal Division and/or the Finance area of the CDBG-DR and CDBG-MIT program prior to expiration of insurance coverage. At PRDOH's option, non-compliance will result in one or more of the following actions: (1) The PRDOH will purchase insurance on behalf of the CONTRACTOR and will charge back all cost to the

CONTRACTOR; (2) all payments due the CONTRACTOR will be held until the CONTRACTOR has complied with the Agreement; and/or (3) The CONTRACTOR will be assessed **Five Thousand Dollars (\$5,000.00) for every day of non-compliance.**

The receipt of any certificate does not constitute agreement by PRDOH that the insurance requirements in the Agreement have been fully met or that the insurance policies indicated on the certificate are in compliance with the requirements of the Agreement. The insurance policies shall provide for **thirty (30) days** written notice to be given to PRDOH in the event coverage is substantially changed, cancelled or non-renewed.

The CONTRACTOR shall require all subcontractors or consultants to carry the insurance required herein or the CONTRACTOR, may provide the coverage for any or all of its subcontractors and if so, the evidence of insurance submitted shall so stipulate and adhere to the same requirements and conditions as outlined above.

The CONTRACTOR expressly understands and agrees that whenever the CONTRACTOR is covered by other primary, excess, or excess contingent insurance that, any insurance or self-insurance program maintained by PRDOH shall apply in excess of and will not contribute with insurance provided by the CONTRACTOR under this Agreement.

#### **XVI. HOLD HARMLESS**

The CONTRACTOR and its affiliates, its successors and assignees will indemnify the PRDOH from any damages and/or losses arising out of any breach of this Agreement by the CONTRACTOR or against personal injuries or property damage resulting from any act of negligence or omission by the CONTRACTOR and its affiliates in connection with this Agreement.

#### **XVII. FORCE MAJEURE**

In the event of a fire, flood, earthquake, natural disaster, hurricane, riot, act of governmental authority in its sovereign capacity, pandemic officially declared by the Government of Puerto Rico, strike, labor dispute or unrest, embargo, war, insurrection or civil unrest, any *Force Majeure* including inclement weather, herein collectively referred to as *Force Majeure* during the term of this Agreement, neither the PRDOH nor the CONTRACTOR shall be liable to the other party for nonperformance during the conditions created by such event.

The CONTRACTOR shall notify, as soon as possible, the PRDOH of the occurrence of the *Force Majeure* event and describe in reasonable detail, the nature of the *Force Majeure* event.

#### **XVIII. CONFLICTS OF INTEREST**

The CONTRACTOR shall comply with the ethics requirements set forth herein and warrant that to the best of its knowledge and belief and except as otherwise disclosed, it does not have any organizational conflict of interest which is defined as a situation in which the nature of the work under a PRDOH contract and CONTRACTOR'S organizational, financial, contractual or other interest are such that:

- a) Award of the Agreement may result in an unfair competitive advantage; or
- b) The CONTRACTOR's objectivity in performing the contract work may be

impaired.

The CONTRACTOR agrees that if after award he or she discovers an organizational conflict of interest with respect to this Agreement, it shall make an immediate (within the next **seventy-two (72) hours**) and full disclosure in writing to the Contracting Officer, which shall include a description of the action, which the CONTRACTOR has taken or intends to take to eliminate or neutralize the conflict. The CONTRACTOR will disclose the details of any existing or future contract to provide services to third parties participating or for the purpose to participate in disaster recovery programs or projects in Puerto Rico. The PRDOH may, however, terminate the Agreement for the convenience of PRDOH if it would be in its best interest.

In the event the CONTRACTOR was aware of an organizational conflict of interest before the award of this Agreement and did not disclose the conflict to the Contracting Officer, the PRDOH may terminate the Agreement for default.

The provisions of this clause shall be included in all subcontracts and/or consulting agreements wherein the work to be performed is similar to the services provided by the CONTRACTOR. The CONTRACTOR shall include in such subcontracts and consulting agreements any necessary provision to eliminate or neutralize conflicts of interest.

#### **XIX. INDEPENDENT CONTRACTOR**

The relationship of the CONTRACTOR to PRDOH shall be that of an independent CONTRACTOR rendering professional services. Neither the CONTRACTOR nor any personnel of the CONTRACTOR shall have any authority to execute contracts or make commitments on behalf of PRDOH. Nothing contained herein shall be deemed to create the relationship of employer/employee, principal/agent, joint venture or partner between the CONTRACTOR and PRDOH. Further, the CONTRACTOR recognizes that in view of its status as an independent CONTRACTOR, neither it nor its employees or subcontractors will be entitled to participate in or receive any fringe benefits normally granted to PRDOH employees under such programs, including, but not limited to, worker's compensation, voluntary disability, travel accident insurance, medical/dental insurance, life insurance, long-term disability, holiday pay, sick pay, salary continuation pay, leaves of absence (paid or unpaid), pension plan and savings plan.

The CONTRACTOR shall have exclusive control over its employees and subcontractors (and the CONTRACTOR's employees and subcontractors are herein, collectively, referred to as the "CONTRACTOR Personnel"), its labor and employee relations and its policies relating to wages, hours, working conditions and other employment conditions. The CONTRACTOR has the exclusive right to hire, transfer, suspend, lay off, recall, promote, discipline, discharge and adjust grievances with its CONTRACTOR Personnel. The CONTRACTOR is solely responsible for all salaries and other compensation of its CONTRACTOR Personnel who provide Services.

The CONTRACTOR is solely responsible for making all deductions and withholdings from its employees' salaries and other compensation and paying all contributions, taxes and assessments, including union payments. The CONTRACTOR shall be responsible for and shall defend, indemnify and hold harmless PRDOH, and its agents, officers, directors, employees, representatives, CONTRACTOR's, successors and assigns against all costs, expenses and liabilities, including without limitation reasonably prudent attorneys' fees relative to the situation, in connection with the CONTRACTOR's employment and/or hiring of any CONTRACTOR Personnel providing any of the Services, including without

limitation: (i) payment when due of wages and benefits, (ii) withholding of all payroll taxes, including but not limited to, unemployment insurance, workers' compensation, FICA and FUTA, (iii) compliance with the Immigration Reform Control Act, and (iv) compliance with any other applicable laws relating to employment of any CONTRACTOR Personnel of, and/or hiring by, CONTRACTOR in connection with the Services.

## XX. NOTICES

All notices required or permitted to be given under the Agreement shall be in writing, and shall be deemed given when delivered by hand or sent by registered or certified mail, return receipt requested, to the address as follows:

To: PRDOH

William O. Rodríguez Rodríguez, Esq.  
Secretary  
Puerto Rico Department of Housing  
606 Barbosa Ave.  
Juan C. Cordero Dávila Bldg.  
San Juan, PR 00918

To: CONTRACTOR

Emilio R. Venegas  
Vice-President  
472 Ave. Tito Castro Ste. 201  
Ponce, PR 00716

## XXI. THIRD PARTIES

Nothing contained in this Agreement shall create a contractual relationship with, or a cause of action of a third party against either the PRDOH or the CONTRACTOR.

## XXII. SUBCONTRACTS

**A. General:** All subcontracts shall contain the applicable provisions described in **Attachment F** (HUD General Provisions), as well as applicable provisions set forth in 2 C.F.R. § 200.101. The PRDOH shall review subcontracts as part of the compliance, monitoring, and oversight process performed by PRDOH or upon request.

**B. Specific Requirements:** All subcontracts shall contain provisions specifying:

- i. That the work performed by the subcontractor be in accordance with the applicable terms of this Agreement between the PRDOH and CONTRACTOR;
- ii. That nothing contained in such subcontract agreement shall impair the rights of the PRDOH;
- iii. That nothing contained herein, or under this Agreement will create any contractual relation between the subcontractor and the PRDOH;
- iv. That the subcontractor specifically agrees to be bound by the confidentiality provision regarding Personal Identifiable Information set forth in this Agreement;
- v. That CONTRACTOR will be responsible for ensuring all subcontract work is performed consistent with federal and state regulations and/or policies to be eligible for reimbursement of the approved work; and

vi. All Federal flow down provisions are included in the subcontract agreement per Federal guidelines.

- C. Monitoring:** CONTRACTOR shall diligently monitor all subcontracted services. If CONTRACTOR discovers any areas of noncompliance, CONTRACTOR shall provide the PRDOH summarized written reports supported with documented evidence of corrective action.
- D. Content:** CONTRACTOR shall cause all the applicable provisions of this Agreement to be included in, and made a part of, any subcontract executed in the performance of this Agreement.
- E. Notification:** CONTRACTOR shall notify and provide a copy of any and all subcontracts related to this Agreement and CDBG-DR and CDBG-MIT funds to the Contract Administration Area of the PRDOH CDBG-DR Legal Division within **three (3) business days** of its execution.

### XXIII. CERTIFICATION OF COMPLIANCE WITH LEGAL REQUIREMENTS

Given that the Agreement involves funds for which HUD is the oversight agency, the CONTRACTOR agrees to carry out its obligations under this Agreement in compliance with all the requirements described in **Attachment F** (HUD General Provisions), **Attachment G** (Contractor Certification Requirement) and the following provisions:

- A. Compliance with Executive Order No. OE-2022-014:** The CONTRACTOR agrees to faithfully comply with the provisions of the Executive Order No. OE-2022-014 of February 20, 2022 (OE-2022-014), the Labor Project Agreement<sup>1</sup> signed by the PRDOH and the Contractor (**Attachment H**).

The CONTRACTOR will provide a minimum salary of fifteen dollars (\$15.00) per hour to skilled construction workers and eleven dollars (\$11.00) to un-skilled construction workers, for the work performed within the "Construction Project", as defined in the OE-2022-014.

The CONTRACTOR commits to acquire and use cement produced in Puerto Rico in compliance with Act No. 109 of July 12, 1985 for the completion of the "Construction Project". The CONTRACTOR acknowledges that this is an essential condition of this Agreement whose breach by itself, or by any subcontractor, will release PRDOH from disburse funds for any part or section of the "Construction Project" completed in non-compliance with OE-2022-014. In addition, the CONTRACTOR recognizes that non-compliance with this clause could lead to cancellation, without more, of this Agreement.

The CONTRACTOR shall include in any awarded contract to perform the work on behalf of the PRDOH, a clause in which obligate the subcontractor to comply with all provisions of OE-2022-014 (including the provisions concerning the acquisition of cement produced in Puerto Rico and the minimum compensation for workers who work within the "Construction Project"), the Labor Project Agreement signed between the PRDOH and the Contractor, as well as any other document issued pursuant to OE-2022-014.

<sup>1</sup> The OE 2022-014 implements a pilot program for the incorporation of the Labor Agreements. The Secretary of Labor has to issue a new Labor Agreement in compliance with OE-2022-014. Until such agreement has been issued, the Labor Agreement under Executive Order No. OE-2018-033 remains in effect.

Similarly, the clause to be included by the CONTRACTOR must provide for any subcontractor to include a similar compliance clause in any subcontract that provides for the release of its obligation before the CONTRACTOR.

**B. Compliance with Act No. 173.** The CONTRACTOR hereby certifies that in signing this Agreement it is in compliance with Act No. 173 of August 12, 1988, as amended, known as the "Board of Examiners of Engineers, Architects, Surveyors, and Landscape Architects of Puerto Rico Act", 20 L.P.R.A. §§ 711-711z to exercise the profession of engineering, architecture, surveying or landscaping architecture in Puerto Rico, is registered in the official Register of the Board, and is an active member of the College of Engineers and Surveyors of Puerto Rico or the College of Architects and Landscape Architects of Puerto Rico, as applicable.

**C. Compliance with Executive Order 24:** Pursuant to Executive Order 24 of June 18, 1991, the CONTRACTOR certifies and guarantees that at the signing of this Agreement it has filed all the necessary and required income tax returns to the Government of Puerto Rico for the last **five (5) years**. The CONTRACTOR further certifies that it has complied and is current with the payment of any and all income taxes that are, or were due, to the Government of Puerto Rico. The CONTRACTOR shall hand out, to the satisfaction of the PRDOH and whenever requested by the PRDOH during the term of this Agreement, the necessary documentation to support its compliance of this clause. The CONTRACTOR will be given a specific amount of time by the PRDOH to produce said documents. During the term of this Agreement, the CONTRACTOR agrees to pay and/or to remain current with any repayment plan agreed to by the CONTRACTOR with the Government of Puerto Rico.

**D. Compliance with Executive Order 52:** Pursuant to Executive Order 52 of August 28, 1992, amending EO-1991-24, the CONTRACTOR certifies and warrants that it has made all payments required for unemployment benefits, workmen's compensation and social security for chauffeurs, whichever is applicable, or that in lieu thereof, has subscribed a payment plan in connection with any such unpaid items and is in full compliance with the terms thereof. The CONTRACTOR accepts and acknowledges its responsibility for requiring and obtaining a similar warranty and certification from each and every CONTRACTOR and subcontractor whose service the CONTRACTOR has secured in connection with the services to be rendered under this Agreement and shall forward evidence to PRDOH as to its compliance with this requirement.

**E. Social Security and Income Tax Retentions:** The CONTRACTOR will be responsible for rendering and paying the Federal Social Security and Income Tax Contributions for any amount owed as a result of the income from this Agreement.

**F. Government of Puerto Rico Municipal Tax Collection Center (CRIM, for its Spanish acronym):** The CONTRACTOR certifies and guarantees that at the signing of this Agreement it has no current debt with regards to property taxes that may be registered with the Government of Puerto Rico's Municipal Tax Collection Center. The CONTRACTOR further certifies to be current with the payment of any and all property taxes that are or were due to the Government of Puerto Rico. The CONTRACTOR shall hand out, to the satisfaction of the PRDOH and whenever requested by the PRDOH during the term of this Agreement, the necessary documentation to support its compliance of this clause. The CONTRACTOR will deliver upon request any documentation requested under this clause as per request of PRDOH. During the Term of this Agreement, the CONTRACTOR agrees to pay and/or to remain current with

any repayment plan agreed to by the CONTRACTOR with the Government of Puerto Rico with regards to its property taxes.

- G. Income Tax Withholding:** The PRDOH shall retain the corresponding amount from all payments made to the CONTRACTOR, as required by the Puerto Rico Internal Revenue Code. The PRDOH will advance such withholdings to the Government of Puerto Rico's Treasury Department (known in Spanish as *Departamento de Hacienda del Gobierno de Puerto Rico*). The PRDOH will adjust such withholdings provided the CONTRACTOR produces satisfactory evidence of partial or total exemption from withholding.
- H. Compliance with Act No. 45 of April 18, 1935, as amended, 11 L.P.R.A. § 1, et seq.:** The CONTRACTOR certifies and guarantees that at the signing of this Agreement has valid insurance issued by the State Insurance Fund Corporation (CFSE, for its Spanish Acronym), as established by Act No. 45, *supra*, known as the "Puerto Rico Workers' Accident Compensation Act".
- I. Government of Puerto Rico's Agency for the Collection of Child Support (ASUME, for its Spanish acronym):** The CONTRACTOR certifies and guarantees that at the signing of this Agreement that the CONTRACTOR nor any of its Partners, if applicable, have any debt or outstanding debt collection legal procedures with regards to child support payments that may be registered with the Government of Puerto Rico's Child Support Administration. The CONTRACTOR hereby certifies that it is a limited liability company organized and existing in good standing under the laws of the Government of Puerto Rico. The CONTRACTOR shall present, to the satisfaction of PRDOH, the necessary documentation to substantiate the same. The CONTRACTOR will be given a specific amount of time by PRDOH to deliver said documents.
- J. Compliance with Act No. 168-2000, as amended, 8 L.P.R.A. § 711, et seq.:** The CONTRACTOR is in full compliance with Act No. 168-2000, as amended, known as "Act for the Improvement of Elderly Support of Puerto Rico."
- K. Compliance with Act No. 1-2012, as amended, 3 L.P.R.A. § 1854, et seq.:** The PRDOH and the CONTRACTOR hereby certify that in signing this Agreement they are in compliance with Act No. 1-2012, as amended, known as "Puerto Rico Government Ethics Act of 2011", in connection with the possibility of a conflict of interest.
- L. Clause of Governmental Ethics Certification of Absence of Conflict of Interests -** The CONTRACTOR certifies that: (1) No public servant of this executive agency has a pecuniary interest in this contract, purchase or commercial transaction. (2) No public servant of this executive agency has requested me or accepted from me, directly or indirectly, for him (her), for any member of his family unit or for any person, gifts, bonuses, favors, services, donations, loans or anything else of monetary value. (3) No public servant (s) requested or accepted any good of economic value, linked to this transaction, from any person of my entity as payment for performing the duties and responsibilities of their employment. (4) No public servant has requested from me, directly or indirectly, for him (her), for any member of her family unit, or for any other person, business or entity, some of economic value, including gifts, loans, promises, favors or services in exchange for the performance of said public servant is influenced in my favor or of my entity. (5) I have no kinship relationship, within the fourth degree of consanguinity and second by affinity, with any public servant who has the power to influence and participate in the institutional decisions of this executive agency.

**M. Ethics.** CONTRACTOR also acknowledges receipt and agrees to obey with the Anticorruption Code for the New Puerto Rico known in Spanish as "Código Anticorrupción para el Nuevo Puerto Rico".

**N. Non-Conviction.** The CONTRACTOR certifies that it has not been convicted nor accused of a felony or misdemeanor against the government, public faith and function, or that involves public property or funds, either federal or local in origin. Furthermore, CONTRACTOR also certifies that:

1. It has not been convicted, nor has pleaded guilty at a state or federal bar, in any jurisdiction of the United States of America, of crimes consisting of fraud, embezzlement or misappropriation of public funds, as stated in Act Number 2 of January 2, 2018, as amended, known as the Anti-Corruption Code for the New Puerto Rico, which prohibits the award of Offers or government contracts to those convicted of fraud, misappropriation of public fund.
2. It understands and accepts that any guilty plea or conviction for any of the crimes specified in Article 3 of said Act, will also result in the immediate cancellation of any contracts in force at the time of conviction, between the undersigned and whichever Government Agencies, Instrumentalities, Public Corporations, Municipalities and the Legislative or Judicial Branches.
3. It declares under oath the above mentioned in conformity with what is established as in Act Number 2 of January 2, 2018, as amended, known as the Anti-Corruption Code for the New Puerto Rico, which prohibits awarding Offers for government contracts, to those convicted of fraud, embezzlement or misappropriation of public funds.
4. The CONTRACTOR represents and guarantees that none of its employees, officials or agents have been convicted of a felony or misdemeanor as described in this sub-section. Moreover, the CONTRACTOR agrees to notify PRDOH should any employee, official, or agent is convicted of a felony or misdemeanor as described in this sub-section after the date of this Agreement. Said notice shall be made within **ten (10) business days** from the time of the conviction.

**O. Other payments or compensation:** The CONTRACTOR certifies that it does not receive payment or compensation for regular services rendered as an official or public employee to another government entity, agency, public corporation or municipality, and knows the ethical standards of his profession and assumes responsibility for his actions.

**P. Consequences of Non-Compliance:** The CONTRACTOR expressly agrees that the conditions outlined throughout this Section are essential requirements of this Agreement; thus, should any one of these representations, warrants, and certifications be incorrect, inaccurate or misleading, in whole or in part, there shall be sufficient cause for PRDOH to render this Agreement null and void and the CONTRACTOR reimburse to PRDOH all moneys received under this Agreement.

**Q. Non-Conflict of Interest Certification:** The CONTRACTOR shall comply with **Attachment K** (Non-Conflict of Interest Certification), attached herein and made an integral part of this Agreement, which outlines several situations that may reasonably be considered as conflicts of interest. The aforementioned certification aids PRDOH, in its role as grantee, to identify, evaluate, disclose and manage apparent potential, or

actual conflicts of interest related to CDBG-DR and CDBG-MIT funded projects, activities, and/or operations.

- R. Compliance with the documentation requirements for contracting with professional services with the Government of Puerto Rico (Act No. 237-2004):** The CONTRACTOR shall submit the required documentation applicable for professional services contracts with the Government of Puerto Rico. PRDOH will execute this Agreement conditioned to the submission of the aforementioned documentation within **thirty (30) days** of the signing of this Agreement. Failure to comply with the submission of the documentation may result in the withholding of reimbursements or the termination of the Agreement.

**XXIV. ACT NO. 18 OF OCTOBER 30, 1975, as amended, 2 L.P.R.A. secs. 97-98**

The parties to this Agreement agree that its effective date will be subject to the due registration and remittance to the Office of the Comptroller of Puerto Rico. No rendering or consideration subject matter of this Agreement will be required before its registration at the Office of the Comptroller of Puerto Rico pursuant to Act No. 18 of October 30, 1975, as amended. The CONTRACTOR will be responsible for ensuring that this Agreement has been registered before the rendering of services by requesting a copy of the registered Agreement with its proper number and date of registry. No services under this Agreement will continue to be delivered after its effective date unless at the expiration date, an amendment signed by both parties and duly registered exists. No services performed in violation of this provision will be paid. The party violating this clause will be doing so without any legal authority, this action will be deemed as *ultra vires*.

**XXV. MEMORANDUM NO. 2021-003; CIRCULAR LETTER 001-2021 OF THE OFFICE OF THE CHIEF OF STAFF OF THE GOVERNOR (SECRETARÍA DE LA GOBERNACIÓN) & THE OFFICE OF MANAGEMENT AND BUDGET (OFICINA DE GERENCIA Y PRESUPUESTO)**

- A. Interagency Services Clause:** Both contracting parties acknowledge and agree that services retained may be provided to any entity of the Executive Branch with which the contracting entity makes an interagency agreement or by direct provision of the Office of the Chief of Staff of the Governor (*Secretaría de la Gobernación*). These services will be performed under the same terms and conditions in terms of hours of work and compensation set forth in this Agreement. For purposes of this clause, the term "Executive Branch entity" includes all agencies of the Government of Puerto Rico, as well as public instrumentalities and corporations and the Office of the Governor.
- B. Termination Clause:** The Chief of Staff (*Secretario de la Gobernación*) of the Governor shall have the power to terminate this Agreement at any time.
- C. Contract Review Policy of the Financial Supervision and Administration Board for Puerto Rico:** The parties acknowledge that the contractor has submitted the certification entitled "Contractor Certification Requirement" required in accordance with the Contract Review Policy of the Financial Oversight and Management Board (FOMB) for Puerto Rico, effective as of November 6, 2017 as amended on October 30, 2020, signed by the Contractor's Executive Director (or another official with an equivalent position or authority to issue such certifications). A signed copy of the "Contractor's Certification Requirement" is included as **Attachment G** to this contract.

**XXVI. MEMORANDUM NO. 2021-029; CIRCULAR LETTER NO. 013-2021 OF THE OFFICE OF THE CHIEF OF STAFF OF THE GOVERNOR (SECRETARÍA DE LA GOBERNACIÓN) & THE OFFICE OF MANAGEMENT AND BUDGET (OFICINA DE GERENCIA Y PRESUPUESTO):**

- A.** The PRDOH certifies that the CONTRACTOR was selected as the provider of the services described in this agreement, pursuant to OE 2021-029.
- B.** The Parties certify that they acknowledge the provisions stated in OE 2021-029 and CC 013-2021. Any failure to comply with the requirements set forth in OE 2021-029 and CC 013-2021 will result in the termination of this agreement.
- C.** The CONTRACTOR certifies that it has informed PRDOH of any current contractual relationship with any government entities of the Government of Puerto Rico. The CONTRACTOR certifies that said entities are all the entities of the Government of Puerto Rico with which they maintain a contractual relationship. In addition, the CONTRACTOR recognizes and accepts that omitting any information regarding any current contractual relationship with any governmental entity could result in the termination of this agreement if so required by PRDOH.
- D.** The CONTRACTOR certifies that it has informed the PRDOH whether or not the entity is a public corporation whose shares are exchanged in a stock exchange properly regulated. In the event that the CONTRACTOR certifies that it is not a public corporation that exchanges shares in a stock change, the CONTRACTOR certifies it has completed the applicable certification as stated in CC-013-2021.

**XXVII. FINANCIAL OVERSIGHT AND MANAGEMENT BOARD FOR PUERTO RICO (FOMB) POLICY: REVIEW OF CONTRACTS, AS MODIFIED ON APRIL 30, 2021, REGARDING PROFESSIONAL SERVICES**

The FOMB Policy requires that all agreements that contemplate recurring professional services that may be performed by appropriately trained government staff include a provision of compliance with the adequate transfer of skills and technical knowledge to the pertinent public sector personnel. This requirement shall not apply to contracts which contemplate non-recurring professional services or specialized professional services that may not be performed by existing staff at the applicable governmental entity, including as a result of independence requirements.

Accordingly, given that the agreements under CDBG-DR are non-recurring professional services or specialized professional services, the PRDOH certifies that the transfer of skills and technical knowledge required by the Certified Fiscal Plan is inapplicable given the non-recurring or specialized nature of the contracted services.

As mentioned before, HUD allocated funds for disaster recovery assistance to the Government of Puerto Rico under the CDBG-DR Program. These funds are intended to provide financial assistance to address unmet needs that arise and that are not covered by other sources of financial aid. In addition, with these allocations of funding under the Grant Agreement, the PRDOH will conduct a comprehensive recovery to benefit the residents of Puerto Rico.

**XXVIII. COMPLIANCE WITH THE FINANCIAL OVERSIGHT AND MANAGEMENT BOARD FOR PUERTO RICO (FOMB) POLICY, REVIEW OF CONTRACTS**

As part of the PRDOH contract process, and pursuant to Section 204(b)(2) of the "Puerto Rico Oversight, Management, and Economic Stability Act," 48 U.S.C. §2101, et seq., also

known as "PROMESA", the Financial Oversight and Management Board for Puerto Rico (FOMB) require approval of certain contracts and amendments to assure that they "promote market competition" and "are not inconsistent with the approved fiscal plan." For the approval process, the FOMB requests, among other information, the Contractor Certification Requirement for its evaluation.

In compliance with the above, the CONTRACTOR represents and warrants that the information included in the Contractor Certification Requirement is complete, accurate and correct, and that any misrepresentation, inaccuracy or falseness in such Certification will render the contract null and void and CONTRACTOR will have the obligation to reimburse immediately to the Commonwealth any amounts, payments or benefits received from the Commonwealth under the proposed Amendment and original Agreement.

#### **XXIX. COMPLIANCE WITH FEDERAL LAW, REGULATIONS, & EXECUTIVE ORDERS**

The CONTRACTOR acknowledges that HUD financial assistance will be used to fund the Agreement only. Also, the CONTRACTOR shall comply with all applicable Federal, state and local laws, rules, regulations, and policies relating to CDBG-DR and CDBG Program services. This includes without limitation, applicable Federal Registers; 2 C.F.R. part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards; Housing and Community Development Act of 1974; 24 C.F.R. part 570 Community Development Block Grant; applicable waivers; Fair Housing Act, 24 C.F.R. Part 35, 24 C.F.R. Part 58, 24 C.F.R. Part 135; National Historic Preservation Act, and any other applicable state laws or regulations, including the requirements related to nondiscrimination, labor standards, and the environment; and Action Plan amendments and HUD's guidance on the funds. Also, CONTRACTOR shall comply, without limitation, those set forth in **Attachment F** and in compliance with all the requirements described in **Attachment G**.

#### **XXX. FEDERAL LAWS AND REGULATIONS APPLICABLE TO CONSTRUCTION CONTRACTS**

##### **A. COPELAND "ANTI-KICKBACK" ACT**

Salaries of personnel performing work under this Agreement shall be paid unconditionally and not less often than once a month without payroll deduction or rebate on any account except only such payroll deductions as are mandatory by law or permitted by the applicable regulations issued by the Secretary of Labor pursuant to the Copeland "Anti-Kickback Act" of June 13, 1934 (48 Stat. 948; 62 Stat. 740; 63 Stat. 108; Title 18 U.S.C. § 874; and Title 40 U.S.C. § 276c).

The CONTRACTOR, as well as any subcontractors, shall provide a weekly statement with respect to the wages paid to each of its employees engaged on work covered by the Copeland "Anti-Kickback Act" during the preceding weekly payroll period.<sup>2</sup> The CONTRACTOR, as well as any subcontractors, shall deliver each weekly statement within seven days after the regular payment date of the payroll period, to the PRDOH. After such examination and check as may be made, such statement, or a copy thereof, shall be kept available, or shall be transmitted together with a report of any violation, in accordance with applicable procedures prescribed by the U.S. Department of Labor. The CONTRACTOR shall preserve his weekly payroll records for a period of 6 years from

<sup>2</sup> This statement shall be executed by the contractor or by an authorized officer or employee of the contractor who supervises the payment of wages, and shall be on the back of Form WH 347, "Payroll (For Contractors Optional Use)" or on any form with identical wording. Copies of WH 347 may be obtained from the Government contracting or sponsoring agency or from the Wage and Hour Division Web site at <http://www.dol.gov/whd/forms/index.htm> or its successor site.

date of completion of this Agreement and also the Subrecipients must comply with the record retention requirements, as established in the policy on document handling, administration and accessibility, in accordance with the RKMA policy, and ensure that all documentations is always available for any internal or external tracing visit. Such payroll records shall be made available at all times for inspection by the contracting officer or his authorized representative, and by authorized representatives of the Department of Labor.

The CONTRACTOR, as well as any subcontractors, shall comply with all applicable "Anti-Kickback" regulations and shall insert HUD form 4010 and any additional provisions in all subcontracts covering work under this Agreement to ensure compliance by subcontractors with such regulations as applicable, and shall be responsible for the submission of affidavits and Statements of Compliance required of subcontractors thereunder except as the Secretary of Labor may specifically provide for variations of or exemptions from the requirements thereof.<sup>3</sup>

## **B. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT**

The CONTRACTOR, as well as any subcontractors, shall comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (CWHSSA) (40 U.S.C. §§ 33701-3708) as supplemented by Department of Labor regulations (29 C.F.R. Part 5). Where applicable, all contracts awarded by the non-Federal entity in excess of \$100,000 that involve the employment of mechanics or labors. The provisions of CWHSSA apply to all labors and mechanic, including watchmen and guards. 40 U.S.C. Section 3701(b)(2).

The CONTRACTOR, as well as any subcontractors, agrees to compute the wages of every mechanic and laborer on the basis of a standard work week of forty (40) hours in accordance with and subject to the provisions of the CWHSSA. Any work in excess of the standard work week is permissible provided that the worker is compensated at a rate of no less that on and a half times the basic rate of pay for all hours worked in excess of forty (40) hours in the work week. The CONTRACTOR will not require any laborer or mechanic employed in the performance of this Agreement to work in surroundings or under working conditions that are unsanitary, hazardous, or dangerous to health or safety, as established under construction safety and health standards.

The CONTRACTOR, as well as any subcontractors, shall insert appropriate provisions of the CWHSSA in all subcontracts covering work under this Agreement to ensure compliance by subcontractors with such regulations, and shall be responsible for the submission of affidavits required of subcontractors thereunder except as the Secretary of Labor may specifically provide for variations of or exemptions from the requirements thereof.

The CONTRACTOR, as well as any subcontractors, shall comply with all regulations issued pursuant to that act and with other applicable Federal laws and regulations pertaining to labor standards.<sup>4</sup>

## **C. DAVIS-BACON ACT**

The CONTRACTOR, as well as any subcontractors, shall comply with the Davis Bacon Act (40 U.S.C. §§ 3141-3148) as supplemented by the Department of Labor regulations (29 C.F.R. Part 5).

All laborers and mechanics employed by the CONTRACTOR, as well as any subcontractors, including employees of other governments, on construction, work assisted under this Agreement, and subject to the provisions of the federal acts and regulations listed in this paragraph, shall be paid wages at rates not less than those prevailing on similar construction in the locality as determined by the Secretary of Labor

<sup>3</sup> <https://www.dol.gov/agencies/whd/government-contracts/copeland-anti-kickback>

<sup>4</sup> <https://www.dol.gov/agencies/whd/government-contracts/cwhssa>

in accordance with the Davis-Bacon Act. The advertised specifications for every contract in excess of \$2,000, for construction, alteration, or repair, including painting and decorating, of public buildings and public works. 40 U.S.C. Sec. 3142.<sup>5</sup>

The CONTRACTOR, as well as any subcontractors, shall pay all mechanics and laborers employed directly on the site of the work, unconditionally and at least once a week, and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the advertised specifications, regardless of any contractual relationship which may be alleged to exist between the contractor or subcontractor and the laborers and mechanics. The CONTRACTOR will post the scale of wages to be paid in a prominent and easily accessible place at the site of the work.

There may be withheld from the CONTRACTOR so much of accrued payments as the contracting officer considers necessary to pay to laborers and mechanics employed by the contractor or any subcontractor on the work the difference between the rates of wages required by the contract to be paid laborers and mechanics on the work and the rates of wages received by the laborers and mechanics and not refunded to the contractor or subcontractors or their agents.

On a semi-annual basis, the CONTRACTOR shall submit Form HUD 4710 (Semi-Annual labor Standards Enforcement Report) to PRDOH. All covered subcontracts must include Davis-Bacon and other labor standards clauses and the applicable federal wage determinations as well as the local prevailing wage established in this contract. The Federal Labor Standards Provisions on Form HUD 4010 covers the Davis-Bacon and related acts expected in all subcontracts covering work under this Agreement to ensure compliance by subcontractors with such regulations, and shall be responsible for the submission of affidavits required of subcontractors thereunder except as the Secretary of Labor may specifically provide for variations of or exemptions from the requirements thereof.

The HUD Form 4010 and a Spanish translation of the original form is included as **Attachment I** to this contract. The attachment ensures contractors, with a predominant fluency in Spanish, are able to immediately reference labor requirements to ensure full compliance for Davis-Bacon and related Acts.

In addition, the applicable wage determination is included as **Attachment J** to this contract. The attachment guarantees that the contractors are informed of the prevailing wages to ensure compliance with federal and state regulations.

#### **D. FAIR LABOR STANDARDS ACT OF 1938, AS AMENDED**

The CONTRACTOR, as well as any subcontractors, shall comply with the provisions of the Fair Labor Standards Act (29 U.S.C. §§ 201-219), which governs such matters as Federal minimum wage rates and overtime, as supplemented by the Department of Labor regulations (29 C.F.R. Parts 500-899).

The CONTRACTOR agrees to comply and implement the applicable regulations of the U.S. Department of Labor at 29 C.F.R. Parts 500-899.<sup>6</sup>

#### **XXXI. CDBG-DR POLICIES AND PROCEDURES**

In addition to what is established in this Agreement, the CONTRACTOR shall comply with all CDBG-DR and CDBG-MIT program specific and general policies and procedures, including, but not limited to, the Contract and Subrecipient Agreement Manual, OS&H

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<sup>5</sup> Section 110 of the Act, determines the DBRA applicability to CDBG-DR. The Act further provides that Section 5310 (Section 110 of the Act) apply to the rehabilitation of residential property only if such property contains not less than eight (8) units. (8 units or more)

<sup>6</sup> <https://www.dol.gov/agencies/whd/flsa>

Guideline, MWBE Policy, Procurement Manual for the CDBG-DR Program , URA & ADP Guidelines, Cross Cutting Guidelines, AFWAM Policy, Section 3 Policy, Personally Identifiable Information, Confidentiality, and Nondisclosure Policy and Conflict of Interest and Standards of Conduct Policy, as found in the CDBG-DR Website ([www.cdbg-dr.pr.gov](http://www.cdbg-dr.pr.gov)), which are herein included and made integral part of this Agreement, as they may be updated from time to time, and reporting requirements as established by the PRDOH.

**XXXII. SECTION 3 CLAUSE**

**A.** The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

**B.** The parties to this contract agree to comply with HUD's regulations in 24 C.F.R. part 75, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediments that would prevent them from complying with the part 75 regulations.

**C.** The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

**D.** The contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 C.F.R. part 75 and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 C.F.R. part 75. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 C.F.R. part 75.

**E.** The contractor acknowledges that subrecipients, contractors, and subcontractors are required to meet the employment, training, and contraction requirements of 24 CFR 75.19, regardless of whether Section 3 language is included in recipient or subrecipient agreements, program regulatory agreements, or contracts.

**F.** The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 C.F.R. part 75 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 C.F.R. part 75.

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**G.** Noncompliance with HUD's regulations in 24 C.F.R. part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD-assisted contracts.

**H.** With respect to work performed in connection with Section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (46 U.S.C. § 5307) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of Section 3 and section 7(b) agree to comply with Section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

**I.** The Contractor agrees to submit, and shall require its subcontractors to submit to them, quarterly reports to the PRDOH detailing the total number of labor hours worked on the Section 3 Project, the total number of labor hours worked by Section 3 Workers, and the total number of hours worked by Targeted Section 3 Workers, and any affirmative efforts made during the quarter to direct hiring efforts to low- and very low-income persons, particularly persons who are Section 3 Workers and Targeted Section 3 Workers.

**XXXIII. BYRD ANTI-LOBBYING AMENDMENT, 31 U.S.C. § 1352**

The CONTRACTOR certifies, to the best of his or her knowledge, that:

- A.** -No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- B.** --If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Forms-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- C.** -The CONTRACTOR shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all sub recipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). The CONTRACTOR acknowledges that any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for

each such failure. The CONTRACTOR certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the CONTRACTOR understands and agrees that the provisions of 31 U.S.C. §3801 *et seq.*, apply to this certification and disclosure, if any.

#### XXXIV. EQUAL OPPORTUNITY

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- A. --The CONTRACTOR will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity or national origin. The CONTRACTOR will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The CONTRACTOR agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- B. --The CONTRACTOR will, in all solicitations or advertisements for employees placed by or on behalf of the CONTRACTOR, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
- C. --When applicable, the CONTRACTOR will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the CONTRACTOR's commitments under this Section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- D. --The CONTRACTOR will comply with all provisions of Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, and as supplemented by the rules, regulations, and relevant orders of the United States Secretary of Labor.
- E. --The CONTRACTOR will furnish all information and reports required by Executive Order 11246 of September 24, 1965, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- F. --In the event of the CONTRACTOR's noncompliance with the nondiscrimination clauses of this Agreement or with any of the said rules, regulations, or orders, this Agreement may be canceled, terminated, or suspended in whole or in part and the CONTRACTOR may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, as amended, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, as amended, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

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G.-The CONTRACTOR will include the portion of the sentence immediately preceding paragraph (A) and the provisions of paragraphs (A) through (F) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each subcontractor or vendor. The CONTRACTOR will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance. Provided, however, that in the event a CONTRACTOR becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the CONTRACTOR may request the United States to enter into such litigation to protect the interests of the United States.

### XXXV. SOLID WASTE DISPOSAL ACT

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- 1) In the performance of this contract, the CONTRACTOR shall make maximum use of products containing recovered materials that are Environmental Protection Agency (EPA)- designated items unless the product cannot be acquired:
    - a. Competitively within a timeframe providing for compliance with the contract performance schedule;
    - b. Meeting contract performance requirements; or
    - c. At a reasonable price.
  - 2) Information about this requirement, along with the list of EPA- designated items, is available at EPA's Comprehensive Procurement Guidelines web site, <https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program>.
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  - 3) Contractor must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include:
    - a. procuring only items designated in guidelines of the EPA at 40 C.F.R. part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds ten thousand dollars (\$10,000) or the value of the quantity acquired during the preceding fiscal year exceeded ten thousand dollars (\$10,000);
    - b. procuring solid waste management services in a manner that maximizes energy and resource recovery; and
    - c. establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

### XXXVI. DRUG FREE WORKPLACE

The CONTRACTOR should establish procedures and policies to promote a Drug-Free workplace. Further, the CONTRACTOR should notify all employees of its policy for maintaining a Drug-Free workplace, and the penalties that may be imposed for drug abuse violations occurring in the workplace. Further, the CONTRACTOR shall notify the PRDOH if any of its employees is convicted of a criminal drug offense in the workplace no later than **ten (10) days** after such conviction.

### **XXXVII.SUSPENSION AND DEBARMENT**

- A. -This Agreement is a covered transaction for purposes of 2 C.F.R. part 180 and 2 C.F.R. part 2424. As such, the CONTRACTOR is required to verify that none of the CONTRACTOR, its principals (defined at 2 C.F.R. § 180.995), or its affiliates (defined at 2 C.F.R. §180.905) are excluded (defined at 2 C.F.R. §180.940) or disqualified (defined at 2 C.F.R. §180.935).
- B.--The CONTRACTOR must comply with 2 C.F.R. part 180, subpart C and 2 C.F.R. part 2424, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.
- C. -This certification is a material representation of fact relied upon by PRDOH. If it is later determined that the CONTRACTOR did not comply with 2 C.F.R. part 180, subpart C and 2 C.F.R. part 2424, in addition to remedies available to PRDOH, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.
- D. -The CONTRACTOR agrees to comply with the requirements of 2 C.F.R. part 180, subpart C and 2 C.F.R. part 2424, while this Agreement is valid. The CONTRACTOR further agrees to include a provision requiring such compliance in its lower tier covered transactions.

### **XXXVIII. SYSTEM FOR AWARD MANAGEMENT (SAM) REGISTRATION**

The CONTRACTOR certifies that it is cleared and eligible for award of a contract and is not suspended, debarred, or on a HUD-imposed limited denial of participation. Subsequently, the CONTRACTOR must be registered in the System for Award Management (**SAM**) and shall maintain its registration active during contract performance and through final payment. The CONTRACTOR is responsible during performance and through final payment for the accuracy and completeness of the data within SAM. Failure to maintain registration in SAM may impact obligations and payments under this Agreement.

### **XXXIX. NO OBLIGATION BY THE FEDERAL GOVERNMENT**

The Federal Government is not a party to this Agreement and is not subject to any obligations or liabilities to the non-Federal entity, CONTRACTOR, or any other party pertaining to any matter resulting from the Agreement.

### **XL. PROGRAM FRAUD & FALSE OR FRAUDULENT STATEMENTS OR RELATED ACTS**

The CONTRACTOR acknowledges that 31 U.S.C. Chapter 38 (Administrative Remedies for False Claims and Statements) applies to the CONTRACTOR's actions pertaining to this Agreement.

### **XLI. BANKRUPTCY**

In the event that CONTRACTOR files for bankruptcy protection, the Government of Puerto Rico and PRDOH may deem this Agreement null and void, and terminate this Agreement without notice.

**XLII. ENTIRE AGREEMENT**

This Agreement and all its attachments represent the entire and integrated agreement between PRDOH and the CONTRACTOR and supersede all prior negotiations, representations, agreements and/or understandings of any kind. This Agreement may be amended only by written document signed by both PRDOH and the CONTRACTOR.

**XLIII. MODIFICATION OF AGREEMENT**

Any modification of this Agreement or additional obligation assumed by either party in connection with this Agreement shall be binding only if written and signed by both parties, and its authorized representatives. Those amendments shall make specific reference to this Agreement, comply with programmatic policies, procedures, and guidelines. Such amendments shall not invalidate this Agreement, nor relieve or release the Parties from their obligations under this Agreement.

However, PRDOH reserves the right to notify in writing to CONTRACTOR any applicable policies, procedures, regulations, requirements, guidelines, or change in law, whether existing or to be established, as well as changes and/or amendments thereof, and the notified policies, procedures, regulations, requirements, guidelines and laws shall be deemed incorporated by reference to this Agreement without the need of executing a separate written and signed amendment.

**XLIV. BINDING EFFECT**

This Agreement shall be binding upon and shall inure to the benefit of PRDOH and the CONTRACTOR, their successors and assigns.

The CONTRACTOR shall not assign this Agreement, in whole or in part, without the prior written consent of PRDOH, and any attempted assignment not in accordance herewith shall be null and void and of no force or effect.

**XLV. ASSIGNMENT OF RIGHTS**

The rights of each party hereunder are personal to that party and may not be assigned or otherwise transferred to any other person, contractor, corporation, or other entity without the prior, express, and written consent of the other party.

**XLVI. NON-WAIVER**

The failure or delay of either party to insist upon the performance of and/or the compliance with any of the terms and conditions of this Agreement shall not be construed as a waiver of such terms and conditions or the right to enforce compliance with such terms and conditions.

**XLVII. ORDER OF PRECEDENCE**

In the event of an inconsistency in this Agreement or if a conflict occurs between this Agreement and any Attachment, Appendix, Exhibit, or Schedule, unless otherwise specifically stated in those documents, the order of precedence shall be: Federal laws,

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regulations, and policies applicable to this Agreement, this Contract and the HUD General Provisions (Attachment F), the Scope of Work (Attachment B), the Cost Form (Attachment C), and lastly, the CONTRACTOR's proposal (Attachment A).

#### **XLVIII. GOVERNING LAW JURISDICTION**

This Agreement shall be governed by, interpreted, and enforced in accordance with the laws of the Government of Puerto Rico and any applicable federal laws and regulations. The parties further agree to assert any claims or causes of action that may arise out of this Agreement in the Puerto Rico Court of First Instance, Superior Court of San Juan, Puerto Rico.

#### **XLIX. CONSOLIDATIONS, MERGERS, CHANGE OF NAME, OR DISSOLUTIONS**

##### A. Consolidation or Merger

In the event that the signing party (e.g. Subrecipient, Contractor, or Subcontractor) of the Agreement with the PRDOH moves for a consolidation or merger with another entity (private or public), by its discretion or otherwise, written notice of such decision or event shall be delivered to the PRDOH **at least fifteen (15) business days prior to the effective date** of the consolidation or merger. The notice shall include, but not limited to, a description of: the expected effective date of the consolidation or merger; name of each of the constituent entities moving to consolidate or merge into the single resulting or surviving entity; the proposed name of the resulting entity (in case of a consolidation) or the name of the surviving entity (in case of a merger) if necessary; reference to the projected capacity of the resulting or surviving entity to comply with the terms, conditions, obligations, tasks, services, and performance goals or requirements included in the Agreement as well as its Exhibits or Attachments; and a brief summary of the proposed plan to achieve the transition of duties (Scope of Work), tasks, and performance goals or requirements to the resulting or surviving entity.

Upon the consolidation or the merger becoming effective, and supporting evidence of such event is notified to PRDOH, execution of an Amendment to the Agreement may follow. The Amendment would include, but not limited to, modifications to the clauses that refer to the identity, personal circumstances, address, and any other information related to the signing party deemed relevant by PRDOH for the execution of the Amendment. **No amendment to the Agreement will be necessary if the Subrecipient, Contractor, or Subcontractor becomes the surviving entity following a merger.**

Failure to comply with any of the before mentioned conditions, may result in the activation of the termination clauses provided in the Agreement.

##### B. Change of Name

In the event that the signing party (e.g. Subrecipient, Contractor, or Subcontractor) of the Agreement with the PRDOH initiates a change of name process, written notice of such decision or event shall be delivered to the PRDOH **at least fifteen (15) business days** prior to the effective date of such event. The notice shall include, but not limited to, a description of: the expected effective date of the change of name; the proposed name; inform of any change of address; and reference of any change in the capacity of the entity to comply with the terms, conditions, obligations, tasks, services, and performance goals or requirements included in the Agreement, as well as its Exhibits or Attachments.

Upon the change of name becoming effective, and supporting evidence of such event is notified to PRDOH, execution of an Amendment to the Agreement may follow. The Amendment would include, but not limited to, modifications to the clauses that refer to the identity, personal circumstances, address, and any other information related to the signing party deemed relevant by PRDOH for the execution of the Amendment.

Failure to comply with any of the before mentioned conditions, may result in the activation of the termination clauses provided in the Agreement.

C. Dissolution

In the event that the signing party (e.g. Subrecipient, Contractor, or Subcontractor) of the Agreement with the PRDOH moves for dissolution of the entity, written notice of such decision or event shall be delivered to the PRDOH **at least fifteen (15) business days** prior to the effective date of such event. The notice shall include, but not limited to, a description of the expected effective date of the dissolution; and contact information of one or more of its directors, officials or agents. Upon dissolution, becoming effective, and supporting evidence of such event is notified to PRDOH, termination of the Agreement will follow. Consequently, the signing party acknowledges and agrees to provide to the PRDOH, after termination of the Agreement, the assistance reasonably requested to facilitate the orderly transfer of responsibility for performance of the tasks or services to the PRDOH or a third party designated by the PRDOH. Moreover, all finished or unfinished records (files, data, work product) connected with this Agreement will be turned over to PRDOH following the Agreement termination.

L. **HEADINGS**

The titles to the paragraphs of this Agreement are solely for reference purposes and the convenience of the parties and shall not be used to explain, modify, simplify, or aid in the interpretation of the provisions of this Agreement.

LI. **FEDERAL FUNDING**

The fulfillment of this Agreement is based on those funds being made available to the PRDOH as the lead administrative agency for Recovery. All expenditures under this Agreement must be made in accordance with this Agreement, the policies and procedures promulgated under the CDBG-DR and CDBG-MIT Program, and any other applicable laws. Further, CONTRACTOR acknowledges that all funds are subject to recapture and repayment for non-compliance.

LII. **RECAPTURE OF FUNDS**

PRDOH may recapture payments it makes to CONTRACTOR that (i) exceed the maximum allowable rates; (ii) are not allowed under applicable laws, rules, or regulations; or (iii) are otherwise inconsistent with this Agreement, including any unapproved expenditures. CONTRACTOR must refund such recaptured payments within **thirty (30) business days** after the PRDOH issues notice of recapture to CONTRACTOR.

LIII. **OVERPAYMENT**

CONTRACTOR shall be liable to the PRDOH for any costs disallowed pursuant to financial and/or compliance audit(s) of funds received under this Agreement. CONTRACTOR shall reimburse such disallowed costs from funds other than those CONTRACTOR received under this Agreement.

LIV. **SEVERABILITY**

If any provision of this Agreement shall operate or would prospectively operate to invalidate the Agreement in whole or in part, then such provision only shall be deemed severed and the remainder of the Agreement shall remain operative and in full effect.

LV. **COUNTERPARTS**

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This Agreement may be executed in any number of counterparts, each of whom shall be deemed to be an original, however, all of which together shall constitute one and the same instrument. If the Agreement is not executed by the PRDOH within **thirty (30) calendar days** of execution by the other party, this Agreement shall be null and void.

**LVI.SURVIVAL OF TERMS AND CONDITIONS**

The terms and conditions of this Agreement related to the following subjects shall survive the termination or expiration of this Agreement: interpretive provisions; consideration; warranties; general affirmations, federal assurances, federal and state certifications; CDBG-DR, CDBG-MIT and state funding, recapture of CDBG-DR, CDBG-MIT and/or state funds, overpayment of CDBG-DR, CDBG-MIT and/or state funds; ownership and intellectual property, copyright; records retention methods and time requirements; inspection, monitoring and audit; confidentiality; public records; indemnification and liability; infringement of intellectual property rights; independent contractor relationship; compliance with laws; notices; choice of law and venue; severability; dispute resolution; consolidations, merger, change of name, and dissolution. Terms and conditions that, explicitly or by their nature, evidence the Parties' intent that they should survive the termination or expiration of this Agreement shall so survive.

**IN WITNESS THEREOF**, the parties hereto execute this Agreement in the place and on the date first above written.

**PUERTO RICO DEPARTMENT OF HOUSING**

**VENEGAS CONSTRUCTION CORPORATION**

*William O. Rodríguez Rodríguez*

William O. Rodríguez Rodríguez (Dec 19, 2022 14:52 AST)

William O. Rodríguez Rodríguez, Esq.  
Secretary

*Emilio R. Venegas*

Emilio R. Venegas  
Vice-President

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Attachment A

**MANUFACTURER – TECHNICAL DOCUMENTATION**

*W*  
A. PHOTOVOLTAIC SYSTEM COMPONENTS & OGPE CERTIFICATIONS

1. SOLAR PANELS
2. BATTERIES
3. INVERTERS
4. RACKING SYSTEM
5. OTHERS

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B. WATER STORAGE SYSTEM COMPONENT SPECIFICATIONS

1. WATER TANKS
2. PRESSURIZED TANKS
3. JET PUMP
4. MISCELLANEOUS PLUMBING MATERIALS

## A. Photovoltaic System

### 1. Solar Panels

- a. Canadian Solar
- b. Longi
- c. Philadelphia Solar
- d. IREX
- e. JinkoSolar
- f. JA Solar

### 2. Batteries

- a. Enphase B
- b. Fortress
- c. Sonnen
- d. WARU B
- e. SimpliPhi
- f. Homegrid
- g. SunBeat

### 3. Inverters

- a. SMA
- b. SolArk
- c. WARU
- d. Dafron

### 4. Racking System

- a. Iron Ridge
- b. UniRac
- c. SnapNrack

### 5. Other Components

- a. Enphase OC
- b. SMA OC
- c. TIGO

A. Photovoltaic System

1. Solar Panels

- a. Canadian Solar
- b. Longi
- c. Philadelphia Solar
- d. IREX
- e. JinkoSolar
- f. JA Solar

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NEW

Technical  
Data Sheet

 CanadianSolar

# HiKu

SUPER HIGH POWER MONO PERC MODULE

425 W ~ 450 W

CS3W-425 | 430 | 435 | 440 | 445 | 450MS



## MORE POWER



26 % more power than conventional modules



Up to 4.5 % lower LCOE  
Up to 2.7 % lower system cost



Low NMOT:  $42 \pm 3$  °C  
Low temperature coefficient (Pmax):  
-0.36 % / °C



Better shading tolerance

## MORE RELIABLE



Lower internal current,  
lower hot spot temperature



Cell crack risk limited in small region,  
enhance the module reliability



Heavy snow load up to 5400 Pa,  
wind load up to 3600 Pa\*

25  
years

Linear power output warranty\*

12  
years

Enhanced product warranty on materials  
and workmanship\*

\*According to the applicable Canadian Solar Limited Warranty Statement.

## MANAGEMENT SYSTEM CERTIFICATES\*

ISO 9001:2015 / Quality management system  
ISO 14001:2015 / Standards for environmental management system  
OHSAS 18001:2007 / International standards for occupational health & safety

## PRODUCT CERTIFICATES\*

IEC 61215 / IEC 61730: VDE / CE (Expected in December, 2019)

\* As there are different certification requirements in different markets, please contact your local Canadian Solar sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

CANADIAN SOLAR INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. No. 1 module supplier for quality and performance/price ratio in IHS Module Customer Insight Survey. As a leading PV project developer and manufacturer of solar modules with over 36 GW deployed around the world since 2001.

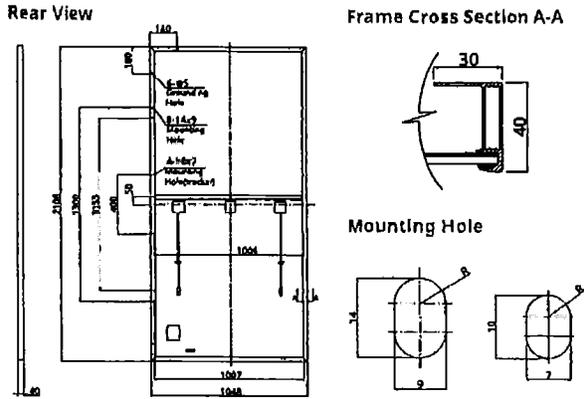
\* For detail information, please refer to Installation Manual.

CANADIAN SOLAR INC.

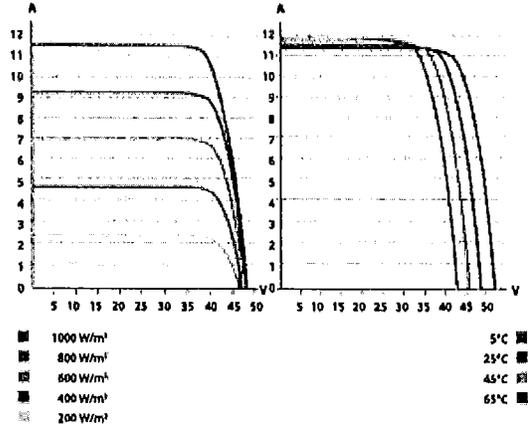
545 Speedvale Avenue West, Guelph, Ontario N1K 1E6, Canada, [www.canadiansolar.com](http://www.canadiansolar.com), [support@canadiansolar.com](mailto:support@canadiansolar.com)

WORR  
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**ENGINEERING DRAWING (mm)**



**CS3W-435MS / I-V CURVES**



**ELECTRICAL DATA | STC\***

CS3W	425MS	430MS	435MS	440MS	445MS	450MS
Nominal Max. Power (Pmax)	425 W	430 W	435 W	440 W	445 W	450 W
Opt. Operating Voltage (Vmp)	39.5 V	39.7 V	39.9 V	40.1 V	40.3 V	40.5 V
Opt. Operating Current (Imp)	10.76 A	10.84 A	10.91 A	10.98 A	11.05 A	11.12 A
Open Circuit Voltage (Voc)	47.7 V	47.9 V	48.1 V	48.3 V	48.5 V	48.7 V
Short Circuit Current (Isc)	11.37 A	11.42 A	11.47 A	11.53 A	11.59 A	11.65 A
Module Efficiency	19.24%	19.46%	19.69%	19.92%	20.14%	20.37%
Operating Temperature	-40°C ~ +85°C					
Max. System Voltage	1500V (IEC/UL) or 1000V (IEC/UL)					
Module Fire Performance	TYPE 1 (UL 1703) or CLASS C (IEC 61730)					
Max. Series Fuse Rating	20 A					
Application Classification	Class A					
Power Tolerance	0 ~ + 5 W					

\* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C

**ELECTRICAL DATA | NMOT\***

CS3W	425MS	430MS	435MS	440MS	445MS	450MS
Nominal Max. Power (Pmax)	316 W	320 W	324 W	328 W	331 W	335 W
Opt. Operating Voltage (Vmp)	36.8 V	36.9 V	37.1 V	37.3 V	37.5 V	37.7 V
Opt. Operating Current (Imp)	8.60 A	8.67 A	8.73 A	8.79 A	8.84 A	8.89 A
Open Circuit Voltage (Voc)	44.7 V	44.9 V	45.1 V	45.3 V	45.5 V	45.6 V
Short Circuit Current (Isc)	9.17 A	9.21 A	9.25 A	9.30 A	9.35 A	9.40 A

\* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m² spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

**MECHANICAL DATA**

Specification	Data
Cell Type	Mono-crystalline
Cell Arrangement	144 [2 X (12 X 6)]
Dimensions	2108 X 1048 X 40 mm (83.0 X 41.3 X 1.57 in)
Weight	24.9 kg (54.9 lbs)
Front Cover	3.2 mm tempered glass
Frame	Anodized aluminium alloy, crossbar enhanced
J-Box	IP68, 3 bypass diodes
Cable	4 mm² (IEC), 12 AWG (UL)
Cable Length (Including Connector)	Portrait: 500 mm (19.7 in) (+) / 350 mm (13.8 in) (-); landscape: 1400 mm (55.1 in); leap-frog connection: 1670 mm (65.7 in)*
Connector	T4 series or H4 UTX or MC4-EVO2
Per Pallet	27 pieces
Per Container (40' HQ)	594 pieces

\* For detailed information, please contact your local Canadian Solar sales and technical representatives.

**TEMPERATURE CHARACTERISTICS**

Specification	Data
Temperature Coefficient (Pmax)	-0.36 % / °C
Temperature Coefficient (Voc)	-0.29 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	42 ± 3°C

**PARTNER SECTION**



\* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. Canadian Solar Inc. reserves the right to make necessary adjustment to the information described herein at any time without further notice.

Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

**CANADIAN SOLAR INC.**  
545 Speedvale Avenue West, Guelph, Ontario N1K 1E6, Canada, [www.canadiansolar.com](http://www.canadiansolar.com), [support@canadiansolar.com](mailto:support@canadiansolar.com)



## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

Solicitante: Ismael Díaz

Correo Electrónico: ismael.diaz@warren-ecm.com

Compañía: WARREN

### Datos de Equipo Certificado

Tipo de Equipo(s): Módulo Fotovoltaico

Clasificación: Equipo Existente

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
Canadian Solar	CS3U-375MS	Certificación de Potencia: IEC 61215 Núm. Certificación: Z2180384937020 Laboratorio: TUVPSG Certificación de Seguridad: UL 1703 Núm. Certificación: 2284121 Laboratorio: CSA	Potencia Nominal: 375Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.56 ft. x 3.25 ft Garantía Manufactura: 10 año(s)
Canadian Solar	CS3U-395MS	Certificación de Potencia: IEC 61215 Núm. Certificación: 40045991 Laboratorio: vde Certificación de Seguridad: UL 1703 Núm. Certificación: 2284121 Laboratorio: CSA	Potencia Nominal: 395Watts 10 años (Potencia): 93.13% 20 años (Potencia): 84.2% Dimensiones: 6.5ft x 3.25ft Garantía Manufactura: 10 año(s)
CANADIAN SOLAR	CS3W-450MS	Certificación de Potencia: IEC 61215 Núm. Certificación: 40045991 Laboratorio: VDE Certificación de Seguridad: UL 1703 Núm. Certificación: 2284121 Laboratorio: CSA	Potencia Nominal: 450Watts 10 años (Potencia): 93.05% 20 años (Potencia): 87.55% Dimensiones: 6.92ft x 3.44FT Garantía Manufactura: 12 año(s)
CANADIAN SOLAR	CS3W-440MS	Certificación de Potencia: IEC 61215 Núm. Certificación: 40045991 Laboratorio: VDE Certificación de Seguridad: UL 1703 Núm. Certificación: 2284121 Laboratorio: CSA	Potencia Nominal: 440Watts 10 años (Potencia): 93.05% 20 años (Potencia): 87.55% Dimensiones: 6.92ft x 3.44FT Garantía Manufactura: 12 año(s)
CANADIAN SOLAR	CS3W-445MS	Certificación de Potencia: IEC 61215 Núm. Certificación: 40045991 Laboratorio: VDE Certificación de Seguridad: UL 1703 Núm. Certificación: 2284121 Laboratorio: CSA	Potencia Nominal: 445Watts 10 años (Potencia): 93.05% 20 años (Potencia): 87.55% Dimensiones: 6.92ft x 3.44FT Garantía Manufactura: 12 año(s)
CANADIAN SOLAR	CS3W-455MS	Certificación de Potencia: IEC 61215 Núm. Certificación: 40045991 Laboratorio: VDE Certificación de Seguridad: UL 1703 Núm. Certificación: 2284121 Laboratorio: CSA	Potencia Nominal: 455Watts 10 años (Potencia): 93.05% 20 años (Potencia): 87.55% Dimensiones: 6.92ft x 3.44FT Garantía Manufactura: 12 año(s)
Canadian Solar	CS3U-385MS	Certificación de Potencia: IEC 61215 Núm. Certificación: 5008436-3972-0002 Laboratorio: VDE Certificación de Seguridad: UL 1703 Núm. Certificación: 2284121 Laboratorio: CSA	Potencia Nominal: 385Watts 10 años (Potencia): 355% 20 años (Potencia): 334% Dimensiones: 2000mm x 892mm Garantía Manufactura: 10 año(s)
CANADIAN SOLAR	CS3W-435MS	Certificación de Potencia: IEC 61215 Núm. Certificación: 40045991 Laboratorio: VDE Certificación de Seguridad: UL 1703 Núm. Certificación: 2284121 Laboratorio: CSA	Potencia Nominal: 435Watts 10 años (Potencia): 93.05% 20 años (Potencia): 87.55% Dimensiones: 6.92ft x 3.44FT Garantía Manufactura: 12 año(s)
Canadian Solar	CS3U-380MS	Certificación de Potencia: IEC 61215 Núm. Certificación: Z2180384937020 Laboratorio: TUVPSG Certificación de Seguridad: UL 1703 Núm. Certificación: 2284121 Laboratorio: CSA	Potencia Nominal: 380Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.56 ft. x 3.25 ft Garantía Manufactura: 10 año(s)

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**Certificación de Equipos de Energía Renovable**

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
Canadian Solar	CS3U-370MS	Certificación de Potencia: IEC 61215 Núm. Certificación: Z2180384937020 Laboratorio: TUVPSG Certificación de Seguridad: UL 1703 Núm. Certificación: 2284121 Laboratorio: CSA	Potencia Nominal: 370Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.56 ft x 3.25 ft Garantía Manufactura: 10 año(s)

**División de Edificabilidad**

Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGPe, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

**Condiciones Especiales**

Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

**Firmas / Sellos**

**Fecha de Expedición:**  
 20/JAN/2021

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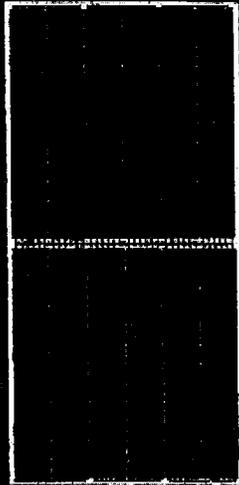


**Ing. Gabriel Hernández Rodríguez**  
**Secretario Auxiliar**



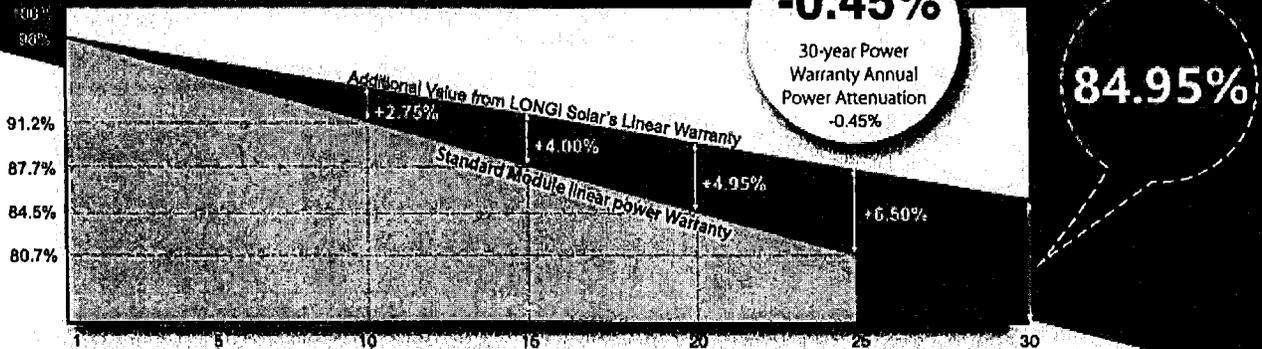
# LR4-72HBD 415~435M

Hi-MO4



**High Efficiency  
Low LID Bifacial PERC with  
Half-cut Technology**

10-year Warranty for Materials and Processing;  
30-year Warranty for Extra Linear Power Output



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#### Complete System and Product Certifications

- IEC 61215, IEC61730, UL1703
- ISO 9001:2008: ISO Quality Management System
- ISO 14001: 2004: ISO Environment Management System
- T562941: Guideline for module design qualification and type approval
- OHSAS 18001: 2007 Occupational Health and Safety



\* Specifications subject to technical changes and tests. LONGI Solar reserves the right of interpretation

#### Front side performance equivalent to conventional low LID mono PERC:

- High module conversion efficiency (up to 19.4%)
- Better energy yield with excellent low irradiance performance and temperature coefficient
- First year power degradation <2%

#### Bifacial technology enables additional energy harvesting from rear side (up to 25%)

**Glass/glass lamination** ensures 30 year product lifetime, with annual power degradation < 0.45%, 1500V compatible to reduce BOS cost

**Solid PID resistance** ensured by solar cell process optimization and careful module BOM selection

**Reduced resistive loss** with lower operating current

**Higher energy yield** with lower operating temperature

**Reduced hot spot risk** with optimized electrical design and lower operating current

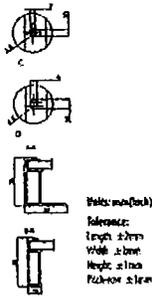
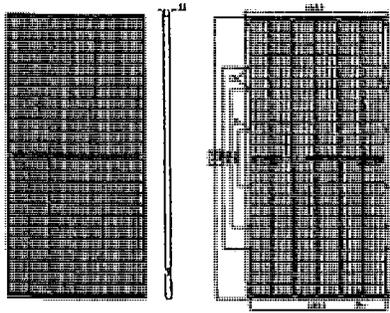
# LONGI

Room 801, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China  
Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGI Solar

Note: Due to continuous technical innovation, R&D and improvement, technical data above mentioned may be of modification accordingly. LONGI Solar have the sole right to make such modification at anytime without further notice. Demanding party shall request for the latest datasheet for such as contract need, and make it a consisting and binding part of lawful documentation duly signed by both parties.

# LR4-72HBD 415~435M

## Design (mm)



## Mechanical Parameters

Cell Orientation: 144 (6×24)  
 Junction Box: IP68, three diodes  
 Output Cable: 4mm<sup>2</sup>, 300mm in length,  
 length can be customized  
 Glass: Dual glass  
 2.0mm coated tempered glass  
 Frame: Anodized aluminum alloy frame  
 Weight: 29.5kg  
 Dimension: 2131×1052×35mm  
 Packaging: 30pcs per pallet  
 150pcs per 20'GP  
 600pcs per 40'HC

## Operating Parameters

Operational Temperature: -40°C ~ +85°C  
 Power Output Tolerance: 0 ~ +5W  
 Voc and Isc Tolerance: ±3%  
 Maximum System Voltage: DC1500V (IEC / UL)  
 Maximum Series Fuse Rating: 20A  
 Nominal Operating Cell Temperature: 45±2°C  
 Safety Class: Class II  
 Fire Rating: (A) type 3  
 Bifaciality: Glazing≥70%

## Electrical Characteristics

Test uncertainty for Pmax: ±3%

Model Number	LR4-72HBD-415M		LR4-72HBD-420M		LR4-72HBD-425M		LR4-72HBD-430M		LR4-72HBD-435M	
	STC	NOCT								
Maximum Power (Pmax/W)	415	308.6	420	312.3	425	316.0	430	319.7	435	323.5
Open Circuit Voltage (Voc/V)	49.0	45.6	49.2	45.8	49.4	46.0	49.6	46.2	49.8	46.4
Short Circuit Current (Isc/A)	10.89	8.82	10.96	8.87	11.02	8.93	11.09	8.98	11.16	9.04
Voltage at Maximum Power (Vmp/V)	40.6	37.7	40.8	37.9	41.0	38.1	41.2	38.2	41.4	38.4
Current at Maximum Power (Imp/A)	10.23	8.19	10.30	8.25	10.37	8.30	10.44	8.36	10.51	8.42
Module Efficiency(%)	18.5		18.7		19.0		19.2		19.4	

STC (Standard Testing Conditions): Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Spectra at AM1.5

NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20°C, Spectra at AM1.5, Wind at 1m/s

Electrical characteristics with different rear side power gain (reference to 425W front)

Pmax /W	Voc/V	Isc /A	Vmp/V	Imp /A	Pmax gain
446	49.4	11.58	41.0	10.88	5%
468	49.4	12.13	41.0	11.40	10%
489	49.5	12.68	41.1	11.92	15%
510	49.5	13.23	41.1	12.44	20%
531	49.5	13.78	41.1	12.96	25%

## Temperature Ratings (STC)

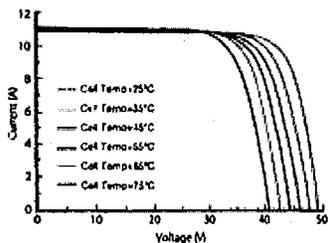
Temperature Coefficient of Isc: +0.050%/C  
 Temperature Coefficient of Voc: -0.284%/C  
 Temperature Coefficient of Pmax: -0.350%/C

## Mechanical Loading

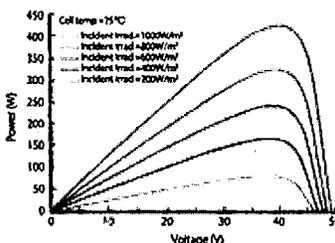
Front Side Maximum Static Loading: 5400Pa  
 Rear Side Maximum Static Loading: 2400Pa  
 Hallstone Test: 25mm Hallstone at the speed of 23m/s

## I-V Curve

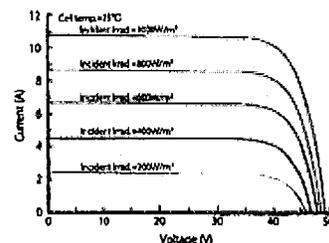
Current-Voltage Curve (LR4-72HBD-425M)



Power-Voltage Curve (LR4-72HBD-425M)



Current-Voltage Curve (LR4-72HBD-425M)



# LONGI

Room B01, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China  
 Tel: +86-21-80162606 Email: module@longi-silicon.com Facebook: www.facebook.com/LONGI Solar

Note: Due to continuous technical innovation, R&D and improvement, technical data above mentioned may be of modification accordingly. LONGI Solar have the sole right to make such modification at anytime without further notice; Demandng party shall request for the latest datasheet for such as contract need, and make it a consistng and binding part of lawful documentation duly signed by both parties.



## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según Indicado(s) a continuación:

**Solicitante:** Daniel Rios

**Correo Electrónico:** daniel.rios@weclpr.com

**Compañía:** N/A

### Datos de Equipo Certificado

**Tipo de Equipo(s):** Módulo Fotovoltaico

**Clasificación:** Equipo Nuevo

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
Longi Solar	LR4-72HBD435M	Certificación de Potencia: IEC 61215 Núm. Certificación: Z2 099333 0039 REV. 13 Laboratorio: TUVPSG Certificación de Seguridad: UL 1703 Núm. Certificación: 70176031 Laboratorio: CSA	Potencia Nominal: 435Watts 10 años (Potencia): 93.95% 20 años (Potencia): 89.45% Dimensiones: 2131MM X 1052MM Garantía Manufactura: 12 año(s)
Longi Solar	LR4-72HBD430M	Certificación de Potencia: IEC 61215 Núm. Certificación: Z2 099333 0039 REV. 13 Laboratorio: TUVPSG Certificación de Seguridad: UL 1703 Núm. Certificación: 70176031 Laboratorio: CSA	Potencia Nominal: 430Watts 10 años (Potencia): 93.95% 20 años (Potencia): 89.45% Dimensiones: 2131MM X 1052MM Garantía Manufactura: 12 año(s)
Longi Solar	LR4-72HBD-415M	Certificación de Potencia: IEC 61215 Núm. Certificación: Z2 099333 0039 REV. 13 Laboratorio: TUVPSG Certificación de Seguridad: UL 1703 Núm. Certificación: 70176031 Laboratorio: CSA	Potencia Nominal: 415Watts 10 años (Potencia): 93.95% 20 años (Potencia): 89.45% Dimensiones: 2131MM X 1052MM Garantía Manufactura: 12 año(s)
Longi Solar	LR4-72HBD-420M	Certificación de Potencia: IEC 61215 Núm. Certificación: Z2 099333 0039 REV. 13 Laboratorio: TUVPSG Certificación de Seguridad: UL 1703 Núm. Certificación: 70176031 Laboratorio: CSA	Potencia Nominal: 420Watts 10 años (Potencia): 93.95% 20 años (Potencia): 89.45% Dimensiones: 2131MM X 1052MM Garantía Manufactura: 12 año(s)
Longi Solar	LR4-72HBD-425M	Certificación de Potencia: IEC 61215 Núm. Certificación: Z2 099333 0039 REV. 13 Laboratorio: TUVPSG Certificación de Seguridad: UL 1703 Núm. Certificación: 70176031 Laboratorio: CSA	Potencia Nominal: 425Watts 10 años (Potencia): 93.95% 20 años (Potencia): 89.45% Dimensiones: 2131MM X 1052MM Garantía Manufactura: 12 año(s)

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### División de Edificabilidad

Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

### Condiciones Especiales

Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

### Firmas / Sellos

**Fecha de Expedición:**





## Certificación de Equipos de Energía Renovable

12/FEB/2021



**Ing. Gabriel Hernández Rodríguez**  
**Secretario Auxillar**

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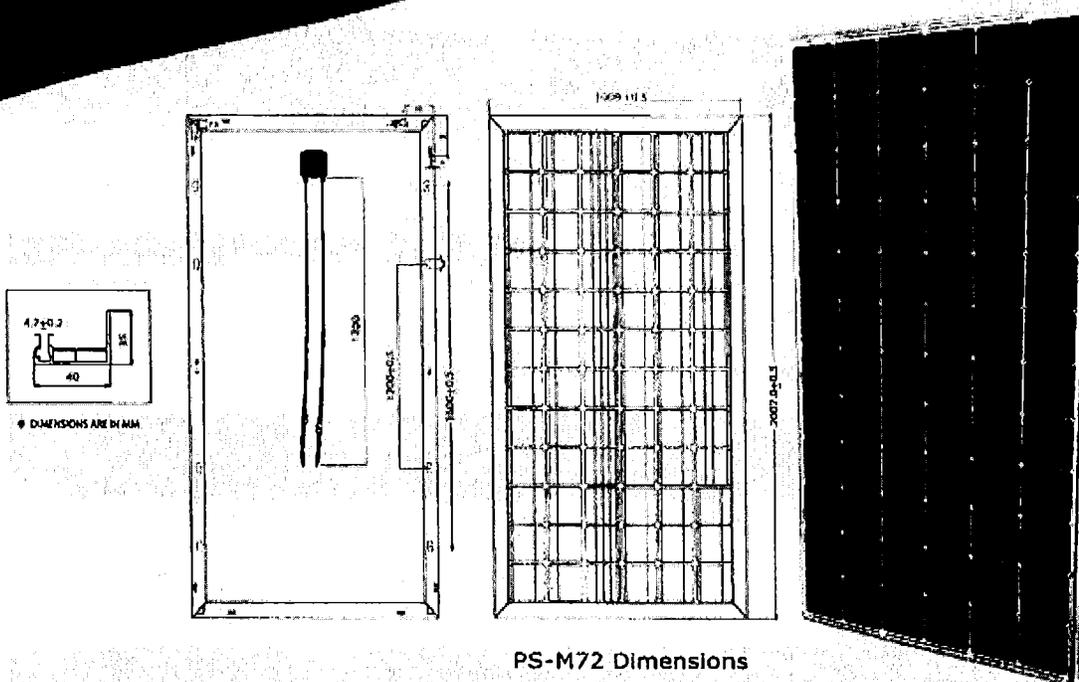


# PS-M72 (390-405 W) AMMAN

## MONO-CRYSTALLINE MODULE



**Philadelphia Solar**  
Delivering Clean Energy Solutions

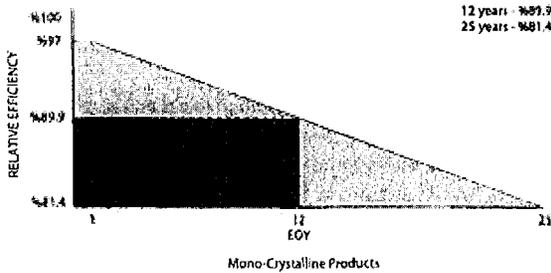


PS-M72 Dimensions

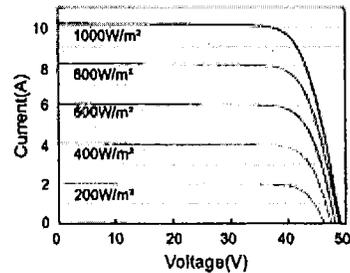
Philadelphia Solar's Mono-Crystalline modules with power up to 405 Wp are produced using the state-of-the-art (automated) robotic production lines.

**WORR** These modules are suitable to be used for most electrical power applications and have excellent durability to prevailing weather conditions.

### LINER PERFORMANCE WARRANTY

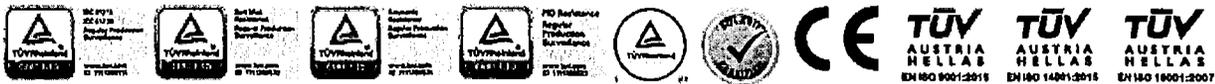


### IV - CURVE M72 - 385 W



### Certificates

- Bankability Report DNV GL



ELECTRICAL CHARACTERISTICS	390W	395W	400W	405W
Characteristics (STC)	STC	STC	STC	STC
Open Circuit Voltage - Voc (V)	49.30	49.64	49.92	50.26
Short Circuit Current - Isc (A)	10.07	10.12	10.16	10.20
Maximum Power Voltage - Vmpp (V)	40.42	40.66	40.98	41.31
Maximum Power Current - Impp (A)	9.66	9.72	9.76	9.81
Maximum Power - Pmax (W)	390	395	400	405
Module Efficiency - $\eta'$ (%)	19.3	19.5	19.8	20.0

Values at Standard Test Conditions STC (Air Mass AM1.5, Irradiance 1000W/m<sup>2</sup>, Cell Temperature +25C).

MATERIAL CHARACTERISTICS		PACKAGING	
Characteristics	Value	Physical Characteristics	Value
Cells per Module	72	Module Dimensions (mm)	2007 x 1008 x 40
Cell Type	Grade A - Mono-Crystalline Silicon (PERC), 158.75x158.75mm	Module Weight (kg)	23
Front Surface	Anti-Reflective Coated Tempered 3.2mm Glass	Pallet Dimensions W.D.H (mm)	2050 x 1140 x 1150
Encapsulant	PID Free EVA	Modules per Pallet	27
Back Cover	Backsheet	Container Capacity	Value
Frame	Anodized Aluminum	20 Feet Container	270 Modules
Junction Box	IP68, 3 Bypass Diodes	40 Feet High-Cube Container	594 Modules
Cable and Connector	1.2m Solar Cables with MC4 Interconnection		
Fire Classification	Spread of flame : A / Burning brand : C		

THERMAL CHARACTERISTICS		OPERATING CONDITIONS	
Characteristics	Value		
Voltage Temperature Coefficient (%/°C)	-0.291	Maximum System Voltage - Vmax (V)	1000/1500
Current Temperature Coefficient (%/°C)	+0.033	Maximum Series Fuse (A)	20
Power Temperature Coefficient (%/°C)	-0.39	Operating Temperature Range (°C)	IEC: -40 to +85 UL: -40 to +90
NOCT (°C)	45 ± 2		

WARRANTY	
Product	12 Years
Power Output	12 Years; 89.9 % of Power Output 25 Years; 81.4 % of Power Output

## FEATURE

-  Positive power tolerance up to %3 extra output.
-  Excellent low light performance.
-  Salt mist and ammonia resistant to endure coastal and agricultural environments.
-  Excellent high mechanical loads, certified to withstand high wind load (2400 pa) and snow load (5400 pa)
-  In-line and post EL (Electroluminescence) machines.
-  PID resistant.

## BENEFITS

- Outstanding technical support.
- Pre and after sales-service.
- 12 years warranty on material and workmanship.
- 25 years linear performance warranty.
- Marketing support to official distributors.
- Customized mounting solutions.

## APPLICATIONS



- Power measuring tolerance: ± %3, other measurements tolerances: ± %5
- Datasheet is subjected to changes without prior notice, always obtain the most recent version of the datasheet.
- Caution: For professional use only, the installation and handling of PV modules and cleaning modules require professional skills and should only be performed by qualified professionals, please read the Installation and Operation Manual before using the modules, also Cleaning Guidelines.

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## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

**Solicitante:** Quintín Ramos

**Correo Electrónico:** qramos@powercommpr.com

**Compañía:** Powercomm Inc

### Datos de Equipo Certificado

**Tipo de Equipo(s):** Módulo Fotovoltaico

**Clasificación:** Equipo Existente

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
PHILADELPHIA	PS-M72-405 AMMAN	Certificación de Potencia: IEC 61215 Núm. Certificación: PV 722040005 01 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: TU 722040018 01 Laboratorio: TUVPTL	Potencia Nominal: 405Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.46FT X 3.25 FT Garantía Manufactura: 12 año(s)
Philadelphia Solar	PS-M72-360	Certificación de Potencia: IEC 61215 Núm. Certificación: PV60109277 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: US8216001302 Laboratorio: TUVPTL	Potencia Nominal: 360Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.46FT X 3.25FT Garantía Manufactura: 10 año(s)
Philadelphia Solar	PS-M72-365	Certificación de Potencia: IEC 61215 Núm. Certificación: PV60109277 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: US8216001302 Laboratorio: TUVPTL	Potencia Nominal: 365Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.46FT X 3.25FT Garantía Manufactura: 10 año(s)
PHILADELPHIA	PS-M72-380 AMMAN	Certificación de Potencia: IEC 61215 Núm. Certificación: PV60109277 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: PV 60109277 Laboratorio: PTL	Potencia Nominal: 380Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.46FT X 3.25 FT Garantía Manufactura: 12 año(s)
PHILADELPHIA	PS-M72-375 AMMAN	Certificación de Potencia: IEC 61215 Núm. Certificación: PV60109277 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: PV 60109277 Laboratorio: PTL	Potencia Nominal: 375Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.46FT X 3.25 FT Garantía Manufactura: 12 año(s)
Philadelphia Solar	PS-M72-370	Certificación de Potencia: IEC 61215 Núm. Certificación: PV60109277 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: US8216001302 Laboratorio: TUVPTL	Potencia Nominal: 370Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.46FT X 3.25FT Garantía Manufactura: 10 año(s)
PHILADELPHIA	PS-M72-395 AMMAN	Certificación de Potencia: IEC 61215 Núm. Certificación: PV 722040005 01 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: TU 722040018 01 Laboratorio: TUVPTL	Potencia Nominal: 395Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.46FT X 3.25 FT Garantía Manufactura: 12 año(s)
PHILADELPHIA	PS-M72-370 AMMAN	Certificación de Potencia: IEC 61215 Núm. Certificación: PV60109277 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: PV 60109277 Laboratorio: PTL	Potencia Nominal: 370Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.46FT X 3.25 FT Garantía Manufactura: 12 año(s)
PHILADELPHIA	PS-M72-400 AMMAN	Certificación de Potencia: IEC 61215 Núm. Certificación: PV 722040005 01 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: TU 722040018 01 Laboratorio: TUVPTL	Potencia Nominal: 400Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.46FT X 3.25 FT Garantía Manufactura: 12 año(s)

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### Certificación de Equipos de Energía Renovable

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
PHILADELPHIA	PS-M72-390 AMMAN	Certificación de Potencia: IEC 61215 Núm. Certificación: PV 722040005 01 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: TU 722040018 01 Laboratorio: null	Potencia Nominal: 390Watts 10 años (Potencia): 91% 20 años (Potencia): 84% Dimensiones: 6.46FT X 3.25 FT Garantía Manufactura: 12 año(s)

#### División de Edificabilidad

Se recomienda la Instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

#### Condiciones Especiales

Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

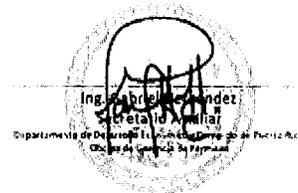
#### Firmas / Sellos

##### Fecha de Expedición:

23/MAR/2021

W

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 WRR



**Ing. Gabriel Hernández Rodríguez**  
**Secretario Auxiliar**



SOLAR MODULE  
**395 W**

**IREX**

*a member of SolarBK*

**72 CELLS - MONOCRYSTALLINE**

Made in  
**VIETNAM**

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**ADVANCED PERC CELL TECHNOLOGY**

Absorbing more light, High module efficiency  
Low breakage rate, Annual power degradation 0.7%



**FAST & SAFE**

Easy installation and handling  
Environmentally friendly



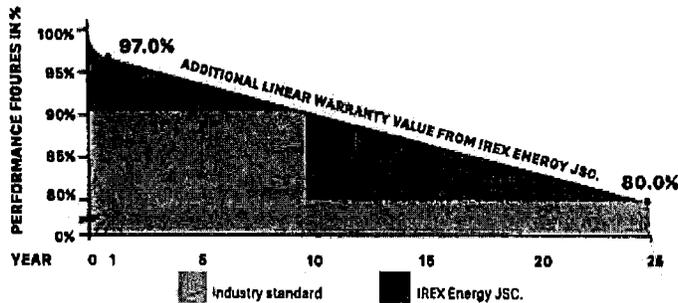
**MODULE DURABILITY**

5400 Pa snow load, 2400 Pa wind load  
Ideal for PV rooftops, ground mount, floating



**THE #1 DOMESTIC PV MANUFACTURER IN VIETNAM**

100% Automatic production line  
International quality PV technology



**12 - years**  
Material & workmanship

**25 - years**  
Linear power Output

Greetings from IREX,

Founded in 2012 and inherited over 40 years of Research and Development from SolarBK - the leading smart renewable energy group in Vietnam, IREX's commitment is to provide the very best photovoltaic products originated from our country. We proudly present the #1 Vietnamese-Made brand with international certifications and having been exported all around the world, satisfying even the toughest regulation from North American and European photovoltaic markets.

With the finest price and customer service can only be found at IREX, we look forward to be working with you in the near future!

**IREX ENERGY JOINT STOCK COMPANY**

Head Office: No. 47, Le Van Thinh Street, Quarter 5, Binh Trung Dong Ward, District 2, HCMC, Vietnam  
Factory Address: Road No. 1A, Phu My 1 Industrial Zone, Phu My Town, Ba Ra - Vung Tau Province, Vietnam  
Tel: +84-28-7300-1559 | Email: info@irex.vn | Website: www.irex.vn  
Fax HCMC: +84-28-7300-8760 | Fax IREX Factory: +84-254-2923-594



**CERTIFICATES**



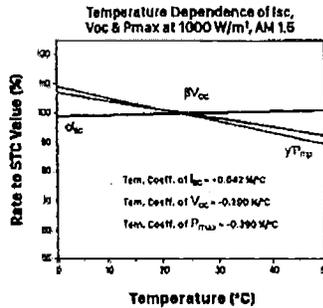
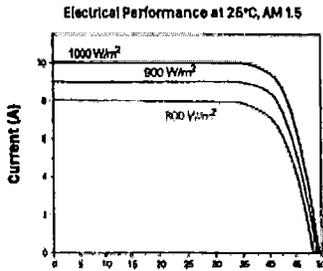
Management System  
ISO 9001:2015



ISO 14001:2015  
Environmental Management System

ISO 9001:2015: Quality Management System  
ISO 14001:2015: Environmental Management System

## PERFORMANCE



## ELECTRICAL CHARACTERISTICS STC

IRM72S-395

Maximum Power (Pmax)	395 W
Power Tolerance	0 - 3 %
Module Efficiency	19.91 %
Maximum Power Current (Imp)	9.38 A
Maximum Power Voltage (Vmp)	42.12 V
Short Circuit Current (Isc)	9.97 A
Open Circuit Voltage (Voc)	49.03 V

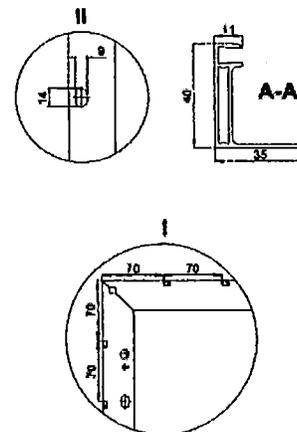
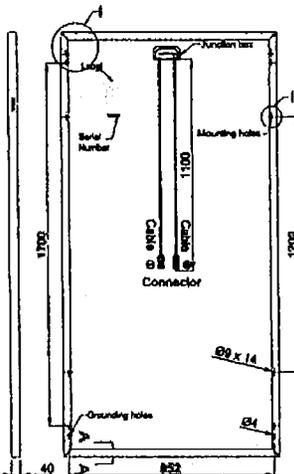
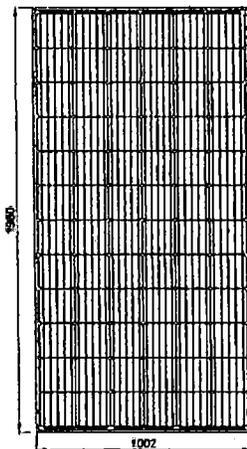
Values at Standard Test Conditions  
 (STC: AM 1.5 Spectrum, Irradiance of 1000 W/m², Cell Temperature 25°C)

## ELECTRICAL CHARACTERISTICS NMOT

IRM72S-395

Maximum Power (Pmax)	312.05 W
Maximum Power Current (Imp)	7.49 A
Maximum Power Voltage (Vmp)	41.70 V
Short Circuit Current (Isc)	7.97 A
Open Circuit Voltage (Voc)	48.54 V

Values at Nominal Module Operating Temperature  
 (NMOT: AM 1.5 Spectrum, Irradiance of 800 W/m², Ambient Temperature 20°C, Wind Speed 1 m/s)



Drawing Only for Reference

## MECHANICAL CHARACTERISTICS

Cell Type  
 Front Cover  
 Back Cover  
 Frame  
 Junction Box  
 Dimension  
 Output Cable  
 Weight  
 Connector

158.75 x 158.75 mm Monocrystalline, 72 (6 x 12) pcs in series  
 3.2 mm High Transmission, Low Iron, Tempered Glass with Anti-Reflective Coating  
 Composite film  
 Anodized Aluminum Alloy type 6063 - T5 (Silver/ Black)  
 3 bypass diodes, IP 68 rated in accordance with IEC 62790  
 1980 x 1002 x 40 mm  
 4 mm² (IEC)/ 12 AWG (UL), 1100 mm in accordance with IEC 62852  
 23 kg (approx)  
 MC4 Compatible

## PACKING INFORMATION

Container	20' GP	40' GP	40' HQ
Pallets per Container	10	24	24
Pieces per Container	270	648	696

## OPERATING CONDITIONS

Operating Temperature	-40°C ~ +85°C
Maximum System Voltage	1500 VDC
Maximum Series Fuse Rating	20 A
NMOT	45°C ± 2°C
Application Class	Class A

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## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

Solicitante: Raul E Reyes

Correo Electrónico: [office@waruenergy.com](mailto:office@waruenergy.com)

Compañía: WARU Energy

### Datos de Equipo Certificado

Tipo de Equipo(s): Módulo Fotovoltaico

Clasificación: Equipo Existente

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
IREX	IR375M-72	Certificación de Potencia: IEC 61215 Núm. Certificación: 20190827-E496023 Laboratorio: UL Certificación de Seguridad: UL 1703 Núm. Certificación: 20181008-E496023 Laboratorio: TUVPTL	Potencia Nominal: 375Watts 10 años (Potencia): 90% 20 años (Potencia): 80% Dimensiones: 6.4 X 3.2 Garantía Manufactura: 25 año(s)

### División de Edificabilidad

Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP<sub>e</sub>, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

### Condiciones Especiales

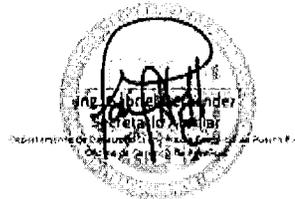
Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

### Firmas / Sellos

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Fecha de Expedición:

13/MAR/2021



**Ing. Gabriel Hernández Rodríguez**

**Secretario Auxiliar**



EAGLE

THE MOST  
DEPENDABLE  
SOLAR BRAND

# EAGLE 72HM G2

390-410 WATT • HALF CELL MONO PERC MODULE

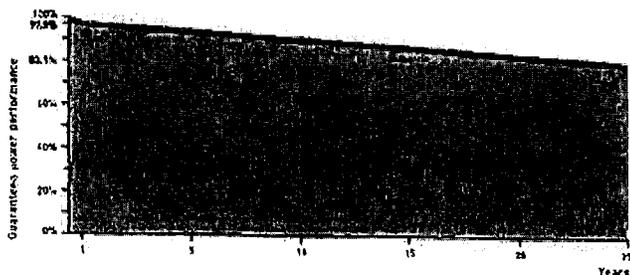
Positive power tolerance of 0~+3%

- NYSE-listed since 2010, Bloomberg Tier 1 manufacturer
- Best-selling module globally for last 4 years
- Top performance in the strictest 3rd party labs
- 99.9% on-time delivery to the installer
- Automated manufacturing utilizing artificial intelligence
- Vertically integrated, tight controls on quality
- Premium solar panel factories in USA and Malaysia

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## LINEAR PERFORMANCE WARRANTY

25-Year Performance Warranty



Performance		Efficiency		Power	
100%	97.5%	21.5%	22.0%	390W	410W
95%	95.0%	21.0%	21.5%	380W	400W
90%	92.5%	20.5%	21.0%	370W	390W
85%	90.0%	20.0%	20.5%	360W	380W
80%	87.5%	19.5%	20.0%	350W	370W
75%	85.0%	19.0%	19.5%	340W	360W
70%	82.5%	18.5%	19.0%	330W	350W
65%	80.0%	18.0%	18.5%	320W	340W
60%	77.5%	17.5%	18.0%	310W	330W
55%	75.0%	17.0%	17.5%	300W	320W
50%	72.5%	16.5%	17.0%	290W	310W
45%	70.0%	16.0%	16.5%	280W	300W
40%	67.5%	15.5%	16.0%	270W	290W
35%	65.0%	15.0%	15.5%	260W	280W
30%	62.5%	14.5%	15.0%	250W	270W
25%	60.0%	14.0%	14.5%	240W	260W
20%	57.5%	13.5%	14.0%	230W	250W
15%	55.0%	13.0%	13.5%	220W	240W
10%	52.5%	12.5%	13.0%	210W	230W
5%	50.0%	12.0%	12.5%	200W	220W
0%	47.5%	11.5%	12.0%	190W	210W



- ISO9001:2008 Quality Standards
- ISO14001:2004 Environmental Standards
- IEC61215, IEC61730 certified products
- OHSAS18001 Occupational Health & Safety Standards
- ULI703 certified products

## KEY FEATURES



### Diamond Half Cell Technology

World-record breaking efficient mono PERC half cut solar cells deliver high power in a small footprint



### Designed for Long Life

Uses the same DuPont protective film as the Space Station, Mars Lander, and retriners. 25-year warranty



### Shade Tolerant

Twin array design allows continued performance even with shading by trees or debris



### Power Boost in Cloudy Conditions

A special film diffuses light, boosting performance even with shading by trees or debris



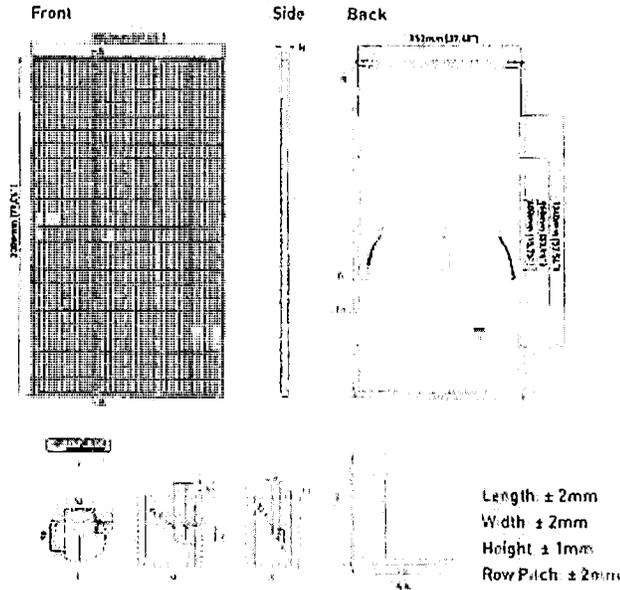
### Protected Against All Environments

Certified to withstand humidity, heat, rain, marine environments, wind, hailstorms, and packed snow

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Jinko Solar

## ENGINEERING DRAWINGS



## MECHANICAL CHARACTERISTICS

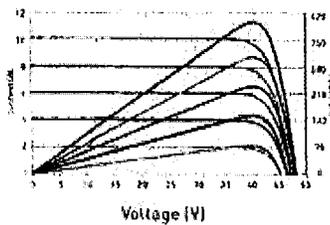
Cells	Mono PERC Diamond Cell (158.75x158.75mm)
No. of Half Cells	144 (6x24)
Dimensions	2008x1002x40mm (79.06x39.45x1.57in)
Weight	22.5kg (49.6lbs)
Front Glass	3.2mm, Anti-Reflection Coating High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminum Alloy
Junction Box	IP67 Rated
Output Cables	12 AWG, 1400mm (55.12in) or Customized Length
Fire Type	Type 1
Pressure Rating	5400Pa (Snow) & 2400Pa (Wind)

## TEMPERATURE CHARACTERISTICS

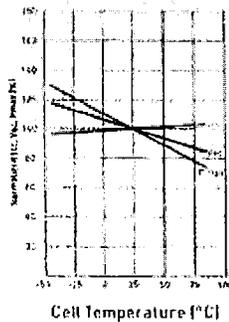
Temperature Coefficients of Pmax	-0.35%/°C
Temperature Coefficients of Voc	-0.29%/°C
Temperature Coefficients of Isc	0.048%/°C
Nominal Operating Cell Temperature (NOCT)	45±2°C

## ELECTRICAL PERFORMANCE & TEMPERATURE DEPENDENCE

Current-Voltage & Power-Voltage Curves (410W)



Temperature Dependence of Isc, Voc, Pmax



## MAXIMUM RATINGS

Operating Temperature (°C)	-40°C - +85°C
Maximum System Voltage	1500VDC (UL and IEC)
Maximum Series Fuse Rating	20A

## PACKAGING CONFIGURATION

(Two pallets = One stack)  
27pcs/pallet, 54pcs/stack, 594pcs/40' HQ Container

## ELECTRICAL CHARACTERISTICS

Module Type	JKM390M-72HL-V		JKM395M-72HL-V		JKM400M-72HL-V		JKM405M-72HL-V		JKM410M-72HL-V	
	STC	NOCT								
Maximum Power (Pmax)	390Wp	287Wp	395Wp	291Wp	400Wp	294Wp	405Wp	298Wp	410Wp	302Wp
Maximum Power Voltage (Vmp)	39.64V	37.0V	39.90V	37.4V	40.16V	37.6V	40.42V	37.8V	40.68V	38.0V
Maximum Power Current (Imp)	9.84A	7.75A	9.90A	7.77A	9.96A	7.82A	10.02A	7.88A	10.08A	7.94A
Open-circuit Voltage (Voc)	48.6V	45.8V	48.8V	46.0V	49.1V	46.2V	49.4V	46.5V	49.6V	46.7V
Short-circuit Current (Isc)	10.46A	8.45A	10.54A	8.51A	10.61A	8.57A	10.69A	8.63A	10.76A	8.69A
Module Efficiency STC (%)	19.38%		19.63%		19.88%		20.13%		20.38%	

\*STC: ● Irradiance 1000W/m<sup>2</sup>  
NOCT: ● Irradiance 800W/m<sup>2</sup>

☉ Cell Temperature 25°C  
☁ Ambient Temperature 20°C

☁ AM = 1.5  
☁ AM = 1.5

☁ Wind Speed 1m/s

\*Power measurement tolerance: ±3%

The company reserves the final right for explanation on any of the information presented hereby. JKM390-410M-72HL-V-A4-US

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**Jinko** Solar



### Certificación de Equipos de Energía Renovable

#### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

Solicitante: GERMAN VELAZQUEZ RODRIGUEZ

Correo Electrónico: gvelazquez@dynamicssolarpr.net

Compañía: DYNAMIC SOLAR

#### Datos de Equipo Certificado

Tipo de Equipo(s): Módulo Fotovoltaico

Clasificación: Equipo Nuevo

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
JINKO SOLAR	JKM405M-72HL-V	Certificación de Potencia: IEC 61215 Núm. Certificación: PV 50416412 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: E362479 Laboratorio: UL	Potencia Nominal: 405Watts 10 años (Potencia): 91.6% 20 años (Potencia): 85.6% Dimensiones: 6.59 ft. x 3.29 ft. Garantía Manufactura: 12 año(s)
JINKO SOLAR	JKM410M-72HL-V	Certificación de Potencia: IEC 61215 Núm. Certificación: PV 50416412 Laboratorio: TUVPTL Certificación de Seguridad: UL 1703 Núm. Certificación: E362479 Laboratorio: UL	Potencia Nominal: 410Watts 10 años (Potencia): 91.6% 20 años (Potencia): 85.6% Dimensiones: 6.59 ft. x 3.29 ft. Garantía Manufactura: 12 año(s)

#### División de Edificabilidad

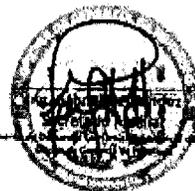
Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

#### Condiciones Especiales

Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

#### Firmas / Sellos

Fecha de Expedición:  
 25/NOV/2020



**Ing. Gabriel Hernández Rodríguez**  
 Secretario Auxiliar



# Harvest the Sunshine

**Mono**

410W MBB Half-Cell Module

JAM72S10 390-410/MR Series

## Introduction

Assembled with multi-busbar PERC cells, the half-cell configuration of the modules offers the advantages of higher power output, better temperature-dependent performance, reduced shading effect on the energy generation, lower risk of hot spot, as well as enhanced tolerance for mechanical loading.

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Higher output power



Lower LCOE



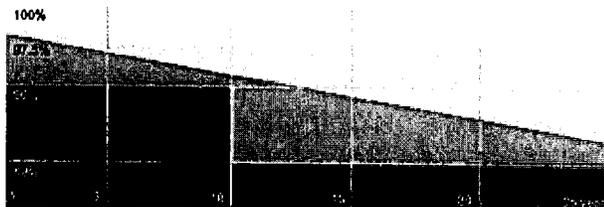
Less shading and lower resistive loss



Better mechanical loading tolerance

## Superior Warranty

- 12-year product warranty
- 25-year linear power output warranty



■ JA Linear Power Warranty ■ Industry Warranty

## Comprehensive Certificates

- IEC 61215, IEC 61730, UL 61215, UL 61730
- ISO 9001: 2015 Quality management systems
- ISO 14001: 2015 Environmental management systems
- OHSAS 18001: 2007 Occupational health and safety management systems
- IEC TS 62941: 2016 Terrestrial photovoltaic (PV) modules – Guidelines for increased confidence in PV module design qualification and type approval



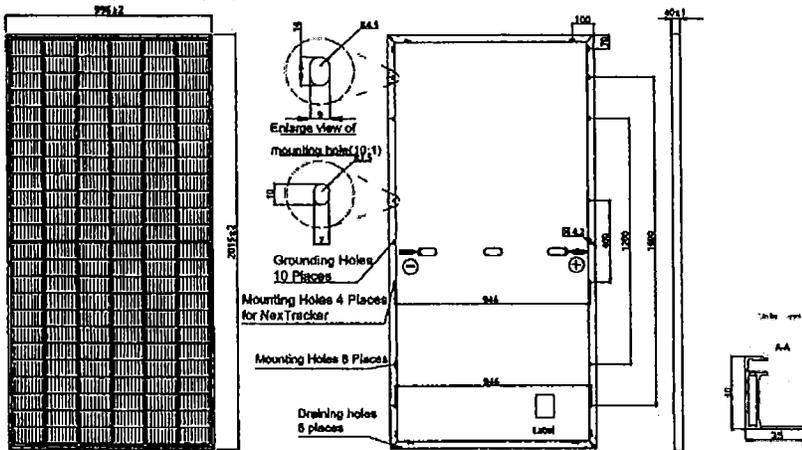
# JA SOLAR

[www.jasolar.com](http://www.jasolar.com)

Specifications subject to technical changes and tests.  
JA Solar reserves the right of final interpretation.



**MECHANICAL DIAGRAMS**



Remark: customized frame color and cable length available upon request

**SPECIFICATIONS**

Cell	Mono
Weight	20.7kg±3%
Dimensions	2015±2mm×996±2mm×40±1mm
Cable Cross Section Size	4mm <sup>2</sup> (12AWG)
No. of cells	144 (6×24)
Junction Box	IP68, 3 diodes
Connector	QC 4.10-35
Cable Length (Including Connector)	Portrait: 300mm(+)/400mm(-); Landscape: 1200mm(+)/1200mm(-)
Packaging Configuration	27 Per Pallet
Front Glass	2.8mm

**ELECTRICAL PARAMETERS AT STC**

TYPE	JAM72S10 -390/MR	JAM72S10 -395/MR	JAM72S10 -400/MR	JAM72S10 -405/MR	JAM72S10 -410/MR
Rated Maximum Power(Pmax) [W]	390	395	400	405	410
Open Circuit Voltage(Voc) [V]	49.01	49.30	49.58	49.86	50.12
Maximum Power Voltage(Vmp) [V]	40.71	41.02	41.33	41.60	41.88
Short Circuit Current(Isc) [A]	10.23	10.28	10.33	10.39	10.45
Maximum Power Current(Imp) [A]	9.58	9.63	9.68	9.74	9.79
Module Efficiency [%]	19.4	19.7	19.9	20.2	20.4
Power Tolerance			0~+5W		
Temperature Coefficient of Isc(α <sub>Isc</sub> )			+0.044%/°C		
Temperature Coefficient of Voc(β <sub>Voc</sub> )			-0.272%/°C		
Temperature Coefficient of Pmax(γ <sub>Pmp</sub> )			-0.350%/°C		

STC

Irradiance 1000W/m<sup>2</sup>, cell temperature 25°C, AM1.5G

Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.  
\*For NextTracker installations static loading performance: front load measures 2400Pa, while back load measures 2400Pa.

**ELECTRICAL PARAMETERS AT NOCT**

TYPE	JAM72S10 -390/MR	JAM72S10 -395/MR	JAM72S10 -400/MR	JAM72S10 -405/MR	JAM72S10 -410/MR
Rated Max Power(Pmax) [W]	294	288	302	306	310
Open Circuit Voltage(Voc) [V]	45.90	46.15	46.41	46.66	46.91
Max Power Voltage(Vmp) [V]	38.15	38.40	38.65	38.90	39.16
Short Circuit Current(Isc) [A]	8.15	8.20	8.25	8.31	8.36
Max Power Current(Imp) [A]	7.71	7.76	7.81	7.87	7.92

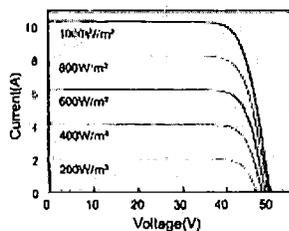
NOCT Irradiance 800W/m<sup>2</sup>, ambient temperature 20°C, wind speed 1m/s, AM1.5G

**OPERATING CONDITIONS**

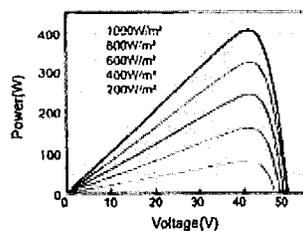
Maximum System Voltage	1000V/1500V DC(UL)
Operating Temperature	-40°C~+85°C
Maximum Series Fuse	20A
Maximum Static Load,Front*	5400Pa(112 lb/ft <sup>2</sup> )
Maximum Static Load,Back*	2400Pa(50 lb/ft <sup>2</sup> )
NOCT	45±2°C
Fire Performance	Type 1

**CHARACTERISTICS**

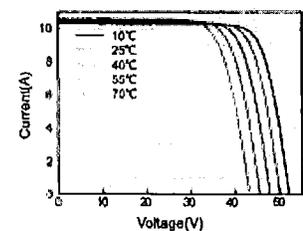
Current-Voltage Curve JAM72S10-405/MR



Power-Voltage Curve JAM72S10-405/MR



Current-Voltage Curve JAM72S10-405/MR





## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

Solicitante: Rafael E Davila

Correo Electrónico: rdavila@wts-corp.com

Compañía: WTSolar LLC

### Datos de Equipo Certificado

Tipo de Equipo(s): Módulo Fotovoltaico

Clasificación: Equipo Nuevo

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
JA Solar	JAM72S10-405W/MR	Certificación de Potencia: UL 61730 Núm. Certificación: 4001505 Laboratorio: ITSNA Certificación de Seguridad: UL 61730 Núm. Certificación: 4001505 Laboratorio: ITSNA	Potencia Nominal: 405Watts 10 años (Potencia): 90% 20 años (Potencia): 80% Dimensiones: 6.6ft X 3.2ft Garantía Manufactura: 25 año(s)

### División de Edificabilidad

Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

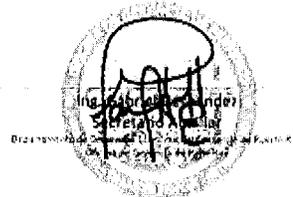
### Condiciones Especiales

Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

### Firmas / Sellos

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**Fecha de Expedición:**  
 03/NOV/2021



**Ing. Gabriel Hernández Rodríguez**  
**Secretario Auxiliar**



A. Photovoltaic System

2. Batteries

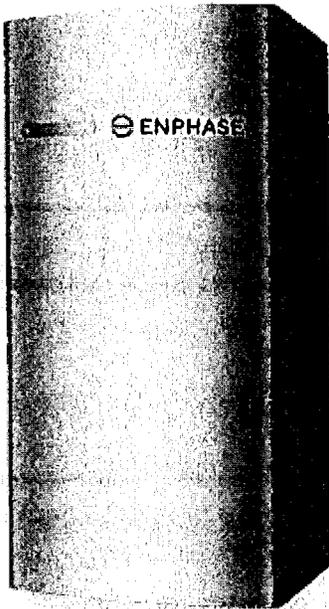
- a. Enphase B
- b. Fortress
- c. Sonnen
- d. WARU B
- e. SimpliPhi
- f. Homegrid
- g. SunBeat

W

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# Enphase Encharge 3

The Enphase Encharge 3™ all-in-one AC-coupled storage system is **reliable, smart, simple, and safe**. It has a total usable energy capacity of 3.36 kWh and includes four embedded grid-forming microinverters with 1.28 kW power rating. It provides backup capability and installers can quickly design the right system size to meet the needs of both new and retrofit solar customers.



## Reliable

- Proven high-reliability IQ Series Microinverters
- Ten-year limited warranty
- Four embedded IQ 8X-BAT Microinverters
- Passive cooling (no moving parts/fans)

## Smart

- Grid-forming capability for backup operation
- Remote software and firmware upgrade
- Mobile app-based monitoring and control
- Support for self consumption
- Utility time of use (TOU) optimization

## Simple

- Fully integrated AC battery system
- Quick and easy plug-and-play installation
- Interconnects with standard household AC wiring

## Safe

- Battery safety tested
- Lithium iron phosphate (LFP) chemistry for maximum safety and longevity

# Enphase Encharge 3

<b>MODEL NUMBER</b>	
ENCHARGE-3-1P-NA	Encharge 3 battery storage system with integrated Enphase Microinverters and battery management unit (BMU). Includes: - One Encharge 3.36 kWh base unit (B03-A01-US00-1-3) - One Encharge 3 cover kit with cover and wall mounting bracket (B03-C-0350-0)
<b>ACCESSORIES</b>	
ENCHARGE-HNDL-R1	One set of Encharge base unit installation handles
<b>OUTPUT (AC)</b>	
	<b>@240 VAC*</b>
Rated (continuous) output power	1.28 kVA
Peak output power	1.92 kVA (10 seconds)
Nominal voltage / range	240/211–264 VAC
Nominal frequency / range	60/57–63 Hz
Rated output current	5.3 A
Peak output current	8.2A (10 seconds)
Power factor (adjustable)	0.85 leading ... 0.85 lagging
Maximum units per 20 A branch circuit	Three units (single phase)
Interconnection	Single phase
Maximum AC short circuit fault current over 3 cycles	23.2 Arms
Round trip efficiency <sup>2</sup>	89%
<b>BATTERY</b>	
Total capacity	3.5 kWh
Usable capacity	3.36 kWh
Round trip efficiency	96%
Nominal DC voltage	67.2 V
Maximum DC voltage	73.5 V
Ambient operating temperature range	-15° C to 55° C (5° F to 131° F) non-condensing
Optimum operating temperature range	0° C to 30° C (32° F to 86° F)
Chemistry	Lithium Iron phosphate (LFP)
<b>MECHANICAL DATA</b>	
Dimensions (WxHxD)	367 mm x 664 mm x 319mm (14.45 in x 26.14 in x 12.56 in)
Weight	One individual 44.2 kg (97.4 lbs) base unit plus 7.8 kg (17.2 lbs) cover and mounting bracket, total 52 kg (114.6 lbs)
Enclosure	Outdoor – NEMA 3R
IQ BX-BAT microinverter enclosure	NEMA type 6
Cooling	Natural convection – No fans
Altitude	Up to 2500 meters (8200 feet)
Mounting	Wall mount
<b>FEATURES AND COMPLIANCE</b>	
Compatibility	Compatible with grid-tied PV systems. Compatible with Enphase M215/M250 and IQ Series Micros, Enphase Enpower, and Enphase IQ Envoy for backup operation.
Communication	Wireless 2.4 GHz
Services	Backup, self-consumption, TOU, Demand Charge, NEM Integrity
Monitoring	Enlighten Manager and MyEnlighten monitoring options; API Integration
Compliance	UL 9540, UN 38.3, UL 9540A, UL 1998, UL 991, NEMA Type 3R, AC156 EMI: 47 CFR, Part 15, Class B, ICES 003 Cell Module: UL 1973, UN 38.3 Inverters: UL 62109-1, IEC 62109-2, UL 1741SA, CAN/CSA C22.2 No. 1071-16, and IEEE 1547
<b>LIMITED WARRANTY</b>	
Limited Warranty <sup>2</sup>	>70% capacity, up to 10 years or 4000 cycles
	1. Supported in backup/off-grid operation. 2. AC to battery to AC at 50% power rating 3. Whichever occurs first. Restrictions apply.

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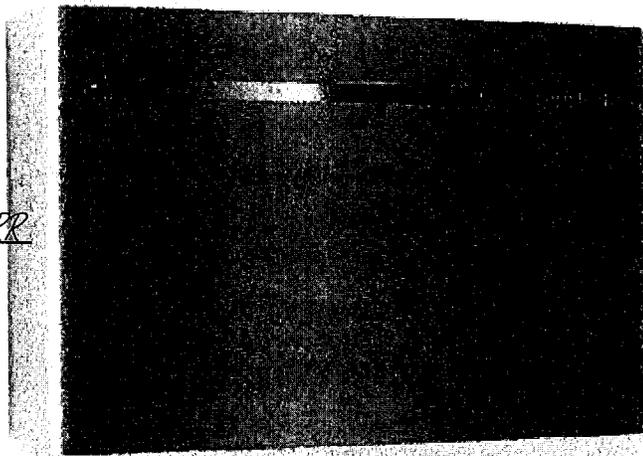
To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

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# Enphase Encharge 10

The **Enphase Encharge 10™** all-in-one AC-coupled storage system is **reliable, smart, simple, and safe**. It is comprised of three base Encharge 3™ storage units, has a total usable energy capacity of 10.08 kWh and twelve embedded grid-forming microinverters with 3.84 kW power rating. It provides backup capability and installers can quickly design the right system size to meet the needs of both new and retrofit solar customers.



## Reliable

- Proven high reliability IQ Series Microinverters
- Ten-year limited warranty
- Three independent Encharge storage base units
- Twelve embedded IQ 8X-BAT Microinverters
- Passive cooling (no moving parts/fans)

## Smart

- Grid-forming capability for backup operation
- Remote software and firmware upgrade
- Mobile app-based monitoring and control
- Support for self consumption
- Utility time of use (TOU) optimization

## Simple

- Fully integrated AC battery system
- Quick and easy plug-and-play installation
- Interconnects with standard household AC wiring

## Safe

- Cells safety tested
- Lithium iron phosphate (LFP) chemistry for maximum safety and longevity

# Enphase Encharge 10

<b>MODEL NUMBER</b>	
ENCHARGE-10-1P-NA	Encharge 10 battery storage system with integrated Enphase Microinverters and battery management unit (BMU). Includes: - Three Encharge 3.36 kWh base units (B03-A01-US00-1-3) - One Encharge 10 cover kit with cover, wall mounting bracket, watertight conduit hubs, and interconnect kit for wiring between batteries (B10-C-1050-0)
<b>ACCESSORIES</b>	
ENCHARGE-HNDL-R1	One set of Encharge base unit installation handles
<b>OUTPUT (AC)</b>	
	<b>@ 240 VAC<sup>1</sup></b>
Rated (continuous) output power	3.84 kVA
Peak output power	5.7 kVA (10 seconds)
Nominal voltage / range	240 / 211 – 264 VAC
Nominal frequency / range	60 / 57 – 61 Hz
Rated output current	16 A
Peak output current	24.6A (10 seconds)
Power factor (adjustable)	0.85 leading ... 0.85 lagging
Maximum units per 20 A branch circuit	1 unit (single phase)
Interconnection	Single-phase
Maximum AC short circuit fault current over 3 cycles	69.6 Arms
Round trip efficiency <sup>2</sup>	89%
<b>BATTERY</b>	
Total capacity	10.5 kWh
Usable capacity	10.08 kWh
Round trip efficiency	96%
Nominal DC voltage	67.2 V
Maximum DC voltage	73.5 V
Ambient operating temperature range	-15° C to 55° C (5° F to 131° F) non-condensing
Optimum operating temperature range	0° C to 30° C (32° F to 86° F)
Chemistry	Lithium Iron phosphate (LFP)
<b>MECHANICAL DATA</b>	
Dimensions (WxHxD)	1070 mm x 664 mm x 319 mm (42.13 in x 26.14 in x 12.56 in)
Weight	Three individual 44.2 kg (97.4 lbs) base units plus 21.1 kg (48.7 lbs) cover and mounting bracket; total 154.7 kg (341 lbs)
Enclosure	Outdoor – NEMA type 3R
IQ 8X-BAT microinverter enclosure	NEMA type 6
Cooling	Natural convection – No fans
Altitude	Up to 2500 meters (8200 feet)
Mounting	Wall mount
<b>FEATURES AND COMPLIANCE</b>	
Compatibility	Compatible with grid-tied PV systems. Compatible with Enphase M215/M250 and IQ Series Micros, Enphase Enpower, and Enphase IQ Envoy for backup operation.
Communication	Wireless 2.4 GHz
Services	Backup, self-consumption, TOU, Demand Charge, NEM Integrity
Monitoring	Enlighten Manager and MyEnlighten monitoring options; API integration
Compliance	UL 9540, UN 38.3, UL 9540A, UL 1998, UL 991, NEMA Type 3R, AC156 EMI: 47 CFR, Part 15, Class B, ICES 003 Cell Module: UL 1973, UN 38.3 Inverters: UL 62109-1, IEC 62109-2, UL 1741SA, CAN/CSA C22.2 No. 1071-16, and IEEE 1547
<b>LIMITED WARRANTY</b>	
Limited Warranty <sup>3</sup>	>70% capacity, up to 10 years or 4000 cycles
<ol style="list-style-type: none"> <li>Supported in backup/off grid operations</li> <li>AC to Battery to AC at 50% power rating.</li> <li>Whichever occurs first. Restrictions apply.</li> </ol>	

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To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

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## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

Solicitante: Gabriel E Ferrer

Correo Electrónico: gferrer@enphase.com

Compañía: Enphase Energy, Inc.

### Datos de Equipo Certificado

Tipo de Equipo(s): Batería

Clasificación: Equipo Nuevo

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
Enphase	ENCHARGE-3T-1P-NA		Capacidad: 52 Ah Voltaje Nominal: 67 VDC Tipo de Batería: Litio Hierro Fosfato Tipo de Carga y Descarga: 1,28 KVA Dimensiones Nominales: 430 mm x 775 mm x 188 mm Peso nominal: 108 lbs. Garantía Manufactura: 10 año(s)
Enphase	ENCHARGE-10T-1P-NA		Capacidad: 156 Ah Voltaje Nominal: 67 VDC Tipo de Batería: Litio Hierro Fosfato Tipo de Carga y Descarga: 3,84 KVA Dimensiones Nominales: 1283 mm x 775 mm x 188 mm Peso nominal: 316 lbs. Garantía Manufactura: 10 año(s)

### División de Edificabilidad

Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

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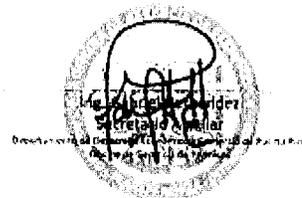
### Condiciones Especiales

Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

### Firmas / Sellos

Fecha de Expedición:

20/OCT/2021



Ing. Gabriel Hernández Rodríguez

Secretario Auxiliar





## Certificación de Equipos de Energía Renovable

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# FORTRESS *Power eFlex*

*eFlex* 5.4 Lithium Battery Storage

## Energy Savings & Security with Fortress Power



Maximize Your Solar Investment with Battery Storage



Achieve Grid Independence during Power Outages



Reduce Your Electric Bill



Versatile Applications including Home, Business,  
Mobile, Telecom and Railway



SCAN FOR  
INSTALLATION  
MANUAL

# eFlex 5.4 kWh Solar Storage Battery

Taking Innovation to the Next Level

Safest Lithium Technology (LiFeP04) on the market

MODbus and CANbus Communication for Internet-of-Things Copatibility

98% Roundtrip Efficiency

IP65 Dust and Water Proof Design

10 Year Warranty with Unlimited Partial Cycles

Data communication with popular hybrid inverters

Market Leading BMS Battery to Maximize Reliability and Longevity



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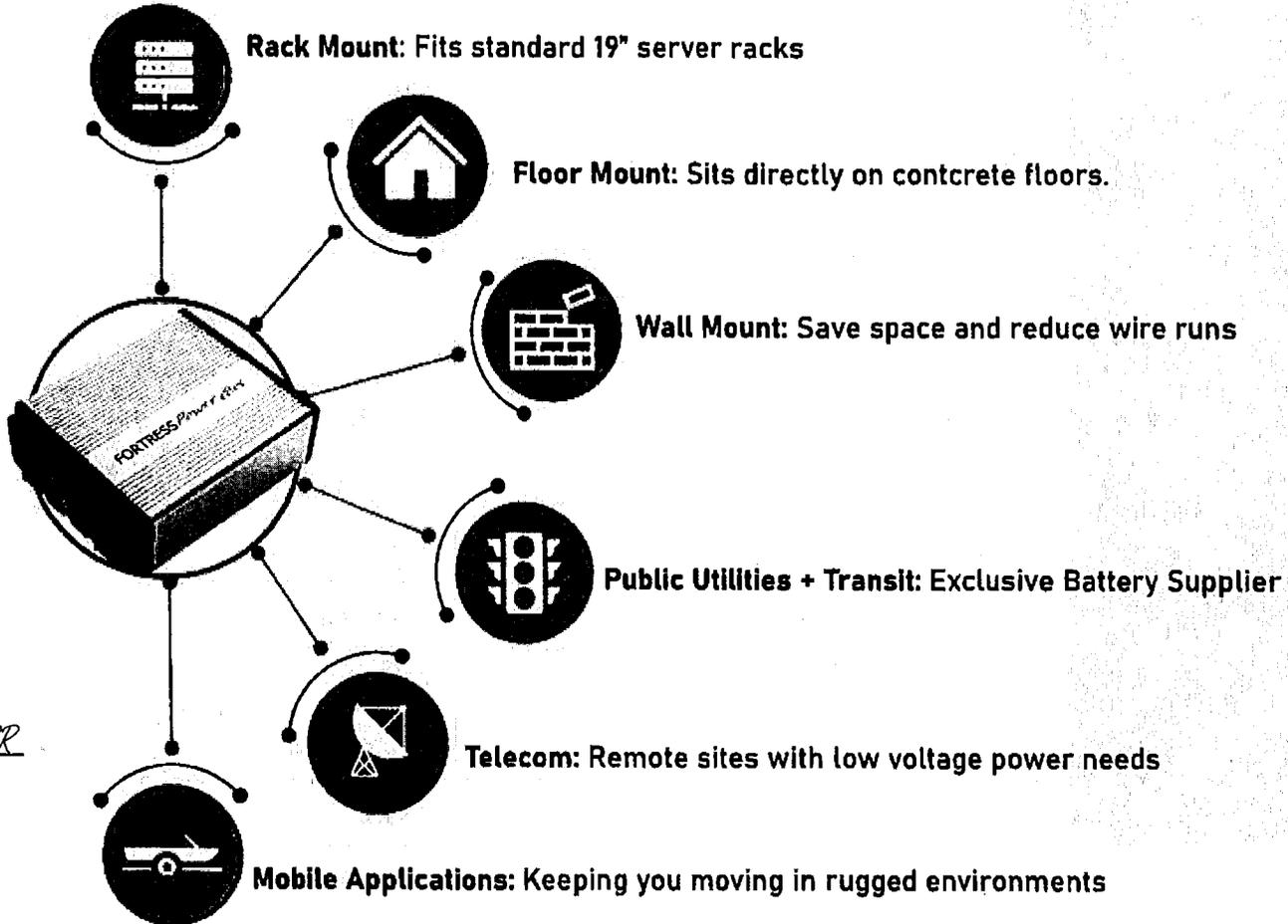
“Few companies offer such support at all these levels”

“Fortress Power has been fantastic to work with. Their technical team is readily available for installation questions. Their shipping team keeps me informed of the timing of deliveries. The sales department makes sure we know about sale prices, new products, and their terrific discount for veterans. Few companies offer such support at all these levels. A super team to work with!”

- Lori Hunt  
Practical Preppers LLC

# Versatile Applications

## Designed For Multiple Project Scenarios



*"You Think It - We'll Power It"*

**INTERESTED IN BECOMING A  
CERTIFIED INSTALLER?**

Join us to bring the latest energystorages to millions of homes and businesses across the world!

SCAN ME



# eFlex 5.4 kWh Lithium Storage

	<i>eFlex 5.4</i>
Total Energy (kWh)	5.4
Max. Charge Current (Continuous) [A]	100
Max. Discharge Current (Continuous) [A]	60
Max. Pulse Current (for 5sec) [A]	130
Capacity [Ah]	105
Voltage Range [V]	44-58.4
Charging Temperature [F]	32 to 113
Discharging Temperature [F]	32 to 140
Storage Temperature [F]	32 to 95
Dimension [LxWxH, Inch]	21.5 x 17.5 x 7.2
Weight [lbs]	116
Life Cycles	6000 @ 80% DoD
Round Trip Efficiency	>98%

Compatible with Most  
Inverters on the Market

Schneider Sol-Ark MidNite Solar OutBack Power SMA Morningstar

## ABOUT FORTRESS POWER

Fortress Power proudly services homes, businesses, utilities, telecom and transportation companies worldwide. Our Pennsylvania-based team's passion for clean energy storage has earned us a place among the world's top energy storage battery manufacturers.

Our logistics centers in California, Florida and Pennsylvania offer easy distribution to all of our major markets. Fortress Power's high-performance solar lithium battery storage products are designed, engineered and inventoried along with live technical support in the United States.

Fortress Power has partnered with industry leading lending institutions to help make your solar investment as easy as possible. Please visit our website for purchasing and financing options.



Fortress Power is a manufacturer of high-performance solar lithium battery storage products that are designed, engineered and inventoried along with live technical support in the United States!

[www.fortresspower.com](http://www.fortresspower.com)

[sales@fortresspower.com](mailto:sales@fortresspower.com)

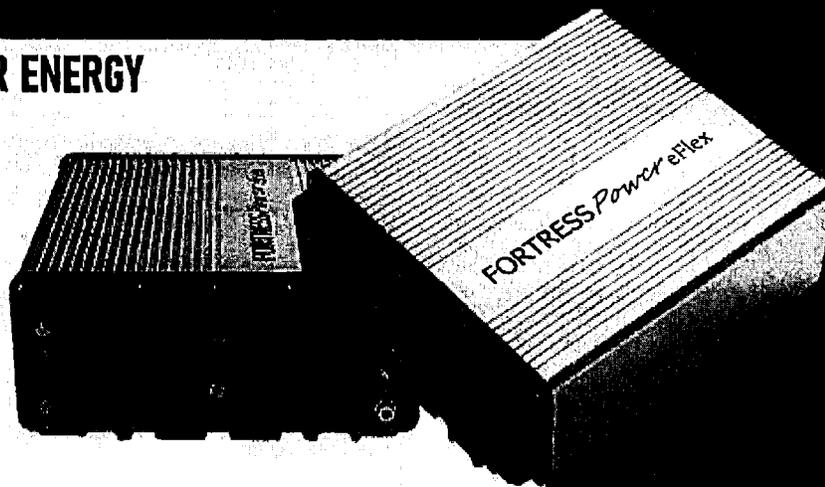
(877) 497-6937

# FORTRESS *Power eFlex*



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## SECURING YOUR ENERGY



**Fortress Power**

 505 Keystone Rd. Southampton PA 18966 USA

 [www.fortresspower.com](http://www.fortresspower.com)

 [sales@fortresspower.com](mailto:sales@fortresspower.com)

 877-497-6937

# eFLEX 5.4

## LITHIUM IRON PHOSPHATE BATTERY

The Fortress Power eFlex is a 5.4 kWh scalable energy storage solution based on safe and energy dense prismatic Lithium Iron Phosphate cells. The digital processor Battery Management System (BMS) includes high amperage contactor disconnects and advanced Closed-Loop inverter communication, as well as individual cell voltage monitoring, temperature monitoring, and cell balancing to maximize reliability and longevity. Canbus, modbus, and wifi communication enable internet-of-things compatibility. The IP65 case ensures direct water spray and dust will not penetrate the battery internals from all directions. The unit can be wall mounted, floor mounted, and server rack mounted for hard-to-reach access in renewable, marine, RV, mobile, telecom, railway applications and more!

- 98% Roundtrip efficiency
- High Durability and Long-Lasting
- Safe Lithium Iron Phosphate Technology (LiFePO4)
- Flexible mounting options
- Data communication with popular hybrid Inverters
- Remote monitoring
- Advanced cell level monitoring and balancing
- Integrated heat sink for 5x better thermal performance

### Electrical Specifications

Nominal Voltage:	51.2V
Nominal Capacity:	105AH
Rated Capacity @ 0.5C (50A):	5.374 kWh
Resistance:	<10 mΩ
Efficiency (at 0.5C):	98%
Self-Discharge:	<1% / Month
Maximum Allowed Modules in Parallel:	15

### Charge Specifications

Recommended Charge Current:	<55A
Maximum Charge Current:	100A
Recommended Charge Voltage:	54.4V
BMS Charge Voltage Disconnect:	>56V

### Discharge Specifications

Recommended Continuous Discharge Rate:	60A (3KW DC)
Peak Continuous Discharge Rate:	100A (5 KW 60 Min)
Maximum Surge Power Rate:	130A (6.6 KW 5S)
Recommended Low Voltage Disconnect:	48V
Battery Low Voltage Protection:	<45V
Battery recovery Voltage:	45V

### Temperature Specifications

Discharge Temperature:	-4°F~131°F (-20°C ~ 55°C)
Charge Temperature:	32°F ~ 114°F (0°C ~ 45°C)
Storage Temperature:	20°F ~ 95°F (-6°C ~ 35°C)

### Mechanical Specifications

Dimensions: (L*W*H)	21.5 x 23 x 17.5 x 7.3 inches 546 x 446 x 183 mm
Weight	108 lbs (49kg)
Terminal Type:	M8
Ring Terminal Size:	3/8ths or larger
Terminal Torque:	70 ~ 77 Nm (51 ~ 5.7 ft-lb)
Case Material:	Anodized Aluminum
Enclosure Protection:	IP65
Cell Type Chemistry:	Prismatic - LiFePO4

### Compliance Specifications:

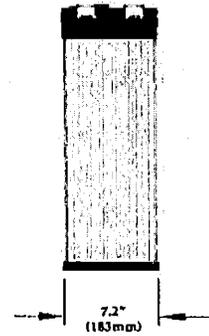
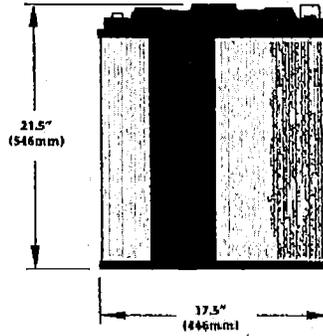
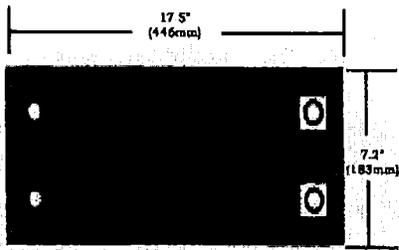
Certifications:	UL1973, UL1642
Shipping Classification:	UN 38.3 CLASS 9

### Basic Charging Profile

Bulk + Absorb Charge	54.4V
Absorb Time	60 minutes
Float Charge	54V
Inverter Charging	2 Stage / No Float
Equalization	No equalization (typical) 54.6V for 10 seconds (rare)
Temperature Compensation	None

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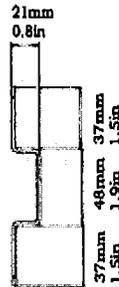
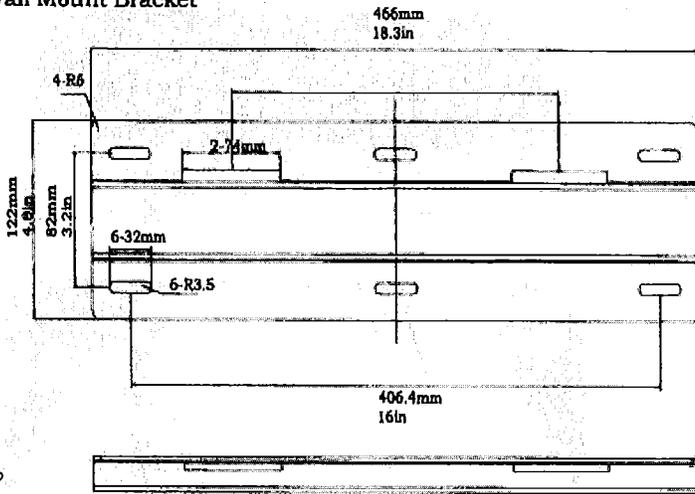




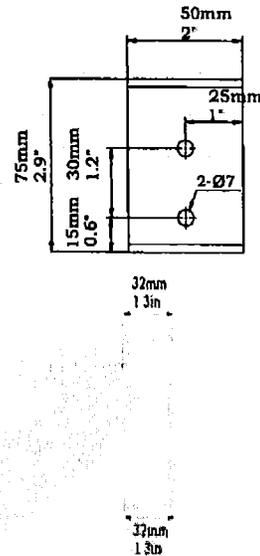
Accessories (Not Included)

Wall Mount Kit

Wall Mount Bracket

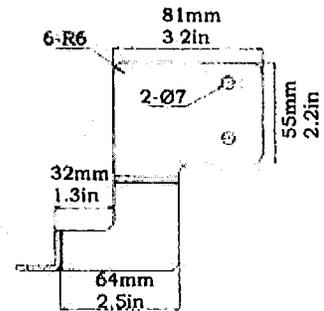
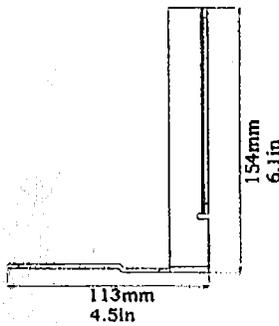
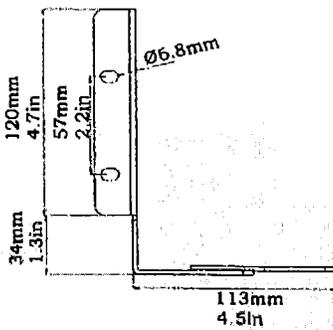


Wall Mount Hook



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Server Rack Mount Kit



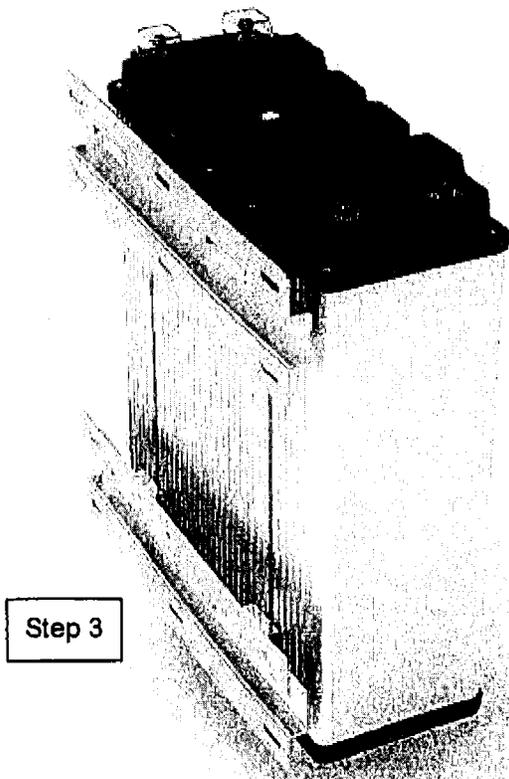
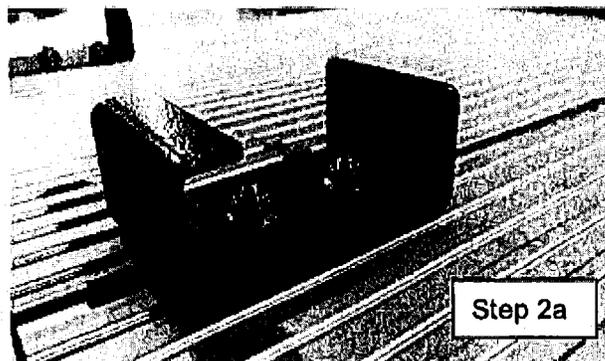
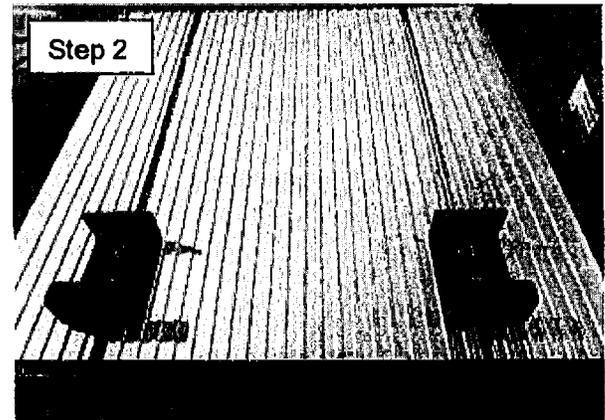
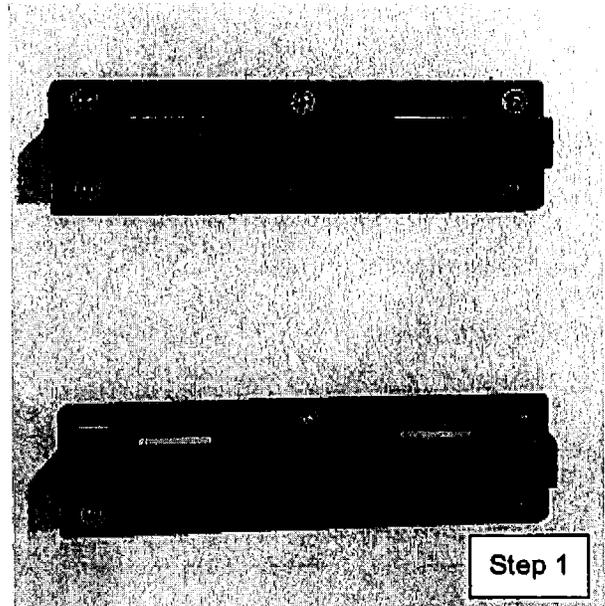
Scan for  
Installation  
Manual:



#### 4.4.2. Mounting the battery pack to a wall

The eFlex 5.4 can be easily wall-mounted using our custom T-slot brackets. The wall-mounting brackets are sold separately. Please ensure the wall and mounting hardware can handle the weight of the batteries.

1. Line up the top bracket on the wall.
  - a. Mark the desired placement using a level to ensure the bracket is horizontal
  - b. Affix the mounting bracket into the wall
2. Using the T-slot screws, fix the male brackets onto the slots in the battery
3. Once all brackets are properly positioned, carefully lift the battery with the help of someone and gently drop it into the female wall mounted brackets



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# Garantía Limitada de Fortress Power – Series LFP, eVault y eFlex

**10 años en los Estados Unidos y Canadá**  
**5 años fuera de los Estados Unidos y Canadá**



## **GARANTÍA LIMITADA para las series LFP-5/10, eVault y eFlex**

**10 años en los Estados Unidos y Canadá  
5 años fuera de los Estados Unidos y Canadá**

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# 1 – COBERTURA DE GARANTÍA LIMITADA

Las baterías de litio-ferrofosfato de Fortress Power LFP-5/10, eFlex y eVault (“Producto(s)”) como las suministra y distribuye Fortress Power, LLC, (“Fortress Power”) una corporación de Pennsylvania, cuentan con garantía (la “Garantía Limitada”) de Fortress Power, LLC, para defectos de fabricación en materiales y mano de obra. En los Estados Unidos y Canadá, la cobertura se prorratea durante un período de diez (10) años (“Período de la Garantía Limitada de 10 años”); o por 6000 ciclos, 80 % de DOD (profundidad de descarga); o 2000 ciclos, 100 % de DOD; lo que ocurra primero. Fuera de los Estados Unidos y Canadá, la cobertura se brinda durante un período de (5) años (“Período de la Garantía Limitada de 5 años”); o por 3000 ciclos, 80 % de DOD; o 1000 ciclos, 100 % de DOD; lo que ocurra primero. Todas las instalaciones internacionales de Productos de Fortress en embarcaciones marítimas y aplicaciones vehiculares están cubiertas con un Período de Garantía Limitada de 5 años. Para cumplir los requisitos, todos los Productos de Fortress deben ser instalados por un profesional autorizado utilizando el Manual de Instalación de Fortress Power y la Guía de Integración de Fortress Power (ambos están disponibles en [www.fortresspower.com/resources](http://www.fortresspower.com/resources)).



**IMPORTANTE** El Manual de Instalación de Fortress Power y la Guía de Integración de Fortress Power para la configuración de los parámetros de las baterías con varios inversores/cargadores se pueden descargar en [www.fortresspower.com/resources](http://www.fortresspower.com/resources).

Tabla 1.0 – Rendimiento energético total de acuerdo con la profundidad de descarga máxima (DOD) para cada producto de Fortress.

Modelo de batería Fortress	80 % de DOD	90 % de DOD	100 % de DOD
eVault 18.5 (48 V)	87,2 MWH	48,9 MWH	36,3 MWH
eFlex 5.4 (48 V)	25,6 MWH	14,4 MWH	10,7 MWH
LFP-10 (48 V)	48,1 MWH	27,1 MWH	20,0 MWH
LFP-5K (48 V)	24,0 MWH	13,5 MWH	10,0 MWH
LFP-5K (24 V)	24,0 MWH	13,5 MWH	10,0 MWH

Los términos de las Garantías Limitadas de 10 años y 5 años (i) comienzan en la fecha original de compra del Producto de Fortress Power según lo indicado en la Tarjeta de registro de la Garantía Limitada enviada a Fortress Power y (ii) continúa durante el Período de la Garantía Limitada. Esta Garantía Limitada solo corresponde al comprador de uso final del Producto de Fortress Power y solo es transferible si el Producto de Fortress Power continúa instalado en el lugar de uso original. Fortress Power no garantiza la mano de obra realizada por una persona o firma que instala el Producto de Fortress Power. Esta Garantía Limitada no cubre el costo de instalación, extracción, envío o reinstalación. Esta Garantía Limitada no cubre fallas de diseño ni errores del instalador, tales como, entre otras, polaridad inversa o uso indebido de todos los equipos del sistema o programación incorrecta de todos los equipos auxiliares del sistema.

Esta Garantía Limitada corresponde solo a un producto de Fortress Power (a) adquirido en Fortress Power o en un distribuidor, proveedor o revendedor autorizados de Fortress Power, y (b) correctamente instalado por un profesional autorizado.

La responsabilidad de Fortress Power según esta Garantía Limitada queda limitada a la reparación o el reemplazo del Producto de Fortress Power, al propio criterio de Fortress Power. Fortress Power no será responsable por otros tipos de pérdidas o costos de cualquier tipo respecto del uso de sus productos. Si se determina que el Producto de Fortress Power es defectuoso como resultado de un defecto de fabricación en los materiales o la mano de obra durante el Período de la Garantía Limitada, a su propio criterio, Fortress Power (i) reparará el Producto, (ii) reemplazará el Producto, (iii) reemplazará el Producto con un Producto similar de Fortress Power o (iv) acreditará el valor depreciado restante del Producto para aplicarlo a la compra de un Producto de Fortress Power nuevo. Si se reemplaza un Producto de Fortress Power, el Producto defectuoso de Fortress Power será propiedad de Fortress Power y debe devolverse a Fortress Power sin reclamo de propiedad alguno de terceros. El período de Garantía de los Productos de Fortress Power

reparados o de su repuesto es de doce (12) meses a partir de la fecha de envío desde Fortress Power, o el tiempo restante del Período de la Garantía Limitada, el que sea mayor.



**NOTA: CONSULTE LOS AVISOS IMPORTANTES EN EL APÉNDICE (Apéndice A)**

## 2 – GUÍA PARA LOS PARÁMETROS OPERATIVOS

A pesar de que las baterías de litio de Fortress Power pueden funcionar a índices y profundidades de descarga muy altos en un rango de temperatura muy amplio, a fin de extender los ciclos de vida y cumplir la Garantía, deben seguirse estas pautas:

### 2.1 – PARÁMETROS DE CARGA

Para ver la recomendación de configuración de cargador/inversor para el mejor rendimiento, consulte el Apéndice B:

	6000 ciclos	3000 ciclos	2000 ciclos
Soporte de ecualización	Apagado	Apagado	Apagado
Límite de capacidad	Consulte la ficha técnica del producto.		
Voltaje de ecualización	Cada 30 días		
Voltaje de recarga	52 V	51 V	47
Voltaje bruto	54,4 V	54,6 V	55,5 V
Voltaje de absorción	54,4 V	54,6 V	55,5 V
Voltaje de corte por batería baja	50,7 V	48,4 V	44
Voltaje de corte por batería alta	61 V	61 V	61 V
Voltaje de flotación	Apagar, si es posible 54,4 V		
Corriente de carga máx.	eVault: 100 A por batería eFlex: 70 A por batería LFP-5: 50 A por batería LFP-10: 70 A por batería	eVault: 170 A por batería eFlex: 70 A por batería LFP-5: 50 A por batería LFP-10: 80 A por batería	eVault: 170 A por batería eFlex: 100 A por batería LFP-5: 80 A por batería LFP-10: 80 A por batería
Corriente de descarga máx.	eVault: 180 A por batería eFlex: 70 A por batería LFP-5: 50 A por batería LFP-10: 100 A por batería	eVault: 180 A por batería eFlex: 70 A por batería LFP-5: 50 A por batería LFP-10: 100 A por batería	eVault: 180 A por batería eFlex: 100 A por batería LFP-5: 80 A por batería LFP-10: 100 A por batería

Parámetros operativos recomendados de cargadores/inversores para 2000 y 3000 ciclos:

- Rango de temperatura operativa: de 32 °F a 120 °F (de 0 °C a 49 °C)

Parámetros operativos recomendados de cargadores/inversores para 6000 ciclos:

- Rango de temperatura operativa: de 50 °F a 110 °F (de 10 °C a 43 °C)

El almacenamiento debe ser igual o superior al doble del rendimiento nominal del inversor en la capacidad del fin de ciclo equivalente al 70 % de la capacidad de retención.

No exponer la batería a temperaturas altas. Las baterías de litio de Fortress Power deben almacenarse fuera de la luz solar directa

de acuerdo con las siguientes condiciones de temperatura.

Temperatura de almacenamiento (mín./máx.): 41 °F/5 °C – 95 °F/35 °C Humedad relativa (mín./máx.): 5 %~75 % HR

## 2.2 – GUÍA RÁPIDA DE DIMENSIONAMIENTO

Dimensionamiento adecuado del sistema es fundamental a fin de mantener el estado y la operación correcta de la batería. Usar un Inversor con un índice de carga que supere el índice de carga máximo recomendado de la batería **puede provocar el mal funcionamiento de la batería** debido a los mecanismos de seguridad. Por lo tanto, es importante dimensionar correctamente la cantidad de baterías, según la potencia del inversor. La tabla del Apéndice B enumera algunos inversores comunes y la cantidad mínima de baterías necesarias para evitar el mal funcionamiento. Consulte los manuales de instalación de la batería y del inversor para la guía de dimensionamiento y los detalles específicos para el correcto dimensionamiento.

## 3 – REGISTRO DE LA GARANTÍA LIMITADA

Para activar esta Garantía Limitada, se debe completar el Formulario de Registro de la Garantía Limitada adjunto del Apéndice C y enviarlo a Fortress Power según las instrucciones establecidas en el Formulario de Registro de la Garantía Limitada. El formulario de registro también puede completarse en nuestro sitio web en el siguiente enlace: [www.fortresspower.com/product-warranty](http://www.fortresspower.com/product-warranty). El formulario de registro de la Garantía Limitada debe estar autorizado y confirmado por Fortress para que sea efectivo. Fortress enviará la confirmación en los 5 días posteriores a la recepción del formulario de registro de la Garantía Limitada. Esta Garantía Limitada corresponde únicamente a los Productos de Fortress Power que (i) estén registrados en el Formulario de Registro de la Garantía Limitada adjunto en esta Garantía Limitada y (ii) estén instalados en el lugar de uso original, que se describe incluyendo la dirección del lugar de uso original en el espacio "Dirección de instalación" provisto en el Formulario de Registro de la Garantía Limitada y el nombre del instalador/distribuidor o proveedor.

## 4-CÓMO OBTENER EL SERVICIO DE LA GARANTÍA LIMITADA

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Para solicitar servicio de garantía, el instalador/distribuidor/proveedor debe contactarse con Fortress Power por escrito durante el Período de la Garantía Limitada. Fortress Power o sus representantes autorizados intentarán solucionar los problemas del Producto de Fortress Power en el lugar de uso original para determinar si el producto es defectuoso. Si Fortress Power determina que se necesita el servicio de la Garantía, Fortress Power emitirá un número de autorización de devolución del producto ("RMA"). Para solicitar un número RMA, debe proporcionar por escrito la siguiente Información a Fortress Power:

- Prueba de la fecha y del lugar de compra, como una copia de la factura de compra del Producto original de Fortress Power.
- El número de modelo y número de serie del Producto de Fortress Power.
- Descripción del problema; y
- Dirección de envío del equipo reparado o del repuesto.

Después de recibir el número RMA, debe empaquetar el Producto de Fortress Power autorizado para devolver, junto con la información descrita arriba, en el contenedor o paquete de envío original de Fortress Power con protección equivalente. Fortress Power no es responsable por los daños de envío provocados por un empaquetado incorrecto del Producto, las reparaciones que necesiten esos daños o el costo de esas reparaciones.

Si al recibir el Producto, Fortress Power determina que es defectuoso y que el defecto está cubierto por los términos de esta Garantía Limitada, Fortress Power aprobará el reclamo de la Garantía Limitada y reparará o reemplazará el Producto sin costo para el usuario.

## 5 – EXCLUSIONES Y LIMITACIONES

Esta Garantía Limitada no corresponde a las baterías de Fortress Power LFP-5/10, eVault y eFlex, ni a los Productos de Fortress Power en las siguientes condiciones: (i) si el Producto de Fortress Power superó el Período de la Garantía Limitada o la cantidad de ciclos cubiertos, o (ii) si el Producto de Fortress Power o cualquiera de sus piezas se modificaron o dañaron en los siguientes casos:

- Instalación o extracción
- Alteración o desmontaje
- Desgaste por uso normal
- Accidente o abuso (que se caiga, etc.)
- Corrosión, exposición ambiental inadecuada
- Reparación o servicio provisto por una instalación de reparación no autorizada
- Rayos
- Operación contraria a las instrucciones del fabricante del producto
- Incendio, inundación o casos fortuitos
- Condiciones de calor o frío excesivos
- Daños por agua
- Envío o transporte
- Daños accidentales o consecuentes causados por otros componentes del sistema de energía, incluidos entre otros, inversores, controladores de carga, disyuntores, interruptores de paso, fusibles, etc.
- Todo producto cuyo número de serie fue modificado, manipulado o eliminado
- Uso y mantenimiento continuos a temperaturas debajo de 32 °F (0 °C) o superiores a 90 °F (32 °C)
- Operación para uso no previsto, o uso que supere los límites o cargas permitido o recomendados para el Producto de Fortress Power

ESTA GARANTÍA LIMITADA ES LA GARANTÍA EXCLUSIVA CORRESPONDIENTE A LOS PRODUCTOS DE FORTRESS POWER. FORTRESS POWER RECHAZA EXPRESAMENTE A OTRAS GARANTÍAS EXPLÍCITAS O IMPLÍCITAS DE PRODUCTOS DE FORTRESS POWER, INCLUIDAS ENTRE OTRAS, GARANTÍAS IMPLÍCITAS DE COMERCIABILIDAD O APTITUD PARA UN PROPÓSITO PARTICULAR. NINGUNA GARANTÍA, YA SEA EXPLÍCITA O IMPLÍCITA, INCLUIDAS ENTRE OTRAS, GARANTÍAS IMPLÍCITAS DE COMERCIABILIDAD O APTITUD PARA UN PROPÓSITO PARTICULAR SE APLICARÁ DESPUÉS DEL PERÍODO DE LA GARANTÍA LIMITADA.

FORTRESS POWER TAMBIÉN LIMITA EXPRESAMENTE SU RESPONSABILIDAD EN CASO DE REPARACIÓN O REEMPLAZO DE UN PRODUCTO DEFECTUOSO SEGÚN LOS TÉRMINOS DE ESTA GARANTÍA LIMITADA, Y EXCLUYE TODA RESPONSABILIDAD POR DAÑOS ACCIDENTALES O CONSECENTES, INCLUIDAS ENTRE OTRAS, LA RESPONSABILIDAD DE QUE UN PRODUCTO DE FORTRESS POWER NO ESTÉ DISPONIBLE PARA USAR O POR LA PÉRDIDA DE INGRESOS O GANANCIAS, INCLUSO SI FORTRESS POWER HA SIDO NOTIFICADO SOBRE LA POSIBILIDAD DE DICHOS DAÑOS. ALGUNOS ESTADOS (O JURISDICCIONES) PUEDEN NO PERMITIR LA EXCLUSIÓN O LIMITACIÓN DE CIERTAS GARANTÍAS O DAÑOS, POR LO QUE ALGUNAS DE LAS EXCLUSIONES ANTERIORES PODRÍAN NO CORRESPONDERLE.

Si existen inconsistencias entre esta Garantía Limitada y otro acuerdo o declaración incluidos o relacionados con el Producto o los

servicios de Fortress Power, registrará esta Garantía Limitada. Si se determina que alguna disposición de esta Garantía Limitada no es válida o no se puede ejecutar, se considerará una modificación en la medida mínima para que sea ejecutable y el resto de esta Garantía Limitada permanecerá válida y ejecutable según sus términos.

## 5 – PROTECCIÓN DEL CONSUMIDOR Y OTRAS LEYES

Algunos estados de EE. UU. u otras jurisdicciones pueden no permitir limitaciones en la duración de una garantía implícita, o la exclusión o limitación de los daños accidentales o consecuentes, por lo tanto, las limitaciones o exclusiones anteriores pueden no corresponderle. Estas entidades gubernamentales pueden brindar derechos y reparaciones adicionales a la garantía, y las disposiciones incluidas en esta Garantía Limitada no tienen la finalidad de limitar, modificar, eliminar, renunciar o excluir ningún requisito obligatorio de garantía provisto por estas jurisdicciones, incluidas ciertas garantías implícitas. Esta Garantía Limitada le otorga derechos legales específicos, y usted puede tener otros derechos que varían según su ubicación.

Su aceptación y uso del Producto de Fortress Power constituye la aceptación de los términos, condiciones y limitaciones de esta Garantía Limitada. Los términos, condiciones y limitaciones de esta Garantía Limitada reemplazan cualquier otro acuerdo o documento relacionado con el contenido del presente, incluidos entre otros, los términos y las condiciones que son parte de un pedido de compra que cubre al Producto de Fortress Power u otro documento enviado a Fortress Power enviado por usted en relación con el Producto de Fortress Power.

## 6 – CÓMO CONTACTARSE CON FORTRESS POWER

Para obtener servicio de Garantía, contáctese con nosotros:  
Fortress Power, LLC  
505 Keystone Road,  
Southampton, Pennsylvania, 18966  
+1 877.497.6937  
[warranty@fortresspower.com](mailto:warranty@fortresspower.com) [www.FortressPower.com](http://www.FortressPower.com)

### Instrucciones para el registro de la Garantía:

Debe registrar su producto para validar la Garantía Limitada. Complete el formulario adjunto y envíelo a [warranty@fortresspower.com](mailto:warranty@fortresspower.com) en los 30 días posteriores a la compra. Incluya una copia de la factura de compra con el formulario de registro. El formulario de registro de la Garantía Limitada también se puede completar en nuestro sitio web en el siguiente enlace: [www.fortresspower/product-warranty](http://www.fortresspower/product-warranty).

## APÉNDICE A – Avisos importantes



**Avisos importantes:** Se deben utilizar disyuntores de circuito, interruptores de seguridad y fusibles en varios puntos de una instalación de generación y almacenamiento energético para aislar y proteger eficazmente todos los componentes del sistema para protegerlo contra fallas, cortocircuitos, inversiones de polaridad o fallas de algún componente del sistema general. Los rangos y valores de fusibles, disyuntores y cables deben determinarse según los estándares establecidos, y deben ser evaluados por electricistas certificados, instaladores autorizados y autoridades de códigos regionales. Aunque cada batería de litio de Fortress Power contiene un BMS interno con circuito que protege las celdas de litio-ferrofosfato contra sobrecargas, descargas excesivas y amperaje de carga excesivo, las baterías de Fortress Power siempre deben instalarse con un controlador de carga y las configuraciones correctas para proteger la batería de un voltaje fotovoltaico (FV) abierto y otras fuentes de carga de alto voltaje. El Sistema de Gestión de Baterías de litio de Fortress Power (BMS) por sí solo, no protegerá las baterías de litio de Fortress Power contra estos fenómenos eléctricos extremos. Si no se cumple el protocolo de instalación, se anulará la Garantía.



**PRECAUCIÓN:** Todas las baterías de Fortress solo pueden ponerse en servicio cuando estén totalmente cargadas. De lo contrario, se anulará la Garantía.



**PRECAUCIÓN:** Use solo un cargador LFP aprobado de Fortress Power si necesita una carga auxiliar antes de la instalación, prueba o resolución de problemas. Si no se usa un cargador LFP aprobado de Fortress Power, se dañará la batería y se anulará la Garantía.



**PRECAUCIÓN:** La carga de baterías LFP a temperaturas inferiores al punto de congelación. No intente cargar la batería a menos de 32 °F (0 grados °C). Si se intentan cargar a temperaturas inferiores al punto de congelación, pueden verse afectados el estado y la vida útil de la batería, y se anulará la Garantía. Si la batería debe cargarse a menos de 32 °F (0 grados °C), el índice de carga no debe superar el 5 % de la capacidad nominal de la batería (C/20).



**PRECAUCIÓN:** Los parámetros incorrectos de dimensionamiento o de carga pueden provocar el mal funcionamiento de la batería. Es necesario calcular correctamente el dimensionado para un sistema, así como ingresar los parámetros de carga correctos en el controlador de carga o inversor. Consulte las secciones 2.1 y 2.2 sobre esos temas. Si no se comprueban estos elementos, el sistema puede no funcionar.

## APÉNDICE B – Guía de dimensionamiento de inversores

Inversor		eVault 18.5 51,2 Vnom	eFlex 5.4 51,2 Vnom	LFP10 51,2 Vnom	LFP-5K-48V 51,2 Vnom	LFP-5K-24V 25,6 Vnom
Schneider Electric	XW Pro 6848	1	3	2	3	—
	XW+ 6848	1	3	2	3	—
	XW+ 5548	1	2	2	2	—
	SW 4048	1	2	1	2	—
	SW 4024	—	—	—	—	—
	SW 2524	—	—	—	—	3
OutBack Power	Radlan 8048A	1	3	2	3	—
	Radlan 4048A	1	2	1	2	—
	SkyBox SBX 5048	1	2	1	2	—
	VFXR 3648A	1	2	1	2	—
	VFXR 3524A	—	—	—	—	—
	FXR 3048A	1	2	1	2	—
	FXR 2524A	—	—	—	—	3
	FXR 2012A	—	—	—	—	—
Sol-Ark	8K	1	3	2	3	—
	12K	1	3	2	3	—
SMA	Sunny Island 6048	1	3	2	3	—
	Sunny Island 4548	1	2	1	2	—
Magnum / Sensata	MS 4448	1	2	1	2	—
	MS 4048	1	2	1	2	—
	MS 4024	—	—	—	—	—
	MS 2024	—	—	—	—	2
Selectronic	SP PRO SPMC 481- AU	1	2	1	2	—
	SP PRO SPMC 482- AU	1	3	2	3	—
Samlex	EVO-4024	—	—	—	—	—
	EVO-2224	—	—	—	—	2
Victron Energy	Quattro 48/3000/35	1	2	1	2	—
	Quattro 48/5000/70	1	2	1	2	—
	Quattro 48/10000/140	2	3	2	3	—
	Quattro 48/15000/200	2	5	3	—	—
	Quattro 24/5000/120	—	—	—	—	—
	MultiPlus 24/2000/50	—	—	—	—	2
	MultiPlus 24/3000/70	—	—	—	—	3
	BlueSolar o SmartSolar 75/10	—	—	—	—	1
	BlueSolar o SmartSolar 75/15	—	—	—	—	1

Esta tabla indica la cantidad mínima de baterías necesarias para la garantía de 6000 ciclos de carga/descarga. Deben seguirse las pautas correctas de dimensionamiento para garantizar la duración de la batería.



### APÉNDICE C -- Formulario de Registro de la Garantía Limitada

<b>Cliente</b>					
Nombre:					
Dirección de instalación (un formulario por lugar):					
Teléfono:					
Correo electrónico:					
<b>Esta sección debe completarla un instalador certificado o electricista autorizado:</b>					
Nombre de contacto:					
Nombre de la empresa:					
Dirección:					
Teléfono:					
Correo electrónico:					
<b>Información de instalación del producto:</b>					
Nombre/Modelo de producto:					
Cantidad de producto:					
<b>Números de serie:</b>					
1		6		11	
2		7		12	
3		8		13	
4		9		14	
5		10		15	
<i>Para los pedidos que superen las (15) baterías, incluya los números de serie en una hoja aparte.</i>					
Fecha de compra del producto:					
¿Dónde se compró el producto?					
Fecha de instalación:					
Fecha de puesta en funcionamiento:					
¿Son las baterías usadas para una Aplicación Móvil? Sí o No					
¿Aplicación de Embarcación Marítima? Sí o No					
***Lugar de instalación del producto de Fortress (por ejemplo, estacionamiento, sótano, RV, instalación marítima, etc.):					
***Consulte la sección 5 para conocer las exclusiones y las limitaciones de la Garantía.					
Tipo de sistema:	Acoplado a CC		Acoplado a CA		Carga de CA (sin FV solar)
<b>Fuentes de carga (marque todas las que correspondan y especifique):</b>					
		Matriz solar FV		Tamaño de Matriz solar FV (vatios):	
		Eólica		Tamaño de turbina eólica (vatios):	
		Generador		Tamaño de generador (vatios):	
		Servicio		*AGS incluido (S/N):	
<b>Para sistemas Acoplados a CC:</b>					
Marca y modelo de inversor:					
Cantidad de inversores:					

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<b>Marca y modelo de controlador de carga:</b>	
<b>Cantidad de controladores de carga:</b>	
<b>Para sistemas Acoplados a CA:</b>	
<b>Marca y Modelo de Inversor de conexión a red (GTI):</b>	
<b>Cantidad de Inversores de conexión a red:</b>	
<b>Usuario y contraseña de control del sistema (si corresponde):</b>	
<b>Lista de Control de Calidad de la Instalación:</b>	
	El dimensionado del banco de baterías se alinea con el Apéndice B del documento de Garantía Limitada.
	El índice de carga está configurado de acuerdo con la sección 2.1 del documento de garantía.
	El banco de baterías está conectado en paralelo, con cables y embarrados de calibres apropiados.
	Los equipos accesorios (inversor y controlador de carga) están programados según la guía de configuración de Fortress.
	El banco de baterías está completamente cargado cuando el sistema se pone en servicio.
<b>Formulario de registro completado por:</b>	
<b>Fecha:</b>	

Imprima el formulario de Registro de la Garantía de Fortress Power, complételo, escanéelo y envíelo por correo electrónico a [warranty@fortresspower.com](mailto:warranty@fortresspower.com).

También puede completar el Registro de la Garantía en nuestro sitio web en

<https://www.fortresspower.com/product-warranty/>

Le agradecemos que adjunte al correo electrónico un diagrama eléctrico unifilar del sistema y / o fotos de la instalación.

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## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

Solicitante: GERMAN VELAZQUEZ

Correo Electrónico: gvelazquez@dynamicsolarpr.net

Compañía: DYNAMIC SOLAR

### Datos de Equipo Certificado

Tipo de Equipo(s): Batería

Clasificación: Equipo Nuevo

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
FORTRESS POWER	eFLEX 5.4		Capacidad: 105 Ah Voltaje Nominal: 52 VDC Tipo de Batería: LITHIUM IRON PHOSPHATE Tipo de Carga y Descarga: 100% DoD (Depth of Discharge) Dimensiones Nominales: 546 mm x 183 mm x 446 mm Peso nominal: 116 lbs. Garantía Manufactura: 10 año(s)

### División de Edificabilidad

Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

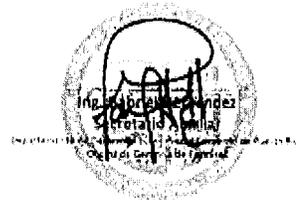
### Condiciones Especiales

Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

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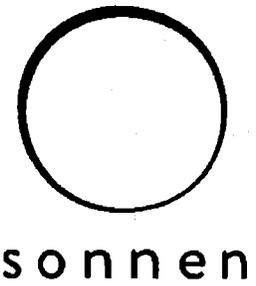
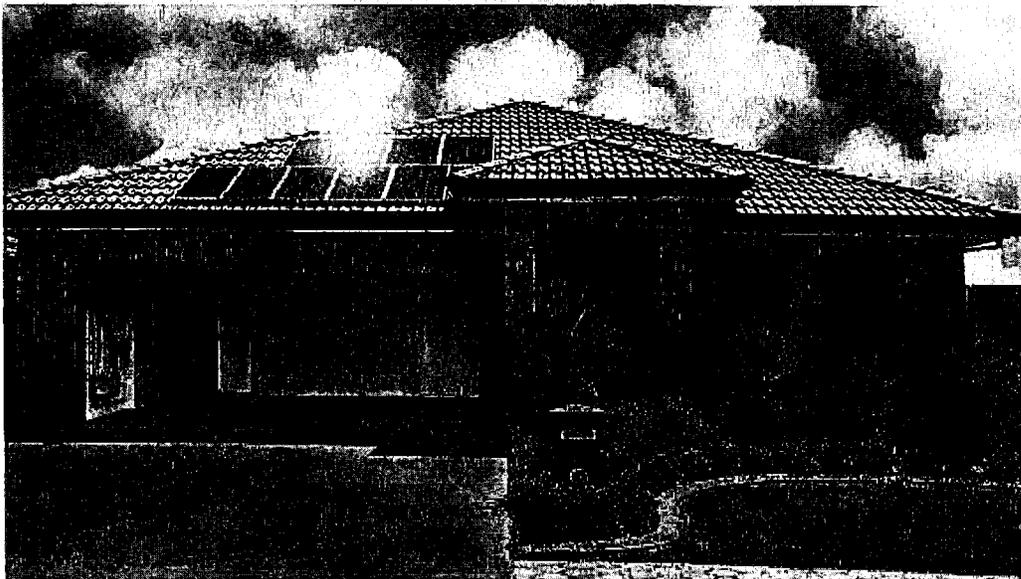
### Firmas / Sellos

Fecha de Expedición:  
 18/AUG/2020



**Ing. Gabriel Hernández Rodríguez**  
**Secretario Auxiliar**



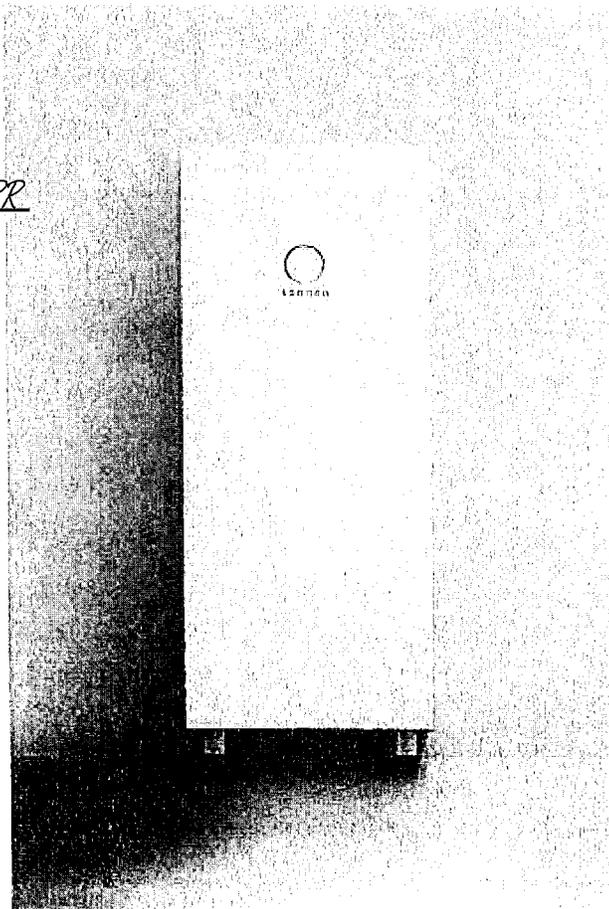


## Tech Specs - sonnenCore

The sonnenCore is an intelligent energy storage solution that combines smart energy management software with safe, long-lasting and cobalt-free batteries to efficiently manage energy usage throughout the day, store excess solar power for use at night and provide reliable emergency backup power to keep homes protected during grid outages.

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Usable Capacity <sup>1</sup>	10 kWh
Nominal power rating (Grid-tied output at 40°C)	4.8 kW
Weight (approximate)	348 lbs
System dimensions W <sup>2</sup> /H <sup>3</sup> /D <sup>4</sup> (adjustable height from ground)	27 / 68 / 11 27 / 73 / 11 (with legs extended)
Grid Integration	AC coupled
Applications	Time-of-use Solar self-consumption Emergency backup power
Usable capacity	5 kWh per battery module
Inverter efficiency	94.4% peak
On-Grid Pass-through	35 A
Round-trip efficiency % (Grid<->Battery)	>85%
Operation temperature range	14°F - 122°F 41°F - 104°F (MAX power)
System Cooling	Natural convection
Comm. Ports	Ethernet
Communication protocols / Control	SunSpec Alliance / API available to select partners
Noise emission	<25 dB
Total harmonic distortion	<5%
Maximum compatible PV Inverter	6 kW

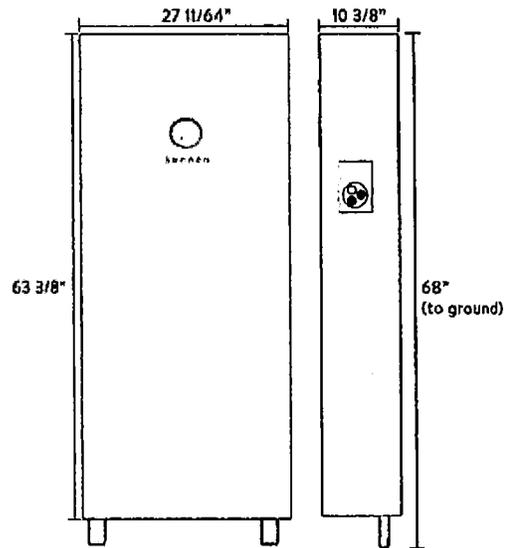
## Off-grid specifications

Nominal Off-Grid current (Continuous)	20 A / 4.8 KVA
Max AC Off-Grid current (Max 30min)	23 A / 5.52 KVA
Max AC Off-Grid current (Max 5s)	30 A / 7.2 KVA
Max AC Off-Grid current (Max 100ms)	36 A / 8.64 KVA

## Compliance information

Certifications	UL1741, UL1741SA, UL1973, UL9540, UN38.3
Grid Connections	IEEE 1547, IEEE 2030 5, Rule 21
Emissions	FCC Part 15 Class B (inverter)
Transient protection	IEEE C62.41 Class B
Warranty <sup>2</sup>	10 year or 10,000 cycle system warranty - includes inverter, battery modules, cabinet and components
Enclosure rating	Type 12

## Measurements



## Battery specification



Nominal DC voltage	102 VDC
DC battery input voltage	80 - 115 VDC
Max charge current	40 A per module
Cell discharge	5 kWh with 100% DoD
Cell chemistry	Lithium iron phosphate
Over-current Protection	Fuse protection

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## sonnen Inc.

1578 Litton Dr, Stone Mountain, GA 30083  
(310) 853-2404

We reserve the right to make technical changes. The values, outputs, other technical data, images, and diagrams in this prospectus and in data sheets, advertisements, and other promotional documents are approximate guidelines in all cases where they have not been identified as binding.

- 1 The sonnenModule4 battery modules are 5.5kWh in total capacity and represent 5kWh of usable capacity per module.
- 2 Please observe our applicable warranty conditions.



## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

Solicitante: DAMARIS PEREZ

Correo Electrónico: dperez@puraenergiapr.com

Compañía: PURA ENERGIA INC

### Datos de Equipo Certificado

Tipo de Equipo(s): Batería

Clasificación: Equipo Nuevo

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
SONNEN	sonnenCore		Capacidad: 98 Ah Voltaje Nominal: 102 VDC Tipo de Batería: Lithium Iron Phosphate Tipo de Carga y Descarga: 5 kWh with 100% DoD Dimensiones Nominales: 27 11/84" X 68" X 10 3/8" Peso nominal: 348 lbs. Garantía Manufactura: 10 año(s)

### División de Edificabilidad

Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

### Condiciones Especiales

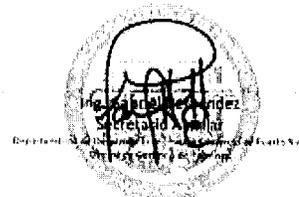
Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

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### Firmas / Sellos

Fecha de Expedición:

08/MAR/2021



Ing. Gabriel Hernández Rodríguez  
 Secretario Auxiliar





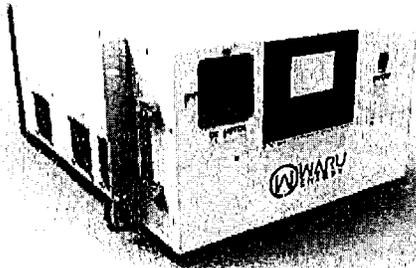
- ✓ Up to 50% less batteries
- ✓ Up to 20% less solar panels
- ✓ Up to 20% installation savings

Split Phase / Two-Three Phase / Single Phase Inverter



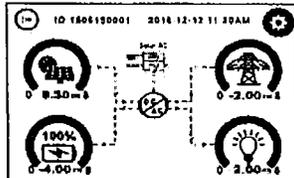
### Inverter Features

- ◆ AC Coupled  
Update existed solar on-grid system to hybrid
- ◆ Smart Load  
Use Gen Input as crucial load output
- ◆ BMS  
Compatible With LI-ION SAMSUNG & LifePo4 BATTERY
- ◆ Multiple Output  
120V/240V Split phase, 230V Single phase, 120V/208V Two-third phase
- ◆ Protections  
PV rapid shutdown control, PV Arc Fault detection, PV input lightning protection, Multiple inverters In parallel
- ◆ Multiple Working Modes  
Grid Tied, Hybrid or OFF Grid. Simultaneously manages power to/from Solar, Battery, Grid, Load and Generator
- ◆ Additional Feature  
UPS time less than 5ms. Six stages time of use setting. Charge and discharge up to 190A 8KW (120A 5KW), Load or home power first with zero export to grid.



### Colour Touchscreen Display

Touchscreen interface as easy to understand as your phone. Simultaneously manages power to/from Solar Panels, Batteries, Grid, Load, and Generator



### Contact Us

**WARU ENERGY, LLC.**

Website: [www.waruenergy.com](http://www.waruenergy.com)

Email: [contact@waruenergy.com](mailto:contact@waruenergy.com)

Phone: +1.850.283.7861

Address: Industrial Victor Fernandez 315 calle 3 San Juan, P.R. 00928

## TECHNICAL DATA

## 5 kW GENESIS

## 7.6 kW GENESIS

### Battery Input Data

Battery Type		Lead-acid or Li-Ion
Battery Voltage Range (V)		40V-60V
Max.Charging Current (A)	120A	190A
Max Discharging Current (A)	120A	190A
Charging Curve		3 Stages/Equalization
External Temperature Sensor		Optional
Charging Strategy for Li-Ion Battery		Self-adaption to BMS

### PV String Input Data

Max DC Input Power (W)	6000W	8800W
Max DC input Voltage (V)		500V
MPPT Range (V)		125V-425V
Start-up Voltage (V)		150V
Max Input Current (A)	11A+11A	18A+18A
No.of MPPT Trackers	2	2
No.of Strings Per MPPT Tracker	1+1	2+2

### AC output data

Rated AC Output and UPS Power (W)	5000W	7600W
Peak Power(off grid)		2 times of rated power, 10 S
Max AC Current(A)	22A	33A
Output Frequency and Voltage	50/60Hz, 120Vac&240Vac(split phase), 208Vac(two-thirds phase) 230Vac(single phase)	
Grid Type	Split phase/two-thirds phase/Single Phase	
Current Harmonic Distortion	THD<3%(Linear load<1.5%)	

### Efficiency

Max Efficiency	97.60%
Euro Efficiency	97.00%
MPPT Efficiency	99.90%

### Protection

PV Arc Fault Detection	Integrated (Except European Type)
PV Input Lightning Protection	Integrated
Anti-islanding Protection	Integrated
PV String Input Reverse Polarity Protection	Integrated
Insulation Resistor Detection	Integrated
Residual Current Monitoring Unit	Integrated
Output Over Current Protection	Integrated
Output Shorted Protection	Integrated
Output Over Voltage Protection	Integrated

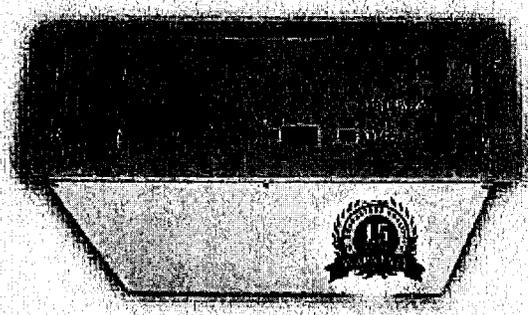
### Certifications and Standards

Grid Regulation	UL1741, IEC61547, VDE-ARN 4105, VDE0126
Safety Regulation	IEC62109-1&2, IEC62040-1
EMC	EN61000-6-1, EN61000-6-3, FCC 15 class B

### General Data

Operating Temperature Range (°C)	-25~60°C, >45°C Derating
Cooling	Fan
Noise (dB)	<30
Communication with BMS	RS485; CAN
Weight (kg)	32KG
Size (Length*Width*Height mm)	680*420*233mm
Protection Degree	IP65
Installation Style	Wall-mounted
Warranty	10 years

# WARU LiFePO4 BATTERY MODULES 4.8kWh



**FEATURES**

- Easy connection, saving installation time and cost.
- Compatible with CAN/RS-485 communication interface.
- Scalable battery design for easy expansion.
- 19 years warranty.

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Compatible and suitable for

 Villa	 Communication base station	 Nomadic area	 Medical Equipment
 Farm	 Household	 Field power supply	 Emergency services

WARU ENERGY, LLC  
 Industrial Víctor M Fernández  
 315 calle 3  
 San Juan, PR 00926

Tel. (787) 680-0008  
[www.waruenergy.com](http://www.waruenergy.com)  
[office@waruenergy.com](mailto:office@waruenergy.com)

**DATASHEET****WUPR4.8KWH**

BATTERY TYPE	LiFePO4
WEIGHT	39kg
DIMENSION (WxDxH)	958mm X 360mm x 177.8mm
CYCLE LIFE	12,000 cycles
IP PROTECTION	IP 20
WARRANTY	15 years
ENERGY CAPAACITY	4.8kWh
USABLE CAPACITY	4.8kWh
DEPTH OF DISCHARGE (DoD)	100%
NOMINAL VOLTAGE	48.0V
MAX. CHARGING CURRENT	100A
MAX. DISCHARGE CURRENT	100A
COMMUNICATION INTERFACE	CAN+RS485
ENVIRONMENTAL TEMPERATURE	-10°C ~+ 60°C
ALLOWED HUMIDITY RANGE	≤95% RH
INSTALLATION MODE	CABINET

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WARU ENERGY, LLC  
Industrial Víctor M Fernández  
315 calle 3  
San Juan, PR 00926

Tel. (787) 680-0008  
[www.waruenergy.com](http://www.waruenergy.com)  
[office@waruenergy.com](mailto:office@waruenergy.com)





## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

**Solicitante:** Raul Reyes Reyes

**Correo Electrónico:** rreyes@waruenergy.com

**Compañía:** WARU Energy

### Datos de Equipo Certificado

**Tipo de Equipo(s):** Inversor

**Clasificación:** Equipo Nuevo

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
WARU ENERGY	SUN-7.6K-SG01-LP1-US	Certificación de Seguridad: UL 1741 Núm. Certificación: SGSNA/18/GZ/00180 Laboratorio: SGSUS	Interconectable: SI Voltaje(s) Salida: 120/240/208 VAC Voltaje(s) Máximo Entrada: 500 VDC Eficiencia Máxima: 97.6% Tipo de Gabinete(NEMA): IP65 Potencia Nominal: 7600Watts Garantía Manufactura: 10 año(s)

### División de Edificabilidad

Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP<sub>e</sub>, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

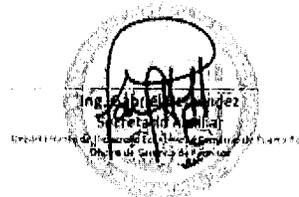
### Condiciones Especiales

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### Firmas / Sellos

**Fecha de Expedición:**  
 25/NOV/2019



**Ing. Gabriel Hernández Rodríguez**  
**Secretario Auxiliar**

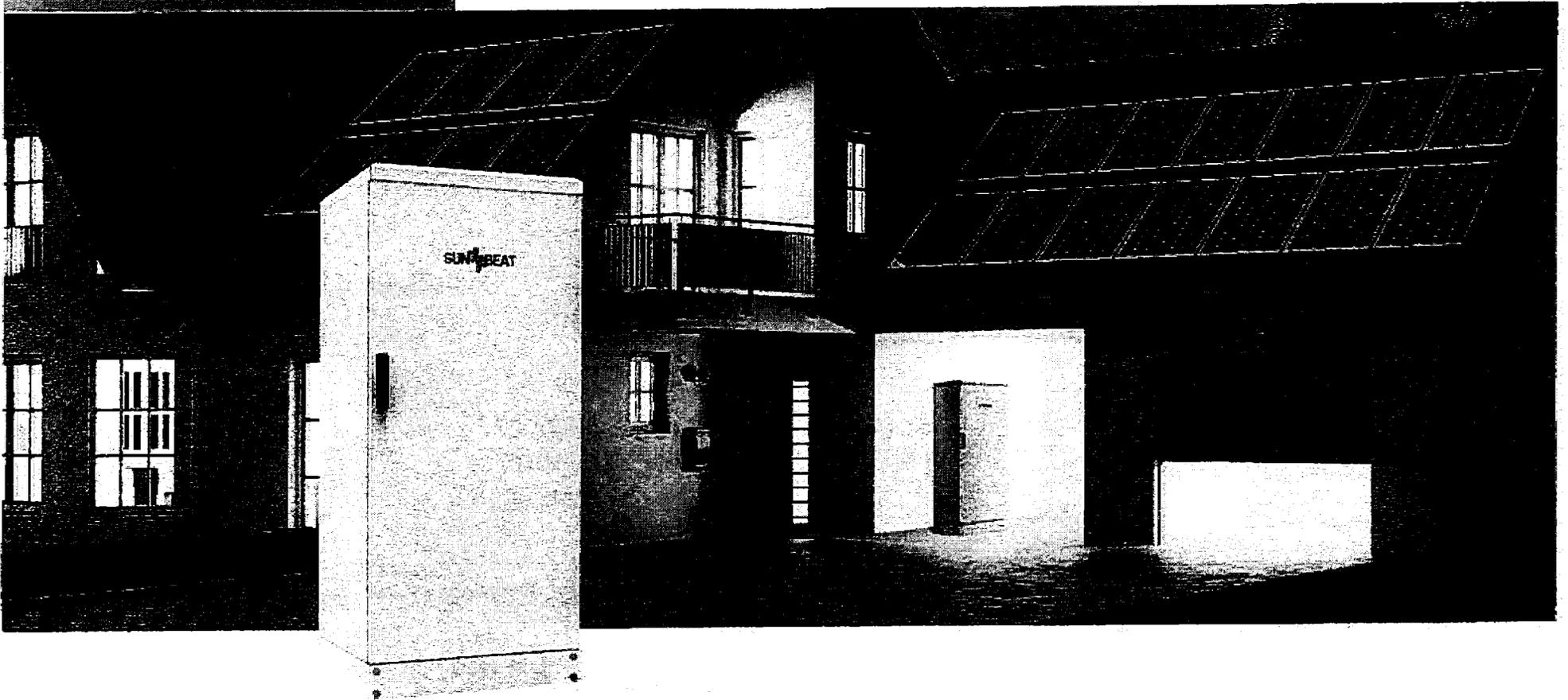


SUNBEAT

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# Li-ion Battery Hybrid Inverters All in One ESS

A line of products designed to meet the needs of the residential  
and small commercial markets of renewable energy





# Energy models

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Up to 30% energy increase maximization and up to 30% cost reduction in BOS equipment plus faster installation

Limited Warranty: 10 years

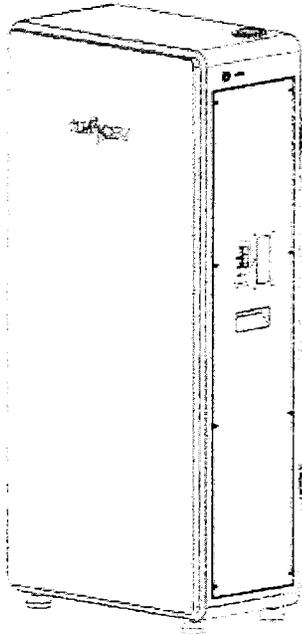
Extension to 15 and 20 years available

5 years service contract included in 5010A or 8020A

When purchased in distributor store with PV solar system above 5 kW; service expandable to 10 or 15 years

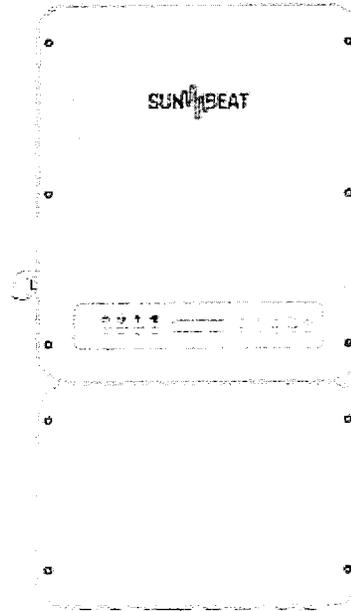
## SunBeat Li-ion Battery

MSI-9.6KWh



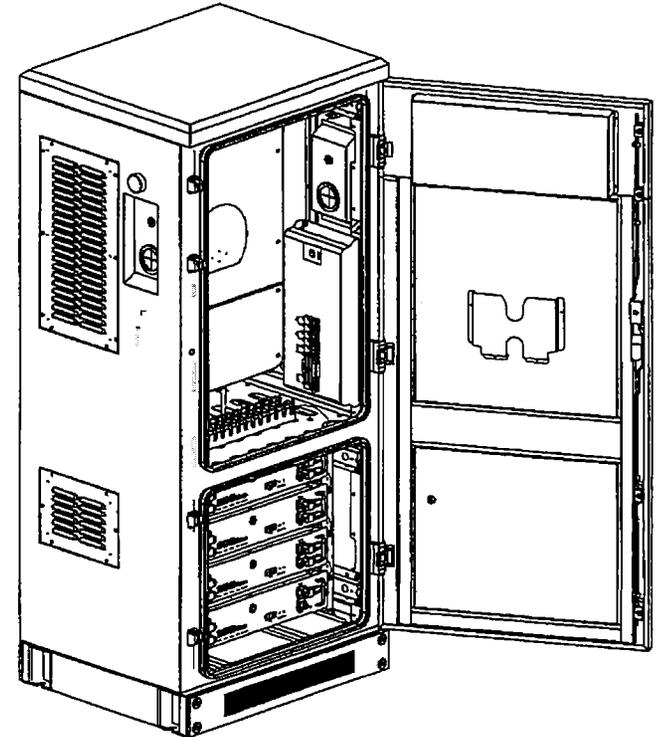
## SunBeat Hybrid Inverter

MSI-5048 / MSI-8048



## SunBeat Energy Storage

Systems 5010A/8020A





Meet the possibilities

SunBeat 48V50Ah Architecture

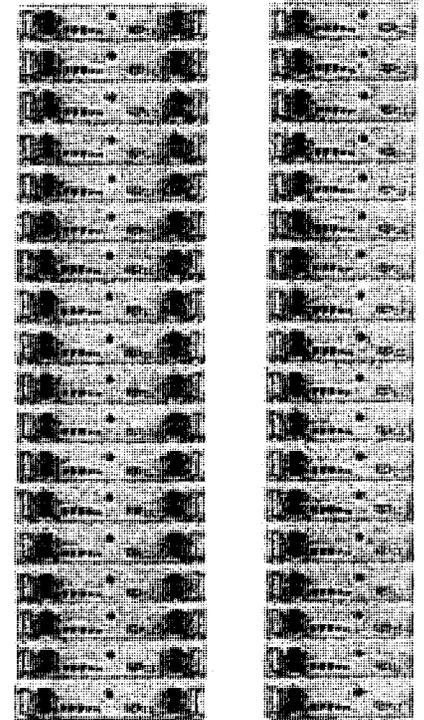


What we learned from 20+ years of energy storage R&D?

**“The weakest link is the strongest link.”**

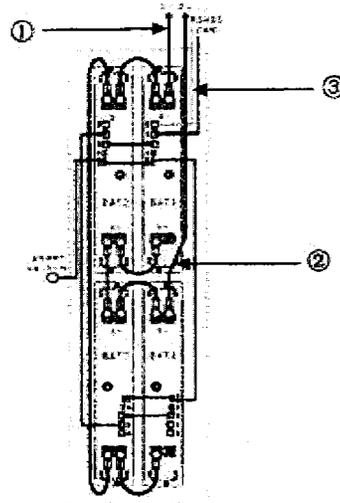
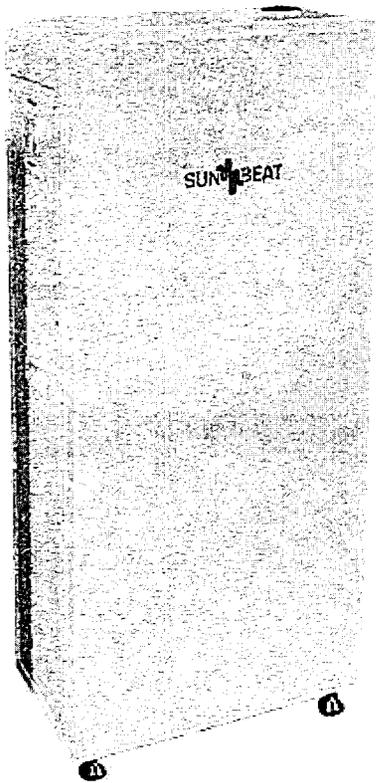
Don't matter how good a product is, when one item fails and deter equipment from functioning then the design is compromised, clients are upset and installers have to manage costly trips to customer facilities.

SunBeat Energy approach is a plug and play energy storage concept similar to microinverters concept to the solar industry. The output from several small independent energy storage devices can be combined to meet any demand of energy storage, allow for greater performance and output of your solar system and are more reliable.



SunBeat Li-ion Battery

MSI-9.6KWh

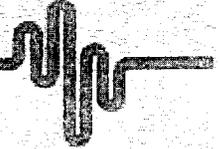


- 200 Ah
- 48 Vdc
- 308 lbs
- 100 amp charging
- 120 Amps discharge
- Capable of up to 4 MSI-9.6KWh per inverter
- Independent BMS per module (four per battery)
- Floor or wall mounted
- OGPe Approved



# Hybrid Inverters

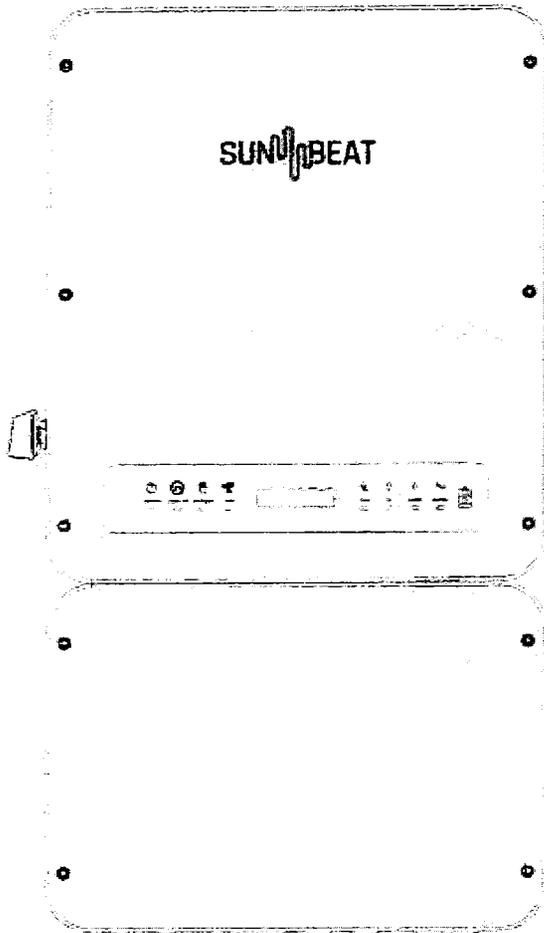
WORK  
WORLD



## SunBeat Hybrid Inverter

MSI-5048 / MSI-8048

97% efficiency



**Multifunctional inverter, solar charger and battery charger for residential and commercial renewable energy markets.**

- Grid tie, self-consumption, off-grid and time of use settings
- Transformerless, two integrated MPPT HV PV chargers (4 strings)
- Choose priority of solar vs batteries vs load
- Three units can be programmed for 120/208 Vac three phase
- Three units of 5 KW integrate to 15 KW AC /19.5 KW PV
- Three units of 8 KW integrate to 24 KW AC/ 33 KW PV
- Can manage up to 4 independent SunBeat Li-ion Battery per inverter
- Can integrate a generator as a second AC source
- Program as grid tie and add batteries later, up to 38+ KWh
- Ogpe, UL listed and Prepa approved

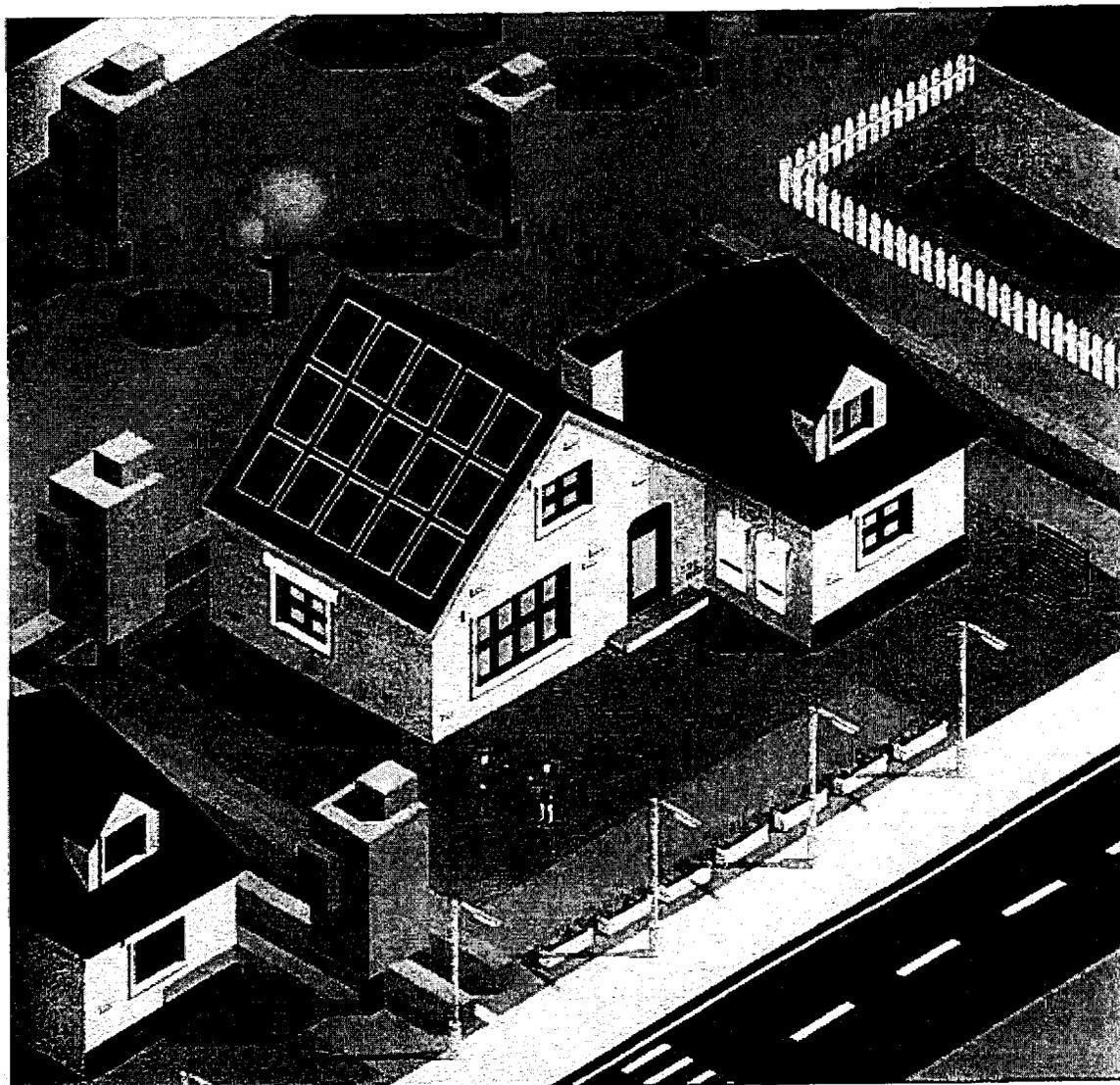
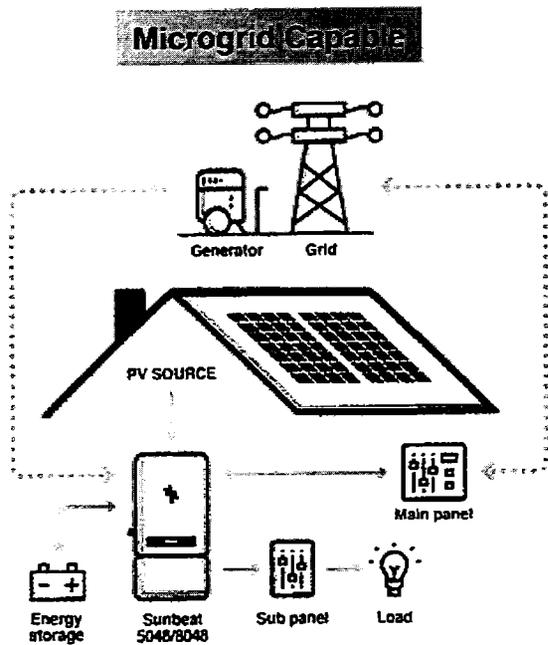
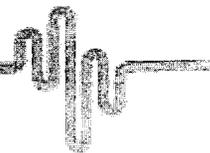
Transformerless inverters maximize power, reduce system complexity and eliminates inverter-centric transformers, associated balance-of-system (BoS) costs, as well as unnecessary wiring losses.

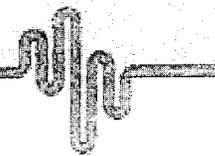
SUNBEAT

Microgrid capable

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WORK

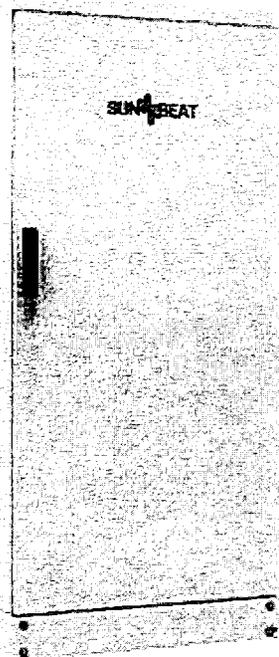
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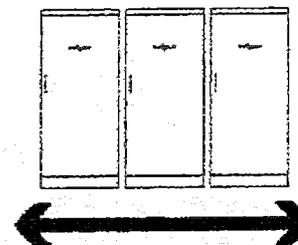
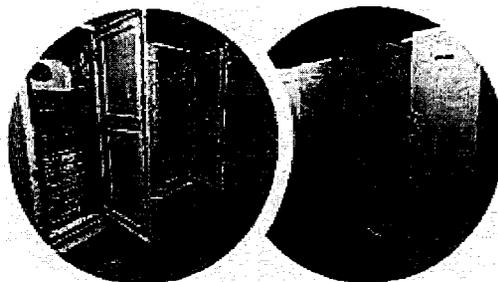


### Home Energy Storage System

SunBeat 5010A/8020A



- Integrated SunBeat Hybrid inverters with SunBeat 48V50Ah modules
- **SunBeat 5010A** has 5 KW AC/9.6 KWh storage, manages up to 6.5 KW PV DC
- **SunBeat 8020A** has 8 KW AC/19.2 KWh storage, manages up to 11 KW PV DC
- Can be parallel up to three units
- DC coupling and AC Coupling
- IP 54 enclosure with lock
- Create various 24 KW/30 KW PV microgrids to meet demand



Up to  
three units  
in parallel

Warranty

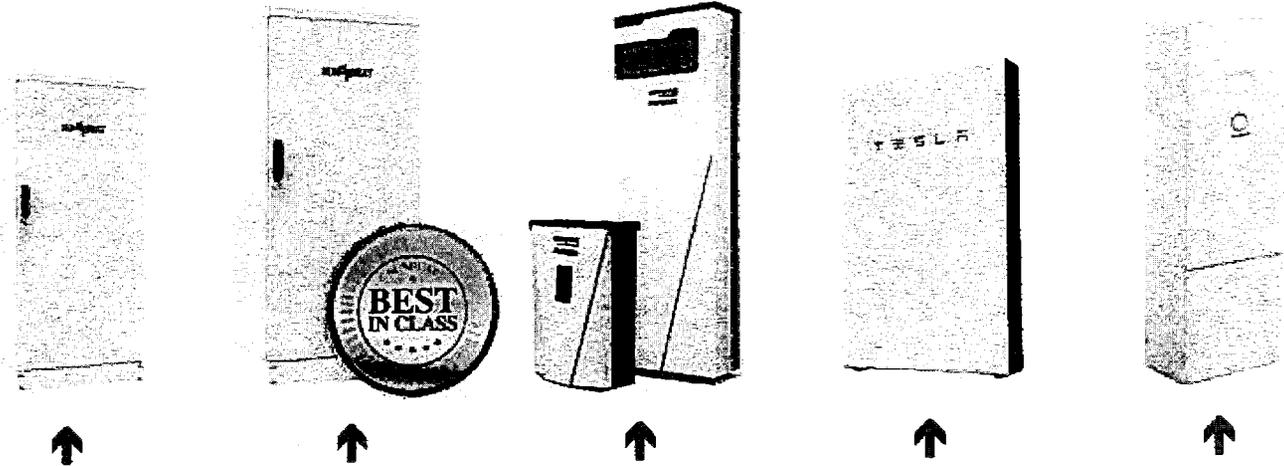


10 years standard warranty  
Expand up to 20



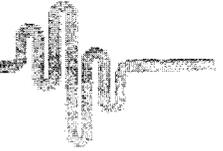
# Energy storage comparison

Our All-in-One electrical interface works with existing and new solar systems, providing a single connection location into your home or Business.



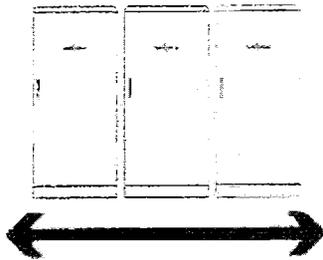
Specifications	SunBeat 5010A	SunBeat 8020A	Generac	Tesla Powerwall	Sonnen Eco 16
*Storage Capacity	9.6 KWh	19.2 KWh	17.1 KWh	13.5 KWh	16 KWh
Continuous Power	5 KW	8 KW	6.7 KW	5 KW	8 KW
Peak Power 10s	10 KW	16 KW	10 KW	7 KW	12 KW
Integrated cabinet	Yes	Yes	Separate inverter	Separate Gateway	Separate battery banks
Additional PV Equipment required	No (DC and AC coupling)	No (DC and AC coupling)	DC coupling PV Link	AC coupling inverter	AC Coupling Inverter
Batteries	Lithium-ion	Lithium-ion	Lithium-ion	Lithium-ion	Lithium-ion
Inverter topology	Transformerless	Transformerless	Transformerless	unknown	Transformer
AC options	120/240 and 120/208	120/240 and 120/208	120/240 or 120/208	120/240	120/240
Inverter efficiency	97%	97%	unknown	unknown	92.5%
Monitoring app	Yes	Yes	Yes	Yes	Yes
Rapid shutdown signal	Yes	Yes	No	No	No
Generator input and charging	Yes	Yes	Yes	No	Yes
solar charge controllers included	Yes	Yes	No	No	No
solar charge controllers capacity	6500W	11000 W	N/A	N/A	N/A

\* Figures based on single storage cabinet of battery modules, Tesla specifications per Tesla specification sheet, Generac per PWRcell specification sheet, Sonnen Eco per Sonnen specification sheet



**Modularity: Up to 24 KW AC and up to 115.2 KWh**

3



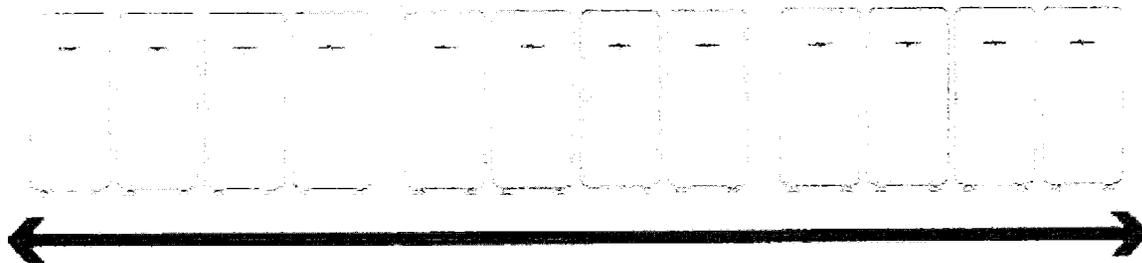
**ALL IN ONE**  
Three units in parallel

3



**HYBRID INVERTERS**  
Three units in parallel

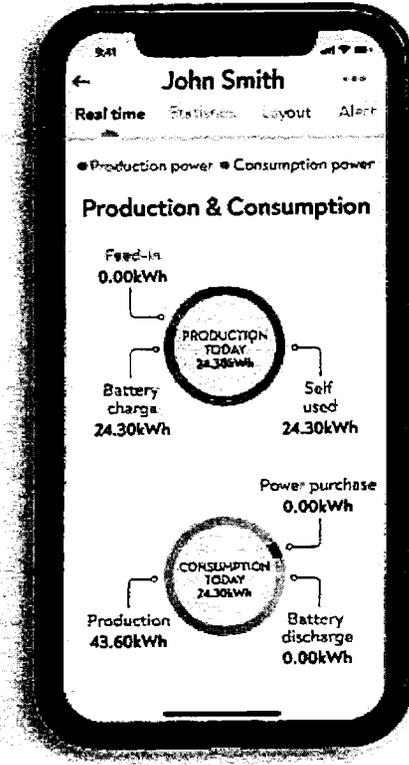
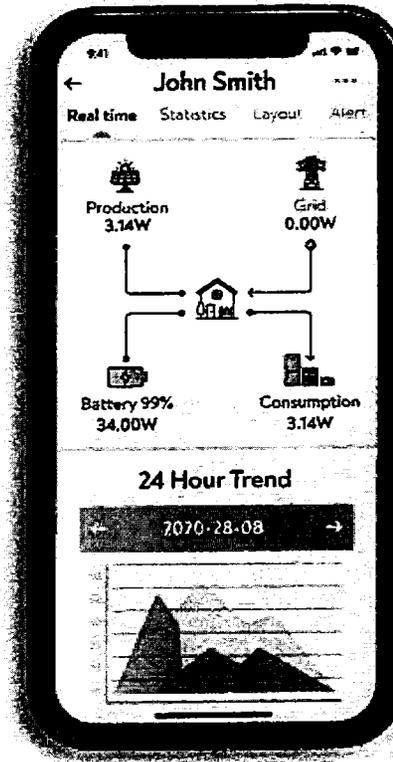
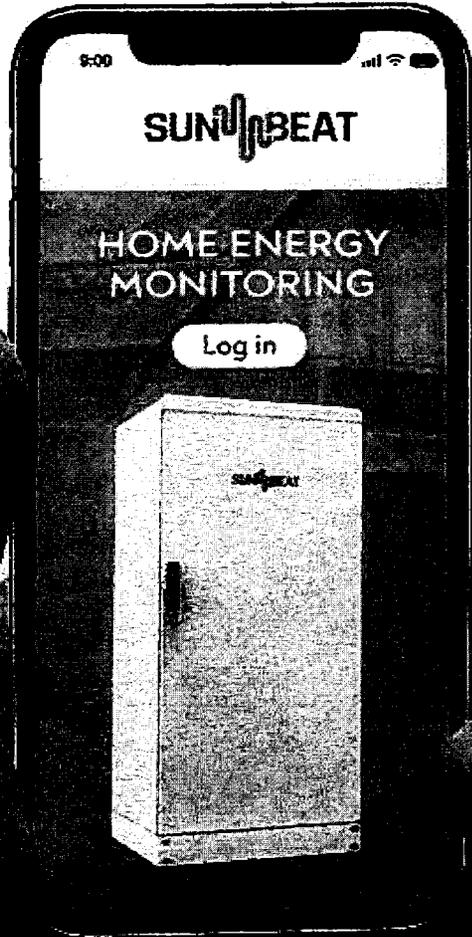
12



**SUNBEAT**  
Up to 12 batteries  
in groups of four



# Home Energy Storage System - Monitoring System



Monitoring System App

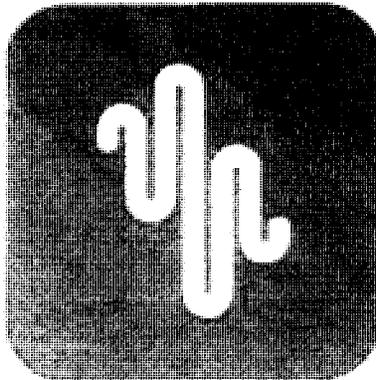


SUNBEAT

Monitoring setup

WARR  
WARR

WARR



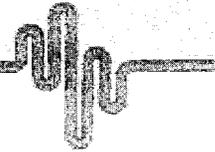
SUNBEAT

- (1) Go to Android Application Market Android and search Solarman or Scan QR Code
- (2) IOS: Scan QR code and download.
- (3) Register an account and Log in



# Partner Monitoring System

WORK



● Online ● No Alerts

Details Sub-system/Device Alerts Layout Work Order Plan Maintenance Record About Authorizations

4 kWh	Daily Energy Charged	Time	Charge	Discharge
		This Month	40.7 kWh	19.4 kWh
		This Year	93.8 kWh	34.09 kWh
2.4 kWh	Daily Energy Discharged	Total	88.6 kWh	40.9 kWh

## Self-used Info

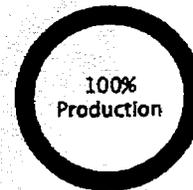
Day Month Year Total

Select Parameters < 2020/12/17



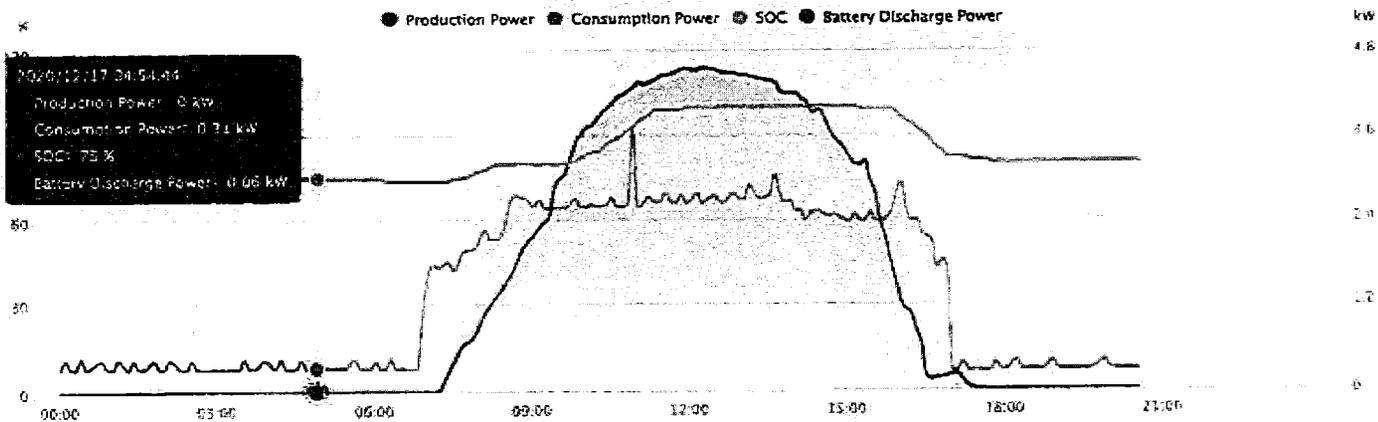
Daily Production **28.9 kWh**

- 97.23% Self-used **28.1 kWh**
- 0% Feed-in **0 kWh**
- 2.76% Battery Charge **0.79 kWh**



Daily Consumption **28.1 kWh**

- 100% Production **28.1 kWh**
- 0% Power Purchased **0 kWh**
- 0% Battery Discharge **0 kWh**







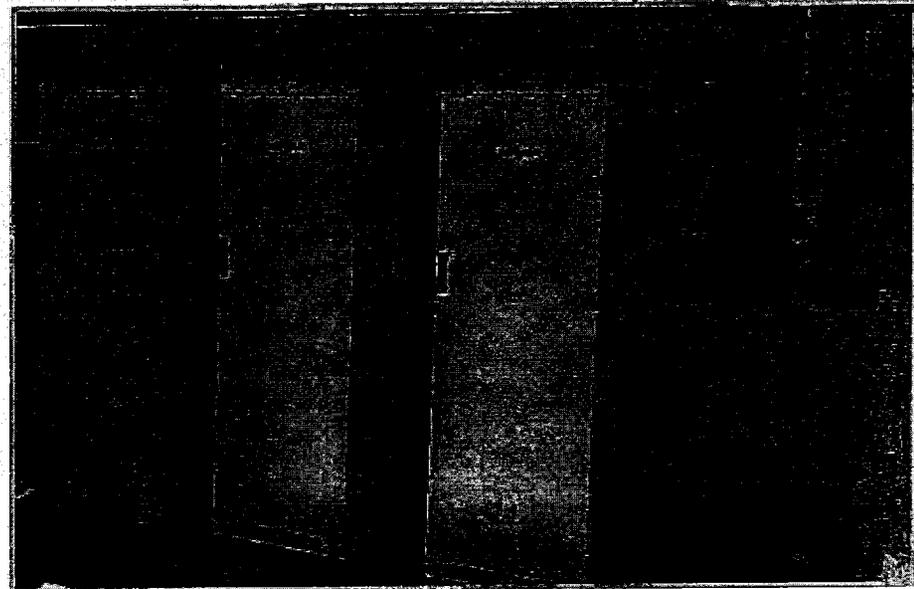
### Our All-in-One Parallel

Single phase install  
Two units 8 KW  
16KW AC  
38.4 KWh storage



- 32 KW (4 ea. 8 KW in parallel)
- Connected to 68 KWh carbon based lead batteries

- Three phase installation
- Three units 120/208 Vac
- 24 KW AC, 33 KW PVdc, 57.6 KWh storage

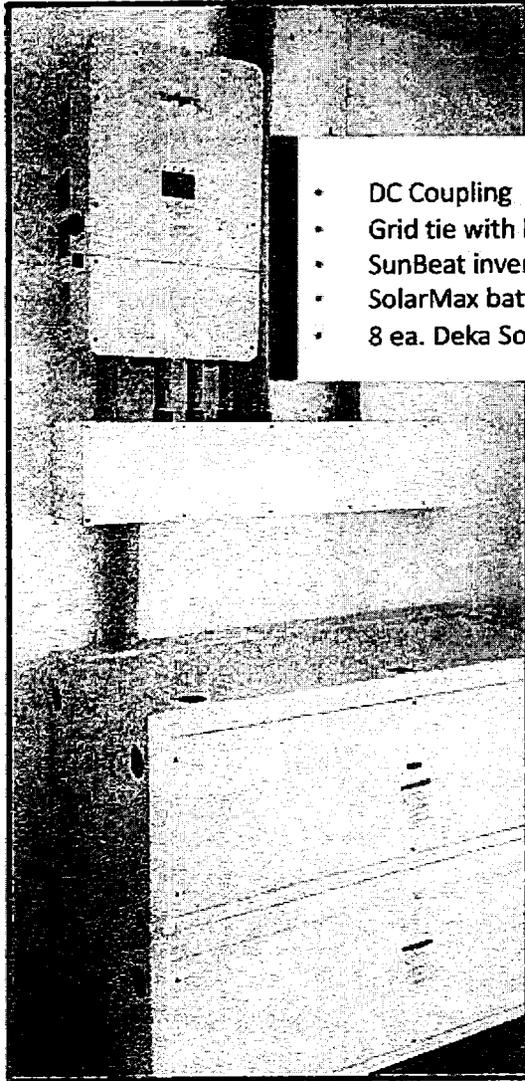




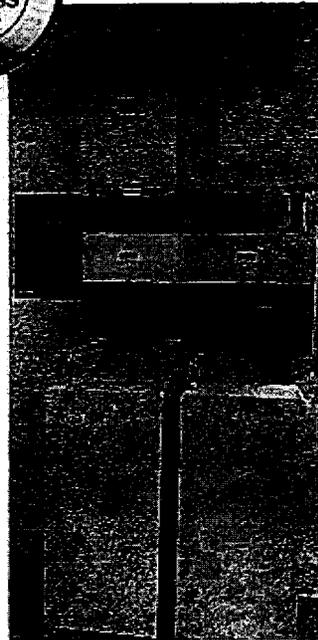
# Meet the possibilities

WORR

FE

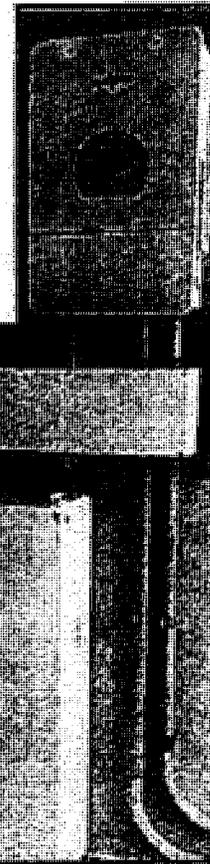


- DC Coupling
- Grid tie with backup
- SunBeat inverter MSI-8048
- SolarMax battery cabinets
- 8 ea. Deka Solar 8G8DLTP



- 12 KW DC coupling
- 10 KW AC Off Grid DC Coupling
- 2 ea. SunBeat inverters MSI-5048
- 19.6 KWh Li-ion storage

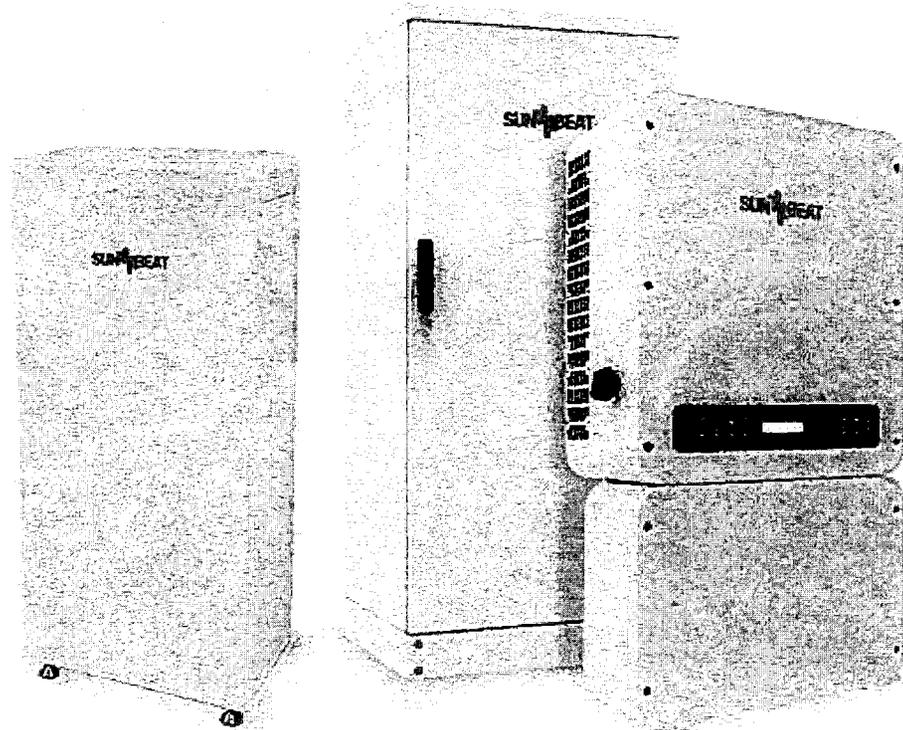
- Grid tie with backup
- AC Coupled to existing SMA inverter
- SunBeat Hybrid inverter MSI-8048
- 2 ea. SunBeat MSI9.6KWh
- 2 ea. Li-ion batteries
- Replaced other storage solution with utility interconnection issues



WARR  
WORR

7

# SUNBEAT





SUNBEAT

[www.sunbeatenergy.com](http://www.sunbeatenergy.com) · f 



## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

**Solicitante:** Emanuel Valentín

**Correo Electrónico:** engineering@maximosolar.com

**Compañía:** Maximo Solar Industries

### Datos de Equipo Certificado

**Tipo de Equipo(s):** Batería

**Clasificación:** Equipo Nuevo

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
SunBeat	SunBeat-MSI		Capacidad: 200 Ah Voltaje Nominal: 48 VDC Tipo de Batería: Lithium Tipo de Carga y Descarga: 100A y 120A Dimensiones Nominales: 550mm x 1150mm x 310mm Peso nominal: 309 lbs. Garantía Manufactura: 10 año(s)

### División de Edificabilidad

Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

### Condiciones Especiales

Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

WRR  
WRR

### Firmas / Sellos

**Fecha de Expedición:**  
 30/JUN/2020



**Ing. Gabriel Hernández Rodríguez**  
**Secretario Auxiliar**



A. Photovoltaic System

3. Inverters

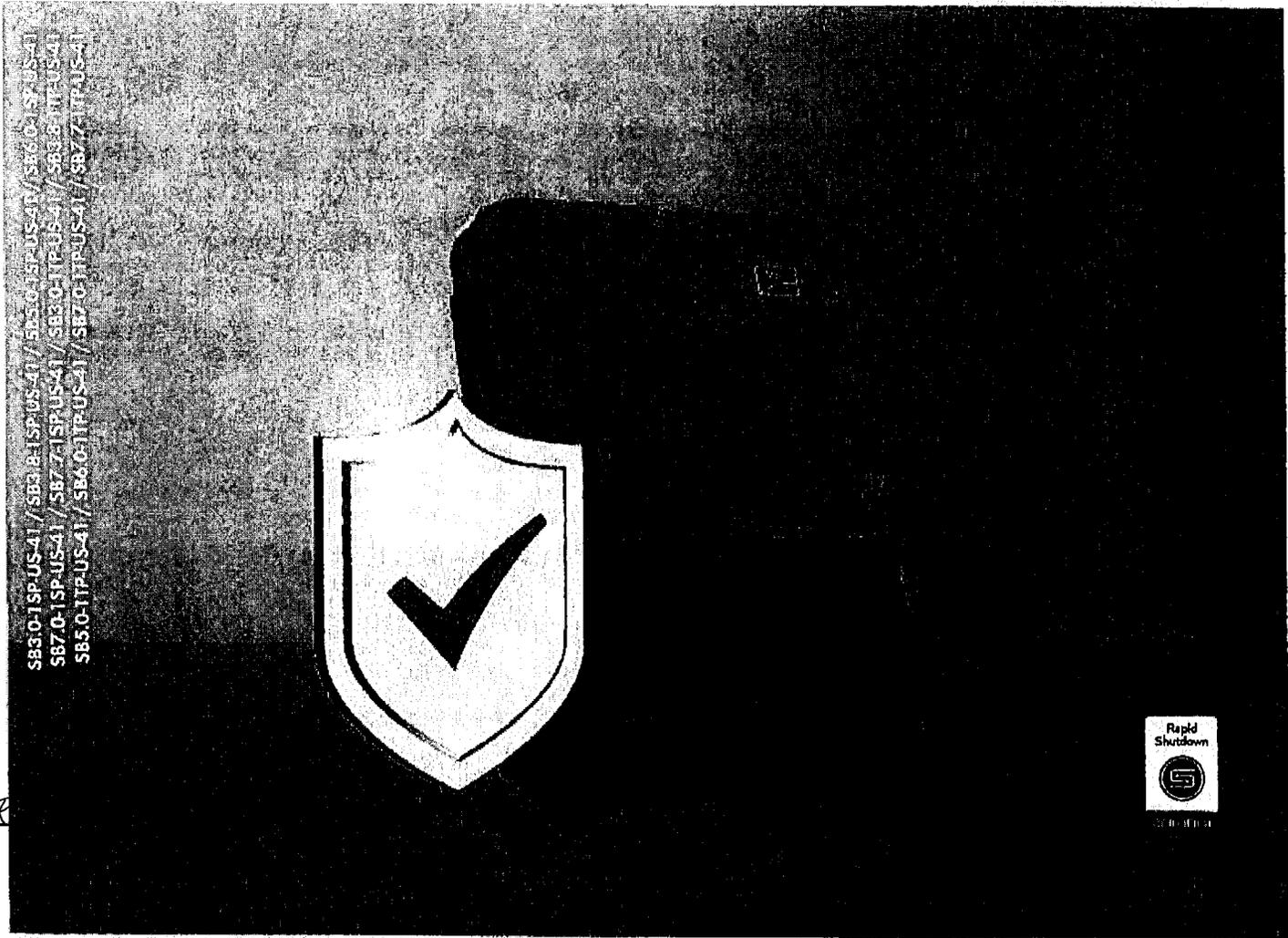
- a. SMA
- b. SolArk
- c. WARU
- d. Dafron

W

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WARR

# SUNNY BOY

3.0-US / 3.8-US / 5.0-US / 6.0-US / 7.0-US / 7.7-US



WOR  
WORR

- | Value-Added Improvements  | Reduced Labor   | Optimized Power Production  | Trouble-Free Service  |
|---|---|---|---|
| <ul style="list-style-type: none"> <li>• SunSpec certified technology for cost-effective module-level shutdown</li> <li>• Advanced AFCI compliant to UL 1699B for arc fault protection</li> </ul> | <ul style="list-style-type: none"> <li>• New Installation Assistant with direct access via smartphone minimizes time in the field</li> <li>• Advanced communication interface with fewer components creates 50% faster setup and commissioning</li> </ul> | <ul style="list-style-type: none"> <li>• ShadeFix, SMA's proprietary shade management solution, produces more power than alternatives</li> <li>• Reduced component count provides maximum system reliability</li> </ul> | <ul style="list-style-type: none"> <li>• SMA Service Mobile App provides simplified, expedited field service</li> <li>• Equipped with SMA Smart Connected, a proactive service solution that is integrated into Sunny Portal</li> </ul> |

## SUNNY BOY 3.0-US / 3.8-US / 5.0-US / 6.0-US / 7.0-US / 7.7-US

Power with a purpose

The residential PV market is changing rapidly. Your bottom line matters more than ever—so we've designed a superior residential solution to help you decrease costs at every stage of your business operations. The Sunny Boy 3.0-US/3.8-US/5.0-US/6.0-US/7.0-US/7.7-US join the SMA lineup of field-proven solar technology backed by the world's #1 service team. This improved residential solution features ShadeFix, SMA's proprietary technology that optimizes system performance. ShadeFix also provides superior power production with a reduced component count versus competitors, which provides maximum reliability. No other optimized solution generates more power or is as easy as systems featuring SMA ShadeFix and SunSpec certified devices. Finally, SMA Smart Connected will automatically detect errors and initiate the repair and replacement process so that installers can reduce service calls and save time and money.

[www.SMA-America.com](http://www.SMA-America.com)

Technical data	Sunny Boy 3.0-US		Sunny Boy 3.8-US		Sunny Boy 5.0-US	
	208 V	240 V	208 V	240 V	208 V	240 V
<b>Input (DC)</b>						
Max. PV power	4800 Wp		6144 Wp		8000 Wp	
Max. DC voltage			600 V			
Rated MPP voltage range	155 - 480 V		195 - 480 V		220 - 480 V	
MPPT operating voltage range			100 - 550 V			
Min. DC voltage / start voltage			100 V / 125 V			
Max. operating input current per MPPT			10 A			
Max. short circuit current per MPPT			18 A			
Number of MPPT tracker / string per MPPT tracker			2 / 1		3 / 1	
<b>Output (AC)</b>						
AC nominal power	3000 W	3000 W	3330 W	3840 W	5000 W	5000 W
Max. AC apparent power	3000 VA	3000 VA	3330 VA	3840 VA	5000 VA	5000 VA
Nominal voltage / adjustable	208 V / ●	240 V / ●	208 V / ●	240 V / ●	208 V / ●	240 V / ●
AC voltage range	183 - 229 V	211 - 264 V	183 - 229 V	211 - 264 V	183 - 229 V	211 - 264 V
AC grid frequency			60 Hz / 50 Hz			
Max. output current	14.5 A	12.5 A	16.0 A	16.0 A	24.0 A	21.0 A
Power factor (cos φ) / harmonics			1 / < 4 %			
Output phases / line connections			1 / 2			
<b>Efficiency</b>						
Max. efficiency	97.2 %	97.6 %	97.3 %	97.6 %	97.3 %	97.6 %
CEC efficiency	96.0 %	96.5 %	96.5 %	96.5 %	96.5 %	97.0 %
<b>Protection devices</b>						
DC disconnect device / DC reverse polarity protection			● / ●			
Ground fault monitoring / Grid monitoring			●			
AC short circuit protection			●			
All-pole sensitive residual current monitoring unit (RCMU)			●			
Arc fault circuit interrupter (AFCI)			●			
Protection class / overvoltage category			I / IV			
<b>General data</b>						
Dimensions (W / H / D) in mm (in)			535 x 730 x 198 (21.1 x 28.5 x 7.8)			
Packaging dimensions (W / H / D) in mm (in)			600 x 800 x 300 (23.6 x 31.5 x 11.8)			
Weight / packaging weight			26 kg (57 lb) / 30 kg (66 lb)			
Temperature range, operating / non-operating			-25°C ... +60°C / -40°C ... +60°C			
Environmental protection rating			NEMA 3R			
Noise emission (typical)			39 dB(A)			
Internal power consumption at night			< 5 W			
Topology / cooling concept			transformerless / convection			
<b>Features</b>						
Ethernet ports			2			
Secure Power Supply			● *			
Display (2 x 16 characters)			●			
2.4 GHz WLAN / External WLAN antenna			● / ○			
ShadeFix technology for string level optimization			●			
Cellular (4G / 3G) / Revenue Grade Meter			○ / ○ **			
Warranty: 10 / 15 / 20 years ***			● / ○ / ○			

UL 1741, UL 1741 SA incl. CA Rule 21 RSD, UL 1998, UL 16998 Ed. 1, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA V2.2 107.1-1, HECO Rule 14H, PV Rapid Shutdown System Equipment

● Standard features, ○ Optional features, — Not available

NOTE: US Inverters ship with gray lids. Data at nominal conditions \* Not compatible with SunSpec shutdown devices \*\* Standard in SBX.X-1TP-US-41

Type designation SB3.0-1SP-US-41 / SB3.0-1TP-US-41 SB3.8-1SP-US-41 / SB3.8-1TP-US-41 SB5.0-1SP-US-41 / SB5.0-1TP-US-41

**Accessories**



External WLAN antenna  
EXTANTUS-40



SunSpec Certified  
Rapid Shutdown  
Receivers

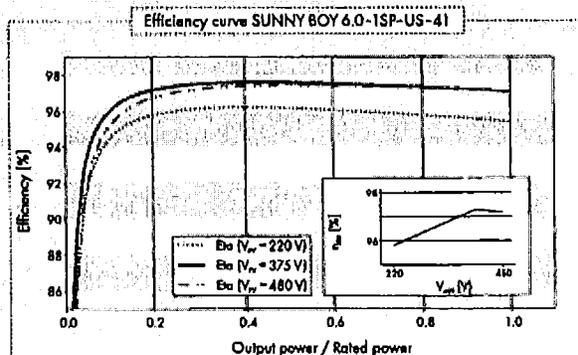


Revenue Grade  
Meter Kit  
RGM03KIT-US-10



Cellular Modem Kit  
CELLMODKIT-US-10

\*\*\* Listed warranty terms are applicable in SMA-designated primary support countries, including the U.S., Canada, and Mexico. Reduced terms or restrictions may apply in other Americas regions and territories including the Pacific and Caribbean.



Technical data	Sunny Boy 6.0-US		Sunny Boy 7.0-US		Sunny Boy 7.7-US	
	208 V	240 V	208 V	240 V	208 V	240 V
<b>Input (DC)</b>						
Max. PV power	9600 Wp		11200 Wp		12320 Wp	
Max. DC Voltage	600 V		600 V		600 V	
Rated MPP Voltage range	220 - 480 V		245 - 480 V		270 - 480 V	
MPPT operating voltage range			100 - 550 V			
Min. DC voltage / start voltage			100 V / 125 V			
Max. operating input current per MPPT			10 A			
Max. short circuit current per MPPT			18 A			
Number of MPPT tracker / string per MPPT tracker			3 / 1			
<b>Output (AC)</b>						
AC nominal power	5200 W	6000 W	6660 W	7000 W	6660 W	7680 W
Max. AC apparent power	5200 VA	6000 VA	6660 VA	7000 VA	6660 VA	7680 VA
Nominal voltage / adjustable	208 V / ●	240 V / ●	208 V / ●	240 V / ●	208 V / ●	240 V / ●
AC voltage range	183 - 229 V	211 - 264 V	183 - 229 V	211 - 264 V	183 - 229 V	211 - 264 V
AC grid frequency			60 Hz / 50 Hz			
Max. output current	25.0 A	25.0 A	32.0 A	29.2 A	32.0 A	32.0 A
Power factor (cos φ) / harmonics			1 / < 4 %			
Output phases / line connections			1 / 2			
<b>Efficiency</b>						
Max. efficiency	97.3 %	97.7 %	97.3 %	97.9 %	97.3 %	97.5 %
CEC efficiency	96.5 %	97.0 %	96.5 %	97.0 %	96.5 %	97.0 %
<b>Protection devices</b>						
DC disconnect device / DC reverse polarity protection			● / ●			
Ground fault monitoring / Grid monitoring			●			
AC short circuit protection			●			
Allpole sensitive residual current monitoring unit (RCMU)			●			
Arc fault circuit interrupter (AFCI)			●			
Protection class / overvoltage category			I / V			
<b>General data</b>						
Dimensions (W / H / D) in mm (in)			535 x 730 x 198 (21.1 x 28.5 x 7.8)			
Packaging Dimensions (W / H / D) in mm (in)			600 x 800 x 300 (23.6 x 31.5 x 11.8)			
Weight / packaging weight			26 kg (57 lb) / 30 kg (66 lb)			
Temperature range: operating / non-operating			-25°C ... +60°C / -40°C ... +60°C			
Environmental protection rating			NEMA 3R			
Noise emission (typical)	39 dB(A)				45 dB(A)	
Internal power consumption at night			< 5 W			
Topology / cooling concept	transformerless / convection				transformerless / fan	
<b>Features</b>						
Ethernet ports			2			
Secure Power Supply			●*			
Display (2 x 16 characters)			●			
2.4 GHz WLAN / External WLAN antenna			●/○			
ShadeFix technology for string level optimization			●			
Cellular (4G / 3G) / Revenue Grade Meter			○/○**			
Warranty: 10 / 15 / 20 years ***			●/○/○			
Certificates and approvals			UL 1741, UL 1741 SA incl. CA Rule 21 RSD, UL 1998, UL 1699B Ed. 1, iEEE1547, FCC Part 15 (Class A & B), CAN/CSA V22.2 107.1-1, HECO Rule 14H, PV Rapid Shutdown System Equipment			
● Standard features ○ Optional features – Not available						
NOTE: US inverters ship with gray lids. Data at nominal conditions * Not compatible with SunSpec shutdown devices **Standard in SBX-X1TP-US-41						
Type designation SB6.0-1SP-US-41 / SB6.0-1TP-US-41 SB7.0-1SP-US-41 / SB7.0-1TP-US-41 SB7.7-1SP-US-41 / SB7.7-1TP-US-41						

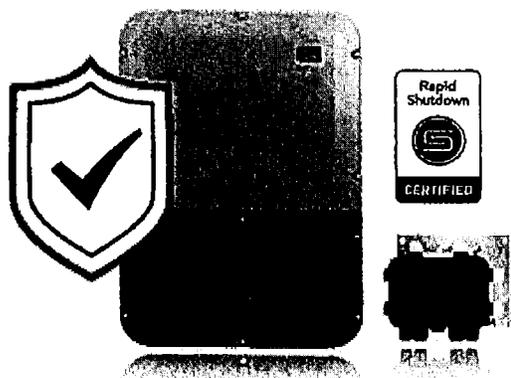
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WORR

## POWER+ SOLUTION

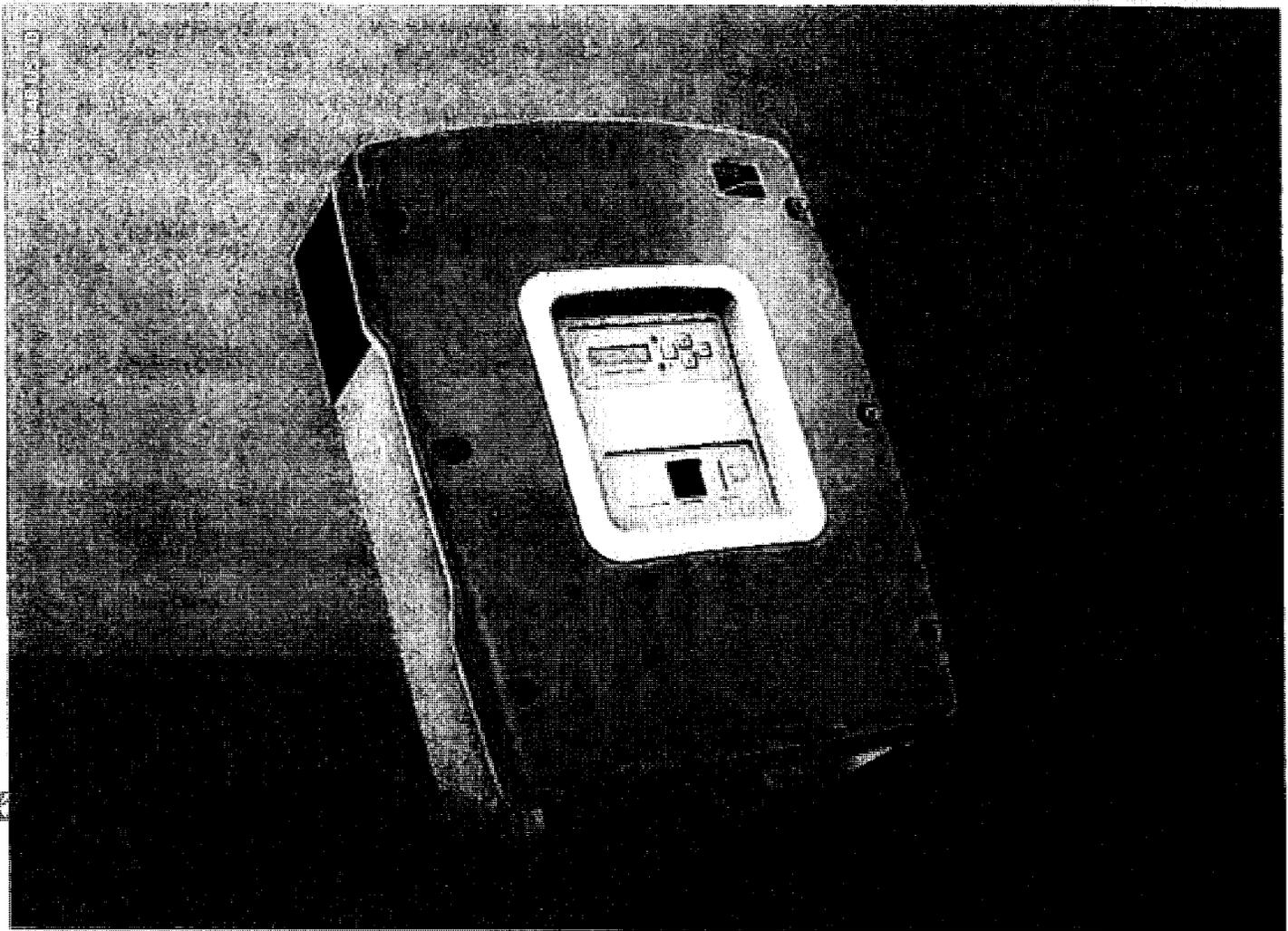
The SMA Power+ Solution combines legendary SMA inverter performance and SunSpec certified shutdown devices in one cost-effective, comprehensive package. In addition, SMA ShadeFix technology optimizes power production and provides greater reliability than alternatives.

This rapid shutdown solution fulfills UL 1741, NEC 2014, and NEC 2017 requirements and is certified to the power line-based SunSpec Rapid Shutdown communication signal over DC wires, making it the most simple and cost-effective rapid shutdown solution on the market.

Visit [www.SMA-America.com](http://www.SMA-America.com) for more information.



## SUNNY ISLAND 6048-US

**Efficient**

- CEC efficiency of 94%
- State of charge calculation
- Intelligent battery management for maximum battery life
- Now supports external BMS and lithium-ion technology

**Simple**

- Easy commissioning with the "Quick Configuration Guide"
- Complete off-grid management
- Excellent for grid-tied battery back up
- Easy monitoring via ennexOS Portal

**Durable**

- Extreme overload capability
- OptiCool™ active temperature management system
- Now with 10-year standard warranty

**Flexible**

- For systems from 6 to 69 kW
- Single, split-phase and three-phase operation, correctable in parallel and modularly expandable
- AC and DC coupling
- Compatible with lithium ion battery systems

## SUNNY ISLAND 6048-US

The proven micro-grid manager

The SMA Sunny Island 6048-US inverter is ideal for off-grid or battery backup operation, scaling up to 23 kW of split-phase continuous power. Easy integration of and robust control features for PV inverters and generators provide for optimal operation with or without grid support. High efficiency provides maximum production and support of external battery management systems provides additional battery flexibility. Usable in split-phase with 2 or 4 inverters (up to 23kW load) or in 208V Wye three-phase systems with 3 inverters (up to 17.3 kW load). Also ideal for larger three-phase loads using the Multicluster Box US (3, 6, 9, or 12 inverters) for up to 69 kW individual loads.

**Technical data**

**AC output (loads)**

Rated grid voltage / AC voltage range  
 Rated frequency / frequency range (adjustable)  
 AC power (at 25 °C / at 40 °C) for 3 hours  
 Rated power (at U<sub>grid</sub> and 25 °C and cos φ = 1)  
 AC power at 25 °C for 30 min / 1 min / 3 s  
 Rated current / max. output current (peak)  
 Total harmonic factor output voltage / power factor with rated power

**AC Input (Genset and/or grid)**

Rated input voltage / AC input voltage range  
 Rated input frequency / allowable input frequency range  
 AC input current

**Battery DC Input**

Rated input voltage / DC voltage range  
 Max. battery charging current / DC rated charging current  
 Battery type / battery capacity range

External BMS compatible

Charge control

**Efficiency / self-consumption**

Max. efficiency / CEC efficiency  
 Self-consumption without load / standby

**Protective devices**

DC reverse polarity protection / DC fuse  
 AC short-circuit / AC overload  
 Overtemperature / battery deep discharge

**General data**

Dimensions (W / H / D)

**Weight**

Operating temperature range

**Features / function**

Operation and display / multi-function relay  
 Degree of protection (according to IEC 60529)  
 State of charge calculation / full charge / equalization charge  
 Integrated soft start / generator support  
 Battery temperature sensor / data cable  
 Warranty  
 Certificates and approvals

**Sunny Island 6048-US**

120 V/105 V - 132 V  
 60 Hz/55 Hz ... 65 Hz  
 6000 W/5000 W  
 5750 W  
 7000 W / 8400 W / 11000 W  
 48 A/180 A for approx. 60 ms  
 3 % / -1 ... +1

**2x Sunny Island 6048-US  
 (120 V / 240 V split-phase)**

240 V/210 V - 264 V  
 12000 W/10000 W  
 11500 W  
 14000 W / 16800 W / 22000 W  
 2 x (48 A/180 A for approx. 60 ms)

120 V/80 V - 150 V  
 240 V/160 V - 300 V  
 60 Hz/54 Hz ... 66 Hz  
 Adjustable between 0 A - 56 A

48 V/41 V - 63 V  
 130 A / 110 A  
 260 A / 220 A  
 Lead, NiCd, LiIon / 100 Ah ... 10000 Ah

Fully automatic charge control

25 W/4 W  
 96 % / 94 %  
 2 x (25 W/4 W)

• / •  
 • / •  
 • / •

467 / 612 / 235 mm  
 18.4 / 24.1 / 9.3 inch  
 63 kg / 139 lb  
 -25 °C ... +60 °C / -13 °F ... +140 °F

Internal / 2  
 Internal / 2 x 2

Indoors (NEMA 1)

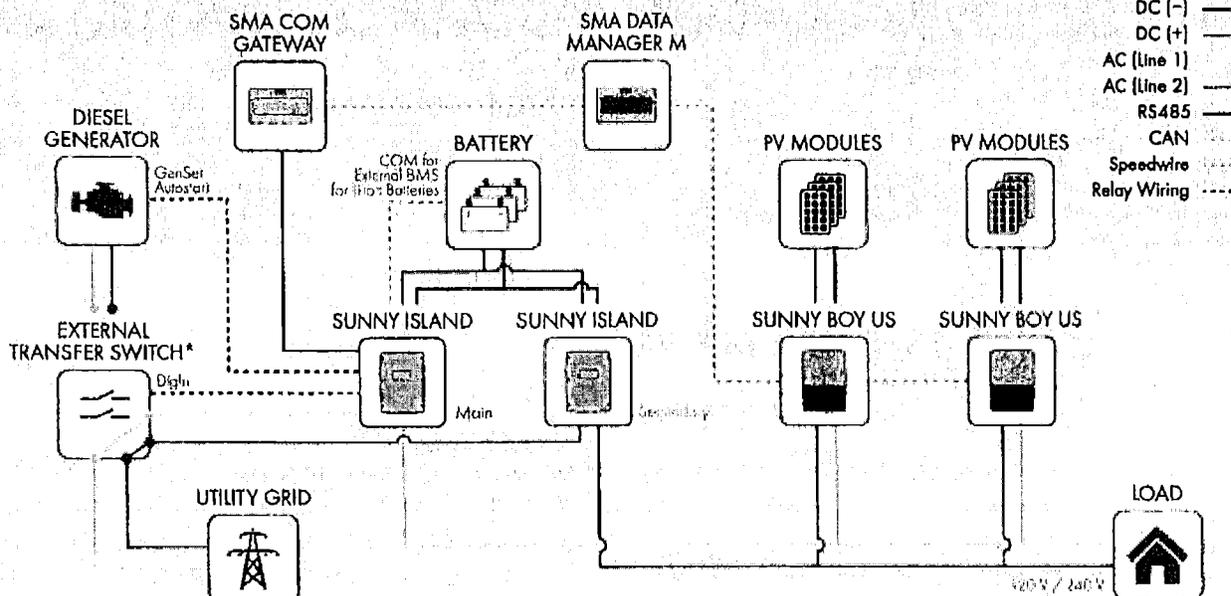
• / • / •  
 • / •  
 • / •  
 10 years

www.SMA-America.com

• Standard feature    ◊ Optional feature    - Not available  
 Type designation

SI6048-US-10

2 x SI6048-US-10



\*Third party component

Toll Free +1 888 4 SMA USA  
 www.SMA-America.com

SMA America, LLC

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## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

**Solicitante:** Jose Colom

**Correo Electrónico:** jose.colom@sma-america.com

**Compañía:** SMA Solar Technology America, LLC

### Datos de Equipo Certificado

**Tipo de Equipo(s):** Inversor

**Clasificación:** Equipo Nuevo

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
SMA	SB 7.0-1SP-US-41	Certificación de Seguridad: UL 1741 Núm. Certificación: 2019-03-13-E210376 Laboratorio: UL	Interconectable: SI Voltaje(s) Salida: 208-240 VAC Voltaje(s) Máximo Entrada: 600 VDC Eficiencia Máxima: 97.9% Tipo de Gabinete(NEMA): 3R Potencia Nominal: 7000Watts Garantía Manufactura: 5 año(s)
SMA	SB 6.0-1SP-US-41	Certificación de Seguridad: UL 1741 Núm. Certificación: 2019-03-13-E210376 Laboratorio: UL	Interconectable: SI Voltaje(s) Salida: 208-240 VAC Voltaje(s) Máximo Entrada: 600 VDC Eficiencia Máxima: 97.7% Tipo de Gabinete(NEMA): 3R Potencia Nominal: 6000Watts Garantía Manufactura: 5 año(s)
SMA	SB 7.7-1SP-US-41	Certificación de Seguridad: UL 1741 Núm. Certificación: 2019-03-13-E210376 Laboratorio: UL	Interconectable: SI Voltaje(s) Salida: 208-240 VAC Voltaje(s) Máximo Entrada: 600 VDC Eficiencia Máxima: 97.5% Tipo de Gabinete(NEMA): 3R Potencia Nominal: 7680Watts Garantía Manufactura: 5 año(s)
SMA	SB 3.0-1SP-US-41	Certificación de Seguridad: UL 1741 Núm. Certificación: 2019-03-13-E210376 Laboratorio: UL	Interconectable: SI Voltaje(s) Salida: 208-240 VAC Voltaje(s) Máximo Entrada: 600 VDC Eficiencia Máxima: 97.6% Tipo de Gabinete(NEMA): 3R Potencia Nominal: 3000Watts Garantía Manufactura: 5 año(s)
SMA	SB 5.0-1SP-US-41	Certificación de Seguridad: UL 1741 Núm. Certificación: 2019-03-13-E210376 Laboratorio: UL	Interconectable: SI Voltaje(s) Salida: 208-240 VAC Voltaje(s) Máximo Entrada: 600 VDC Eficiencia Máxima: 97.6% Tipo de Gabinete(NEMA): 3R Potencia Nominal: 5000Watts Garantía Manufactura: 5 año(s)
SMA	SB 3.8-1SP-US-41	Certificación de Seguridad: UL 1741 Núm. Certificación: 2019-03-13-E210376 Laboratorio: UL	Interconectable: SI Voltaje(s) Salida: 208-240 VAC Voltaje(s) Máximo Entrada: 600 VDC Eficiencia Máxima: 97.6% Tipo de Gabinete(NEMA): 3R Potencia Nominal: 3840Watts Garantía Manufactura: 5 año(s)

### División de Edificabilidad

Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

### Condiciones Especiales





### **Certificación de Equipos de Energía Renovable**

Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

#### **Firmas / Sellos**

**Fecha de Expedición:**  
08/MAY/2020



**Ing. Gabriel Hernández Rodríguez**  
**Secretario Auxiliar**

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# Sol-Ark<sup>®</sup>

## Sol-Ark 5K-P Spec Sheet



Max Allowed PV Power	3250W + 3250W = 6500W
Max PV Power Delivered to Battery & AC Outputs	5000W
Max DC Voltage (Voc)	500V @ 18A, 450V @ 20A
MPPT Voltage Range	150-425V
Starting Voltage	125V
Number of MPPT	2
Max Solar Strings Per MPPT	2
Max DC Current per MPPT (Self Limiting)	10A
Max AC Coupled Input (Micro/String Inverters)	9600W

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Connections	120/240/208V Split Phase
Continuous AC Power to Grid (On-Grid)	5000W 20.8A-L (240V)
Continuous AC Power to Load (Off-Grid)	5000W 20.8A-L (240V)
Surge AC Power 10sec	16,000VA L-L (240V)
Surge AC Power 100ms	25,000VA L-L(240V)
Parallel Stacking	No
Frequency	60/50Hz
Continuous AC Power with Grid or Generator	15120W 63A L-L (240V)
CEC Efficiency	96.5% (Peak 97.5%)
Idle Consumption Typical—No Load	60W
Sell Back Power Modes	Limited to Household/Fully Grid-Tied
Design (DC to AC)	Transformerless DC
Response Time (Grid-Tied to Off-Grid)	4ms
Power Factor	+/- 0.9 - 1.0

Type	Lead-Acid or Li-Ion
Nominal DC Input	48V
Capacity	50 — 9900Ah
Voltage Range	43.0 — 63.0V
Continuous Battery Charging Output	120A
Charging Curve	3-Stage w/ Equalization
Grid to Batt Charging Efficiency	96.0%
External Temperature Sensor	Included
Current Shunt for Accurate % SOC	Integrated
External Gen Start Based on Voltage or %SOC	Integrated
Communication to Lithium Battery	CanBus & RS485

Dimensions (H x W x D)	30.0" x 18.3" x 10.0"
Weight	78 lbs
Enclosure	NEMA 3R
Ambient Temperature	-25-55°C, >45°C Derating
Installation Style	Wall-Mounted
Wi-Fi & LAN Communication	Included
Standard Warranty (verified by HALT Testing)	5 Years

Electronics Certified Safety by SGS Labs to NEC & UL Specs - NEC 690.4B & NEC 705.4/6	Yes
Grid Sell Back — UL1741-2010/2018, IEE-E1547a-2003/2014, FCC 15 Class B, UL1741SA,	Yes
PV DC Disconnect Switch — NEC 240.15	Integrated
Ground Fault Detection — NEC 690.5	Integrated
PV Rapid Shutdown Control — NEC 690.12	Integrated
PV Arc Fault Detection — NEC 690.11	Integrated
PV Input Lightning Protection	Integrated
PV String Input Reverse Polarity Protection	Integrated
AC Output Breakers - 63A	Integrated
250A Battery Breaker / Disconnect	Integrated
Surge Protection	DC Type II / AC Type II



Sol-Ark  
1100 Professional Dr.  
Plano, Texas 75074

To Whom It May Concern:

This letter serves as evidence that Sol-Ark will provide 10-year warranty coverage for SA-5K hybrid storage Inverters installed for the CDBG (Community Development Block Grant) program in Puerto Rico. The terms and conditions of the warranty are the same as the Sol-Ark SA-12K standard 10-year warranty.

The SA-5K 10-year warranty coverage only applies to the CDBG program. Any SA-5K product not associated with the CDBG program will continue to have a standard SA-5K 5-year warranty.

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Goldstein', is written over a horizontal line.

Andy Goldstein  
Sol-Ark  
VP Corporate Strategy

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## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

Solicitante: Ismael Diaz

Correo Electrónico: ismael.diaz@warren-ecm.com

Compañía: Warren

### Datos de Equipo Certificado

Tipo de Equipo(s): Inversor

Clasificación: Equipo Existente

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
Sol-Ark	Sol-Ark 12K-P	Certificación de Seguridad: UL 1741 Núm. Certificación: SGSNA/18/GZ/00127 Laboratorio: SGSUS	Interconectable: SI Voltaje(s) Salida: 120/208/240 VAC Voltaje(s) Máximo Entrada: 500 VDC Eficiencia Máxima: 97% Tipo de Gabinete(NEMA): Nema 1 Potencia Nominal: 9600Watts Garantía Manufactura: 10 año(s)
Sol-Ark	Sol-Ark 5K-48-ST	Certificación de Seguridad: UL 1741 Núm. Certificación: SGSNA/18/GZ/00127 Laboratorio: SGSUS	Interconectable: SI Voltaje(s) Salida: 240 VAC Voltaje(s) Máximo Entrada: 500 VDC Eficiencia Máxima: 97.5% Tipo de Gabinete(NEMA): NEMA 1 Potencia Nominal: 5000Watts Garantía Manufactura: 5 año(s)
Sol-Ark	Sol-Ark-8k-48-ST	Certificación de Seguridad: UL 1741 Núm. Certificación: SGSNA/18/GZ/00127 Laboratorio: SGSUS	Interconectable: SI Voltaje(s) Salida: 120/240 VAC Voltaje(s) Máximo Entrada: 500 VDC Eficiencia Máxima: 98.5% Tipo de Gabinete(NEMA): NEMA 1 Potencia Nominal: 8000Watts Garantía Manufactura: 5 año(s)

### División de Edificabilidad

*WDRR*  
WORR Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

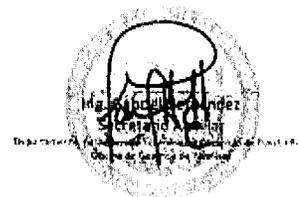
### Condiciones Especiales

Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

### Firmas / Sellos

Fecha de Expedición:

04/AUG/2021





## **Certificación de Equipos de Energía Renovable**

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*Ing. Gabriel Hernández Rodríguez*

*Secretario Auxiliar*

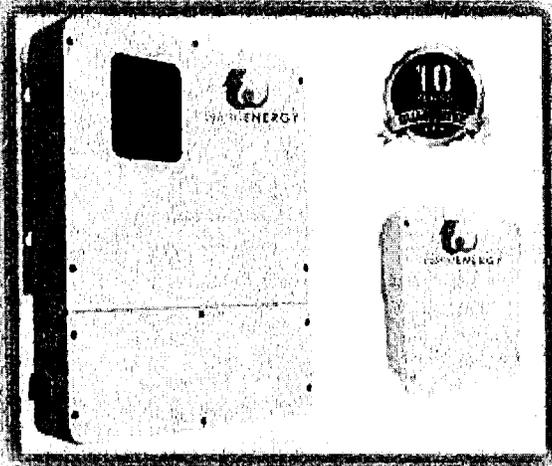
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# WARU HYBRID INVERTER 7.6KW AND 11.4KW



## FLEXIBLE

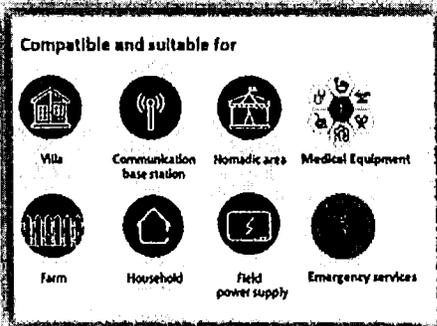
- The model covers 7.6kW – 11.4kW, with unified appearance design.
- Compatible with WARU LiFePO4 battery modules.
- Up to 10 inverters in parallel
- 10 years warranty

## GRACE

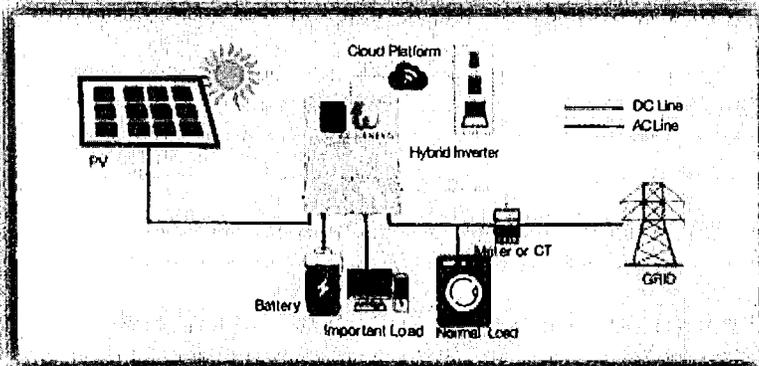
- Fashionable appearance, convenient wiring.
- IP65 design, natural cooling, external fan free design, low noise, improve the whole machine life.

## RELIABLE

- Battery reverse connect protection, the charge and discharge are controlled by intelligent software to improve the battery life.
- Input and Output lightning protection, PV arcing detection.
- Discharge at full power and disconnect the charger automatically when the battery is full.
- Off-grid full power output, transient 1.5 times overload, soft start mode, with air conditioning, water pump and other loads.
- Insulation detection, leakage battery, ground fault detection, Island protection to prevent



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WARR



WARU ENERGY, LLC  
Industrial Víctor M Fernández  
315 calle 3  
San Juan, PR 00926

Tel. (787) 680-0008  
[www.waruenergy.com](http://www.waruenergy.com)  
[office@waruenergy.com](mailto:office@waruenergy.com)



MODEL	WRU7.6KW	WRU11.4KW
<b>PV INPUT</b>		
PV INPUT POWER	10KW	14.82KW
MPPT NUMBER	4	4
PV VOLTAGE RANGE	150-500V	150-500V
MAX PV INPUT VOLTAGE	500V	500V
EACH MPPT INPUT CURRENT	13A	14A
<b>AC OUTPUT (ON GRID)</b>		
RATED AC OUTPUT	120/208/240V 7.6KVA	120/208/240 11.4KVA
AC OUTPUT VOLTAGE	120/240 SPLIT PHASE, 208 TWO/THREE PHASE	120/240 SPLIT PHASE, 208 TWO/THREE PHASE
AC OUTPUT FREQUENCY	50/60Hz	50/60Hz
MAX OUTPUT CURRENT	32A	47.5A
AC REVERSE CHARGING	YES	YES
POWER FACTOR	0.8leading....0.8lagging	0.8leading....0.8lagging
THDI	<2%	<2%
<b>BACKUP AC OUTPUT</b>		
RATED BACKUP OUTPUT POWER	7.6KVA	11.4KVA
MAX BACKUP OUTPUT POWER	9.5KVA 60S / 11.4KVA 1S	14.25KVA 60S / 17.1KVA 1S
BACKUP AC OUTPUT VOLTAGE	120/240 SPLIT PHASE, 208 TWO/THREE PHASE	120/240 SPLIT PHASE, 208 TWO/THREE PHASE
AC FREQUENCY	50/60Hz	50/60Hz
OUTPUT THDI	<2%	<2%
<b>BATTERY</b>		
MAX CHARGE & DISCHARGE CURRENT	100A/100A	100A/100A
BATTERY VOLTAGE RANGE	96V ~ 336V	96V ~ 336V
BATTERY CAPACITY RANGE	6.6 to 66kWh	6.6 to 66kWh
BATTERY TYPE	Lithium LiFePO4	Lithium LiFePO4
COMMUNICATION	CAN, RS485	CAN, RS485
<b>EFFICIENCY</b>		
MAX EFFICIENCY	≥98.2%	≥98.2%
CEC EFFICIENCY	≥97.2%	≥97.2%
<b>PROTECTION</b>		
COMPLETE PROTECTION	Ground protection; AFCI protection; Islanding protection; DC disconnect detection; Battery Reverse protection; Battery charge and discharge protection; Insulation testing; GFCI; DC&AC anti-thunder; Overvoltage and under-voltage protections; AC&DC over-current protection; AC short-circuit current protection; overheating protection	
<b>GENERAL DATA</b>		
AC AND BACKUP OUTPUT CONDUIT SIZE	25.4MM	25.4MM
PV INPUT CONDUIT SIZE	25.4MM	25.4MM
BATTERY INPUT CONDUIT SIZE	34.5MM	34.5MM
OPERATION TEMPERATURE RANGE	-25 ~ +60°C	-25 ~ +60°C
ENVIRONMENT HUMIDITY	0-95%	0-95%
ALTITUDE	0~4000M (Derating when over 2000m)	0~4000M (Derating when over 2000m)
IP GRADE	IP65	IP65
WEIGHT	30kg	30kg
DIMENSION (W x H x D)	530x660x200mm	530x660x200mm
COOLING	NATURAL COOLING	NATURAL COOLING
NOISE EMISSION (dB)	<25dB	<29dB
DISPLAY	LCD	LCD
COMMUNICATION	MODBUS, RS485, WIFI, 4G	MODBUS, RS485, WIFI, 4G
SELF CONSUMPTION AT NIGHT	<2.5W (with battery enabling < 5W)	<2.5W (with battery enabling < 5W)
NO TRANSFORMER	YES	YES
SAFETY	UL1741 SA all options, UL1699B, CSA 22.2	UL1741 SA all options, UL1699B, CSA 22.2
EMC	FCC PART 15 CLASS B	FCC PART 15 CLASS B
WARRANTY	10 YEARS	10 YEARS

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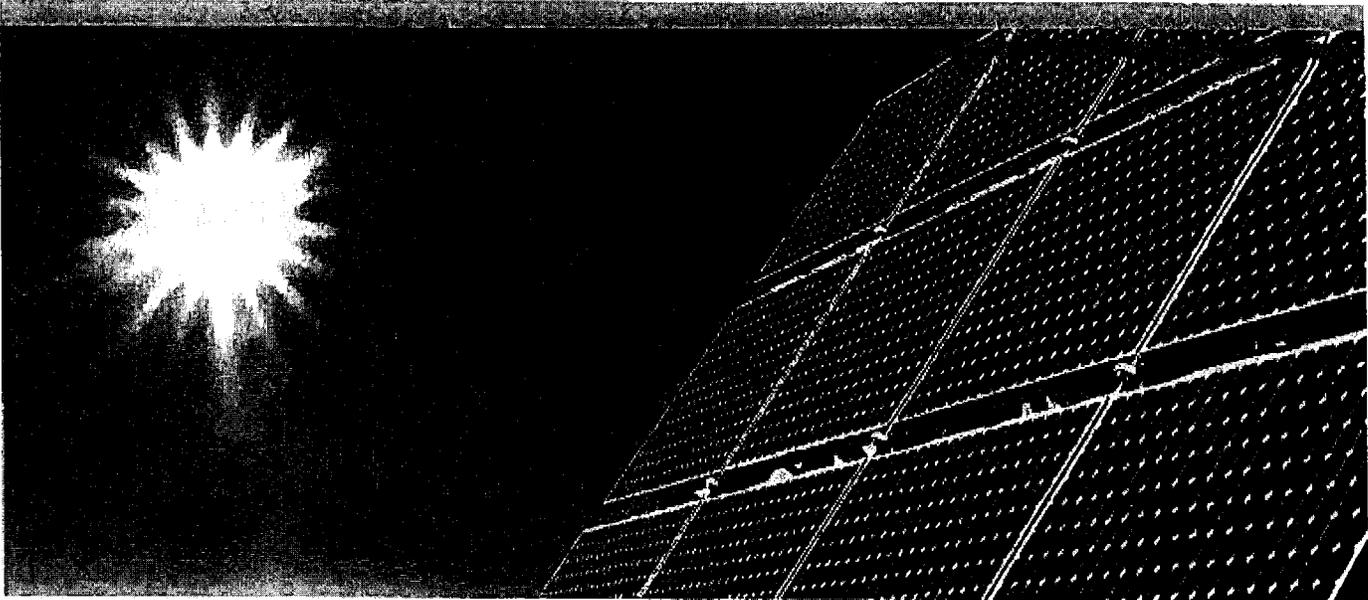
WARU ENERGY, LLC  
Industrial Víctor M Fernández  
315 calle 3  
San Juan, PR 00926

Tel. (787) 680-0008  
[www.waruenergy.com](http://www.waruenergy.com)  
[office@waruenergy.com](mailto:office@waruenergy.com)



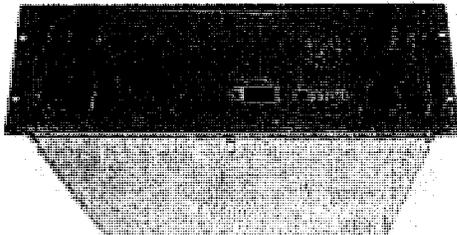


# POWER TOWER-LV WUPT-5160



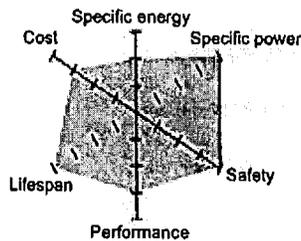
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## ✓ Key Features

-  **Modular**
-  **Plug & play**
-  **Safety**
-  **Long lifespan**



### CHEMISTRY

**WARU ENERGY only goes with LFP for safest operation and longest cycle-life**

Whilst WARU batteries are slightly larger per physical capacity versus other types of Li-Ion used in electronics and EVs, they are easily banked in parallel close together because they don't suffer heat issues and thermal runaway. We have chosen LFePO4 for their superior life, safety and environmental performance.

### About WARU

As one of the earliest pioneers in energy storage market with lithium iron technology, WARU ENERGY has a vision to pave the path for everyone in the world to enjoy clean energy one day.

WARU ENERGY is a multinational company that currently has expansion in 30 countries globally and its products are accredited by UL 1973, IEC62619, TÜV, CEC, UN38.3, AS62040 and many other international standards.

All WARU energy systems are integrated with smart energy management solutions. WARU ENERGY is committed to revolutionize the future energy network through our patented Korean technologies.

**Physical**

Model	WUPT 51&O
Battery Type	LFP (LiFePO4)
System Weight	32 kg
Dimension (W x D x H)	958 mm x 360 mm x 177.8 mm
IP Protection	IP20
Warranty	15 Year Labor Warranty, 33 Year Performance Warranty

**Electrical**

Energy Capacity	3.072 kWh (60Ah)
Usable Capacity	3.072 kWh
Depth of Discharge (DoD)	100%
Nominal Voltage	51.2 V
Operation Voltage Range	44 V ~ 58 V
Internal Resistance	≤ 30 mΩ
Cycle Life	≥ 12,000 at 100% DoD

**Operation**

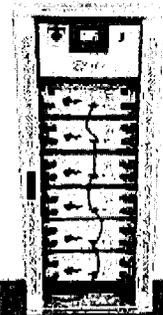
Max. Charge Current	60 A (1C)
Max. Discharge Current	60 A (1C)
Operating Temperature Range	-20 °C ~ 50 °C*
Humidity	15% ~ 85%

**BMS**

Modules Connection	Parallel connection
Capacity Range	Up to 960Ah in parallels modules
Power Consumption	<2 W (Work), <100 mha (Sleep)
Monitoring Parameters	System voltage, current, cell voltage, cell temperature, PCBA temperature
Communication	CAN and RS485, RS232 compatible
Clusters Connection	16 Towers in parallels

\*When the temperature is below 0 °C or above 40 °C, the performance will be limited.

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## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

Solicitante: Raul Reyes Reyes

Correo Electrónico: rreyes@waruenergy.com

Compañía: WARU Energy

### Datos de Equipo Certificado

Tipo de Equipo(s): Inversor

Clasificación: Equipo Nuevo

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
WARU ENERGY	SUN-7.6K-SG01-LP1-US	Certificación de Seguridad: UL 1741 Núm. Certificación: SGSNA/18/GZ/00180 Laboratorio: SGSUS	Interconectable: Sí Voltaje(s) Salida: 120/240/208 VAC Voltaje(s) Máximo Entrada: 500 VDC Eficiencia Máxima: 97.6% Tipo de Gabinete(NEMA): IP65 Potencia Nominal: 7600Watts Garantía Manufactura: 10 año(s)

### División de Edificabilidad

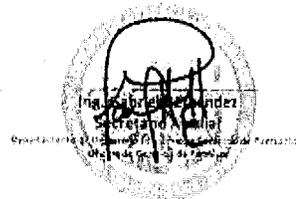
Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

### Condiciones Especiales

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### Firmas / Sellos

Fecha de Expedición:  
 25/NOV/2019



**Ing. Gabriel Hernández Rodríguez**  
**Secretario Auxiliar**

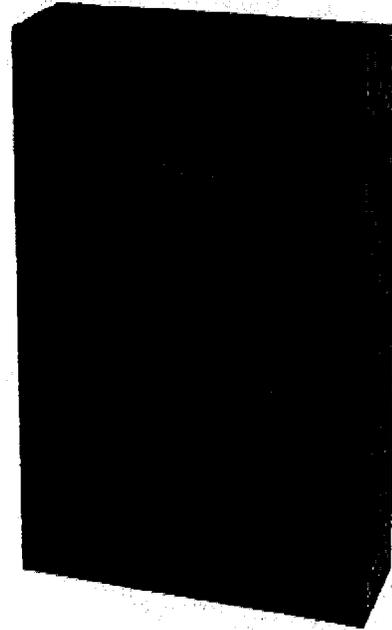
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The Darfon H5000 features a true hybrid design with power sharing between various power sources. This hybrid inverter prioritizes the energy flow and direction from the batteries, PV modules and utility. The H5000 also comes with system monitoring and generator support. It was designed to accommodate both wall or rack mounting options. The H5000 Hybrid Inverter supports a wide range of applications, including off-grid, self-use, net-metering, backup and time-of-use optimization.

## H5000 SPECIFICATIONS

SOLAR DC INPUT	
Max Power	6500W
Operation/MPPT Voltage Range	120 to 500VDC / 250 to 430VDC
Min Start Voltage	150 VDC
Max Input Current	13A / 13A (Two String Input)
INVERTER AC OUTPUT	
Continuous Output Power @ 25°C	5000W
Overload 40sec/5sec/1sec @ 25°C	5500W/6500W/7500W
Rated Output Current (RMS)	21A (@120V and 240V)
Output Frequency (Auto Sensing)	50/60 Hz
Output Voltage	L-N: 120V ± 3%; L-L: 240V ± 3%
AC INPUT FROM GRID	
Automatic Transfer Relay Rating / Typical Transfer Time	33A / 20ms
AC Input Voltage Range	L-L: 180 to 280V (240V Nominal)
AC Input Frequency Range	55 to 65 Hz
AC OUTPUT TO GRID	
Grid Feed-In Current Range	0 to 24A (@240V)
Grid Feed-In Voltage Range	L-L: 211 to 264V ± 3.0V
Grid Feed-In Frequency Range	59.4 to 60.4Hz ± 0.05Hz
EFFICIENCY	
Peak PV to Grid	96%
CEC weighted PV to Grid	95.5%
DC BATTERY CHARGER	
Max Charge Current	60A
Max Discharge Current	150A
DC Voltage Range	42 to 60V (48V Nominal)
Compatible Battery Types	AGM (default), Gel, Li-Ion, LiFePO <sub>4</sub> , Custom
GENERAL SPECIFICATIONS	
Product Weight	35.0kg (71.2lb)
Product Dimensions (H x W x D)	69 x 44.5 x 15cm (27.2 x 17.5 x 5.9in)
Protection Rating	NEMA 1 Indoor / IP20
Operating Temperature	0 to 55°C (power derated above 40°C)
Storage Temperature	-25 to 70°C
Compliances	UL 1741, IEEE 1547, FCC Class B



- True hybrid design with sharing between various power sources
- Up to 6.5kW of Input power with built-in MPPT solar charger
- Compatible with Lithium or lead-acid based batteries
- Six (6) preset modes: Backup, backup w/o grid feed-in, residential, residential w/o grid feed-in, TOU, and TOU w/battery feed-in
- Auxiliary port for generator support
- Transformerless inverter design with true sine-wave AC output
- Flexible design for either wall- or rack-mounted installations
- System monitoring and management via the control panel
- Five (5) year standard warranty



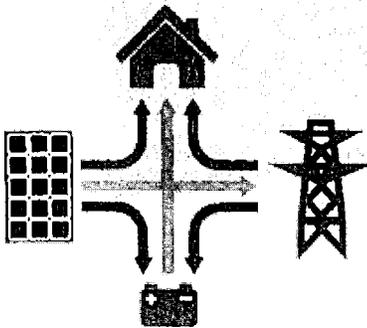
For more information, visit/contact us at [www.darfon.com](http://www.darfon.com) or [pvsales@darfon.com](mailto:pvsales@darfon.com)

## MODE DEFINITION

	CHARGE SOURCE		GRID FEED-IN FROM		PRIORITY FOR PV INPUT TO			PRIORITY FOR LOAD FROM		
	PV	Grid	PV	Batt.	Load	Batt.	Grid	PV	Grid	Batt.
1. Back-up (default)	Yes	Yes	Yes	No	2	1	3	1	2	3
2. Residential	Yes	No	Yes	No	1	2	3	1	3	2
3. Back-up w/o Feed-in	Yes	Yes	No	No	2	1	X	1	2	3
4. Residential w/o Feed-In	Yes	No	No	No	1	2	X	1	3	2
5. TOU	Off-Peak Period	Yes	Yes	Yes	2	1	3	1	2	3
	Peak Period	Yes	No	Yes	1	2	3	1	3	2
6. TOU w/Batt. Feed-In	Off-Peak Period	Yes	Yes	Yes	2	1	3	1	2	3
	Peak Period	Yes	No	Yes	1	3	2	1	3	2

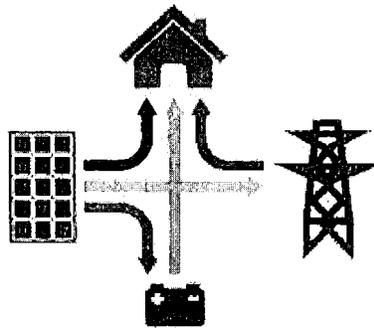
Back-up

When to use:  
The utility is cheap,  
but power is unstable.



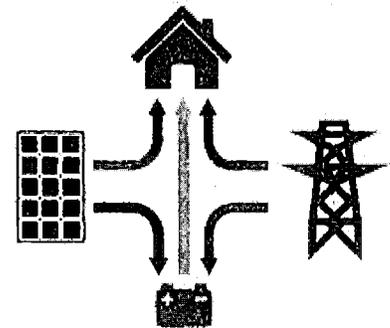
Residential

When to use:  
The utility is expensive,  
but power is stable.



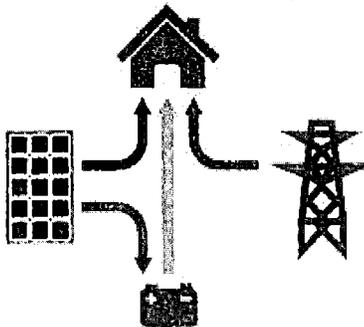
Back-up Without Feed-In

When to use:  
The utility is cheap,  
and you do not want  
to feed into the grid.



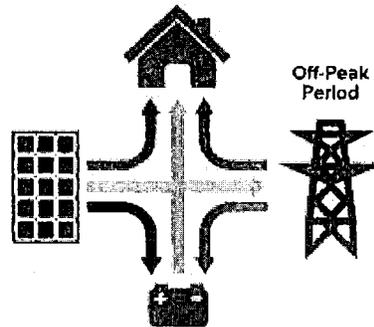
Residential Without Feed-In

When to use:  
The utility is expensive,  
and you do not want  
to feed into the grid



Time-Of-Use (TOU)

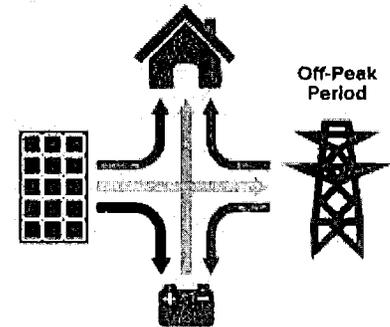
When to use:  
When TOU is defined.



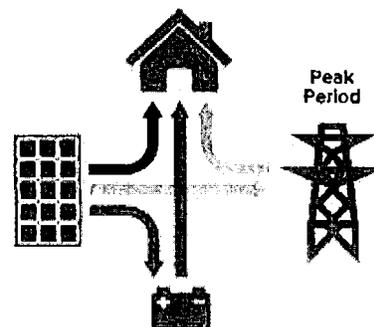
Off-Peak Period

Time-Of-Use (TOU) with Battery Feed-In

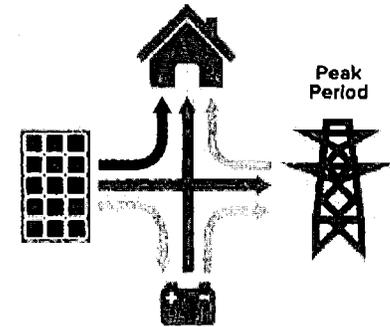
When to use:  
When TOU is defined,  
and battery feed-in is allowed.



Off-Peak Period



Peak Period



Peak Period

← Priority Level 1  
← Priority Level 2  
← Priority Level 3

For more information, visit/contact us at [www.darfonsolar.com](http://www.darfonsolar.com) or [pvsales@darfon.com](mailto:pvsales@darfon.com)



## Certificación de Equipos de Energía Renovable

### Datos de la Solicitud

De acuerdo a la información suministrada se solicita la certificación para equipo(s) de energía renovable Comercial-Privado, en territorio del Estado Libre Asociado de Puerto Rico, según indicado(s) a continuación:

Solicitante: Quintín Ramos

Correo Electrónico: qramos@powercommpr.com

Compañía: Powercomm Inc

### Datos de Equipo Certificado

Tipo de Equipo(s): Inversor

Clasificación: Equipo Existente

MARCA	MODELO	CERTIFICACIONES	ESPECIFICACIONES
DARFON	G320 MICRO INVERTER	Certificación de Seguridad: UL 1741 Núm. Certificación: 4005200 Laboratorio: INTERTEK	Interconectable: Sí Voltaje(s) Salida: (240, 211, 264) VAC Voltaje(s) Máximo Entrada: 60 VDC Eficiencia Máxima: 98.5% Tipo de Gabinete(NEMA): 6 Potencia Nominal: 300Watts Garantía Manufactura: 25 año(s)
DARFON MICRO INVERSOR	MIG300ULXX		
DARFON MICROINVERSOR	MIG240UL00		
Darfon	Darfon HB51	Certificación de Seguridad: UL 1741 Núm. Certificación: 4005200 Laboratorio: ITSNA	Interconectable: Sí Voltaje(s) Salida: 120, 240 VAC Voltaje(s) Máximo Entrada: 500 VDC Eficiencia Máxima: 92% Tipo de Gabinete(NEMA): Nema 1 Indoor Potencia Nominal: 7000Watts Garantía Manufactura: 5 año(s)
Darfon	H5000	Certificación de Seguridad: UL 1741 Núm. Certificación: 4005200 Laboratorio: ITSNA	Interconectable: Sí Voltaje(s) Salida: 120, 240 VAC Voltaje(s) Máximo Entrada: 500 VDC Eficiencia Máxima: 96% Tipo de Gabinete(NEMA): NEMA 1 Potencia Nominal: 6500Watts Garantía Manufactura: 5 año(s)

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### División de Edificabilidad

Se recomienda la instalación del equipo de fuente de energía renovable sometido ante la OGP, a tenor con el Reglamento para la Certificación de Sistemas de Energía Renovable y el Reglamento Conjunto para Obras de Construcción y Usos de Terrenos, vigentes.

### Condiciones Especiales

Bajo ninguna circunstancia, deberá interpretarse que esta certificación implique la aprobación de instalación de equipos en un proyecto de construcción, ni que se autorice iniciar obras de construcción de clase alguna, sin el trámite del correspondiente permiso de construcción.

### Firmas / Sellos

Fecha de Expedición:

23/MAR/2021





## Certificación de Equipos de Energía Renovable

---



**Ing. Gabriel Hernández Rodríguez**  
**Secretario Auxiliar**

W

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A. Photovoltaic System

4. Racking System

a. Iron Ridge

b. UniRac

c. SnapNrack

W

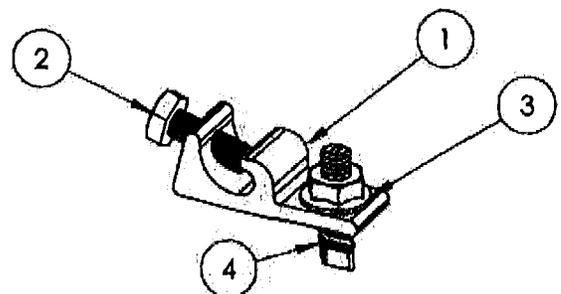
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William O. Rodríguez Rodríguez

William O. Rodríguez Rodríguez (Dec 19, 2022 14:56 AST)

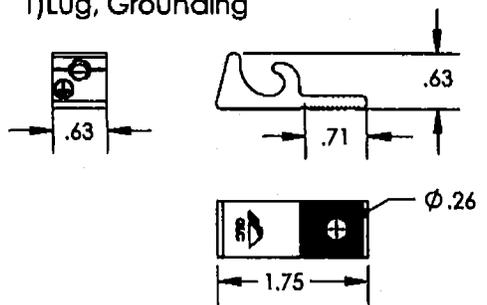
2-11/2022



ITEM NO.	DESCRIPTION	QTY. IN KIT
1	LUG, GROUNDING, LAY-IN - LOW PROFILE	2
2	BOLT, 1/4-28 X .750" HEX CS SST	2
3	NUT, FLANGE HEX 1/4-20 SST	2
4	BOLT, T CSTM 1/4-20 X 1.188" LOCK SS	2

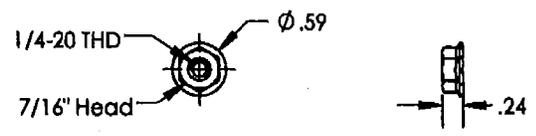
Part Number	Description	Wire Size Range (AWG)
GD-LUG-003	KIT, 2PCS, GROUNDING LUG, LOW PROFILE	4-10

1) Lug, Grounding



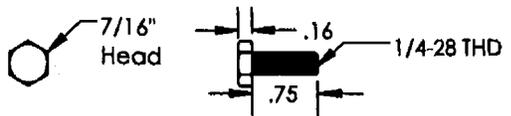
Property	Value
Material	Tin Plated Copper
Finish	Clear Matte

3) Nut, Flange Hex 1/4-20



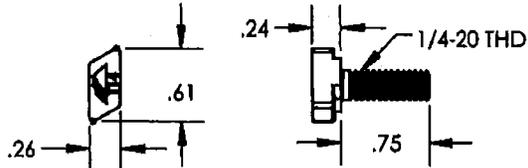
Property	Value
Material	300 Series Stainless Steel
Finish	Clear

2) Bolt, 1/4-28 x .750 Hex



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

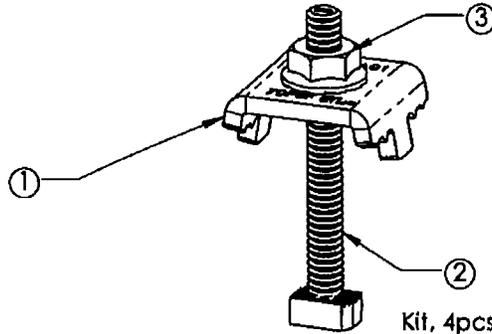
4) Bolt, T CSTM 1/4-20 x .750



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

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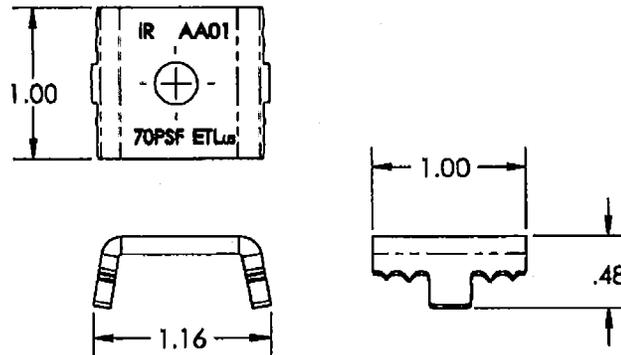
Kit, 4pcs, Grounding Mid Clamp

Item Number	Component	Qty in Kit
1	Clamp, Grounding Mid	4
2	Bolt, T Cstm 1/4-20	4
3	Nut, Flange Hex 1/4-20 SST	4

Kit, 4pcs, Grounding Mid Clamp

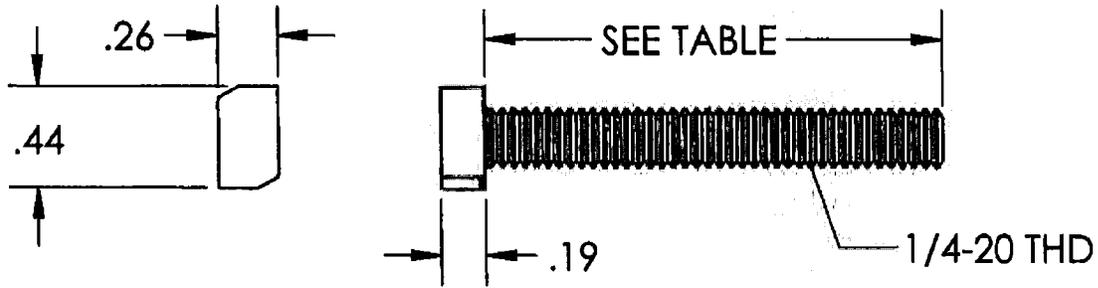
Clear Part Number	Black Part Number	Description / Length	Bolt Length
RS-GD-MCL-200	RS-GD-MCL-200B	Kit, 4pcs, Grounding Mid Clamp 2.00"	2.00"
RS-GD-MCL-225	RS-GD-MCL-225B	Kit, 4pcs, Grounding Mid Clamp 2.25"	2.25"
RS-GD-MCL-250	RS-GD-MCL-250B	Kit, 4pcs, Grounding Mid Clamp 2.50"	2.50"
RS-GD-MCL-275	RS-GD-MCL-275B	Kit, 4pcs, Grounding Mid Clamp 2.75"	2.75"

### 1) Integrated Grounding Mid Clamp



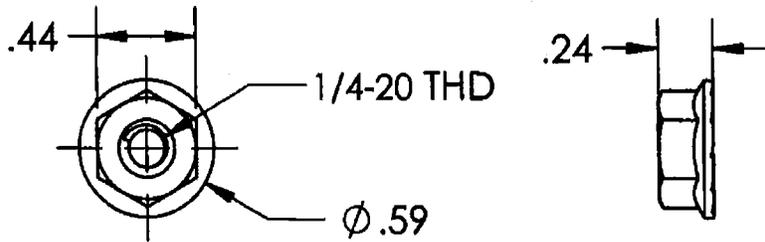
Property	Value
Material	300 Series Stainless Steel
Finish	CLEAR

2) Bolt, T Cstm 1/4-20



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

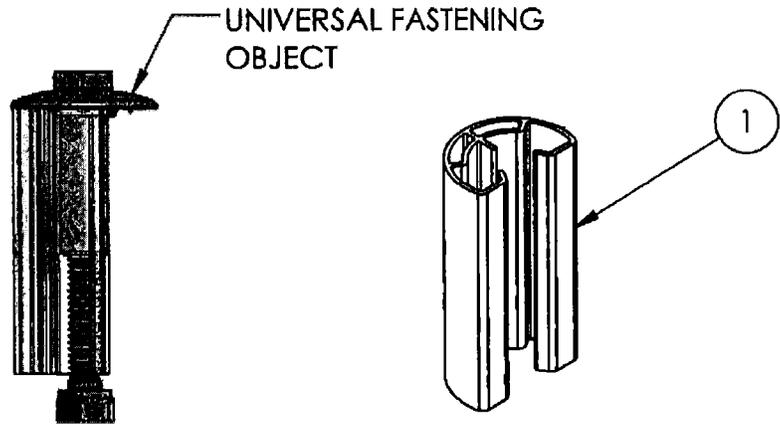
3) Nut, Flange Hex 1/4-20 SST



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

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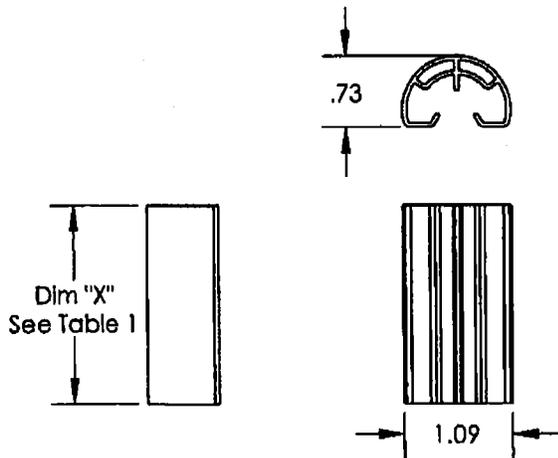
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ITEM NO.	COMPONENT	QTY. IN KIT
1	STOPPER SLEEVE	4

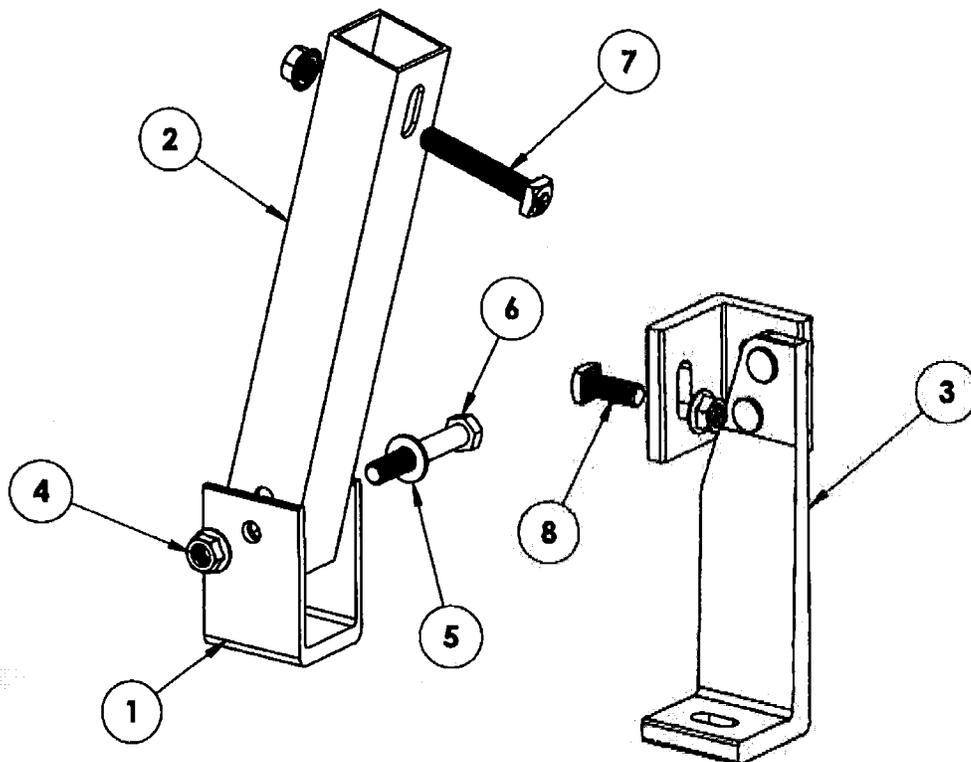
**TABLE 1: STOPPER SLEEVE PART NUMBERS AND HEIGHT**

MILL PART NUMBER	BLACK PART NUMBER	HEIGHT "X" (mm)
UFO-STP-30 mm	UFO-STP-30 mm-B	30
UFO-STP-32 mm	UFO-STP-32 mm-B	32
UFO-STP-33 mm	UFO-STP-33 mm-B	33
UFO-STP-35 mm	UFO-STP-35 mm-B	35
UFO-STP-38 mm	UFO-STP-38 mm-B	38
UFO-STP-40 mm	UFO-STP-40 mm-B	40
UFO-STP-42 mm	UFO-STP-42 mm-B	42
UFO-STP-46 mm	UFO-STP-46 mm-B	46



Property	Value
Material	6000 Series Aluminum
Finish	Mill or Black

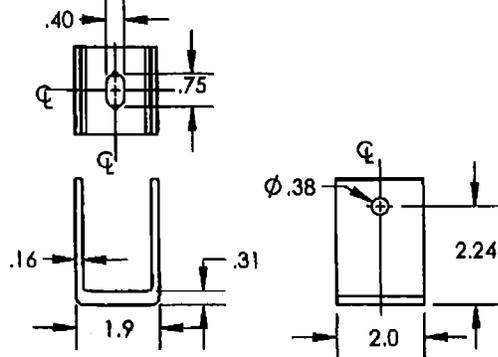
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ITEM NO.	DESCRIPTION	QTY.
1	U-FOOT	1
2	NORTH TILT LEG, 1.5" SQ, LENGTH VARIES	1
3	PRE-ASSEMBLED SOUTH TILT LEG	1
4	NUT, FLANGE HEX 3/8-16 SS	3
5	WASHER, FLAT 3/8 SS	1
6	BOLT, 3/8-16 X 2.5" CS SST	1
7	BOLT, BONDING 3/8-16 SQ HEAD, 2.25"	1
8	BOLT, BONDING 3/8-16 SQ HEAD, 1.0"	1

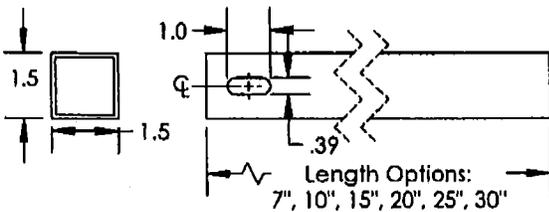
Part Number	Description	North Tilt Leg Length
TM-FTL-007	Kit, Fixed Tilt Leg, 7", Mill	7"
TM-FTL-010	Kit, Fixed Tilt Leg, 10", Mill	10"
TM-FTL-015	Kit, Fixed Tilt Leg, 15", Mill	15"
TM-FTL-020	Kit, Fixed Tilt Leg, 20", Mill	20"
TM-FTL-025	Kit, Fixed Tilt Leg, 25", Mill	25"
TM-FTL-030	Kit, Fixed Tilt Leg, 30", Mill	30"

1) U-Foot



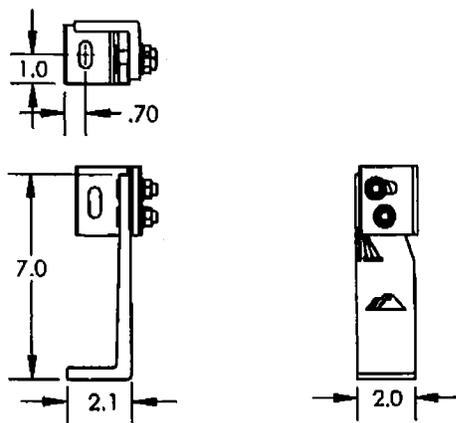
Property	Value
Material	Aluminum
Finish	Mill

2) North Tilt Leg



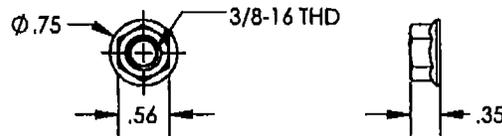
Property	Value
Material	Aluminum
Finish	Mill

3) Pre-assembled South Tilt Leg



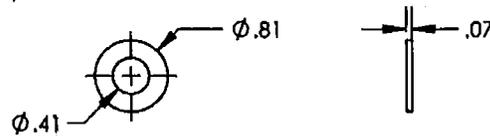
Property	Value
Material	Aluminum
Finish	Mill

4) Nut, Flange Hex 3/8-16 SS



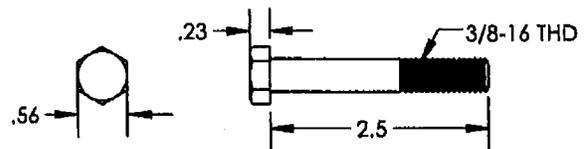
Property	Value
Material	Stainless Steel
Finish	Clear

5) Washer, Flat 3/8 SS



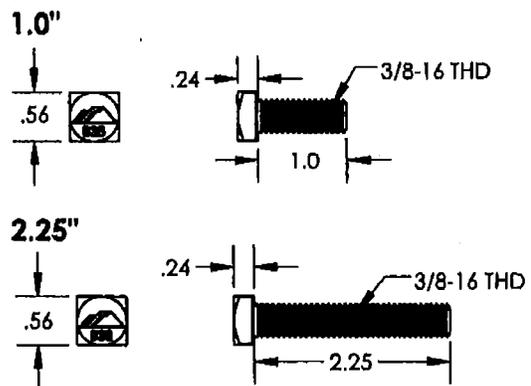
Property	Value
Material	Stainless Steel
Finish	Clear

6) Bolt, 3/8-16 X 2.5" CS SS



Property	Value
Material	Stainless Steel
Finish	Clear

7, 8) Bolt, Bonding 3/8-16 Sq Head



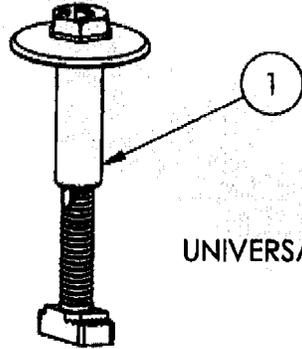
Property	Value
Material	Stainless Steel
Finish	Clear

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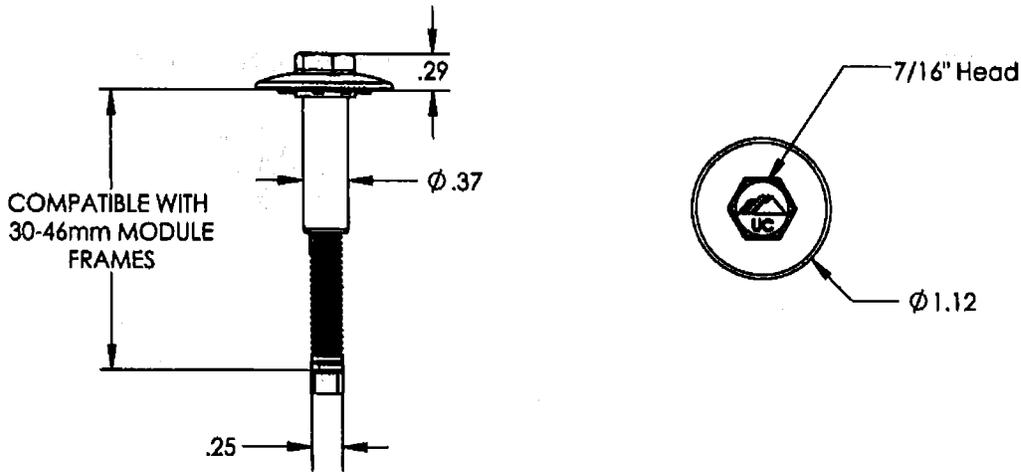
# Universal Fastening Object

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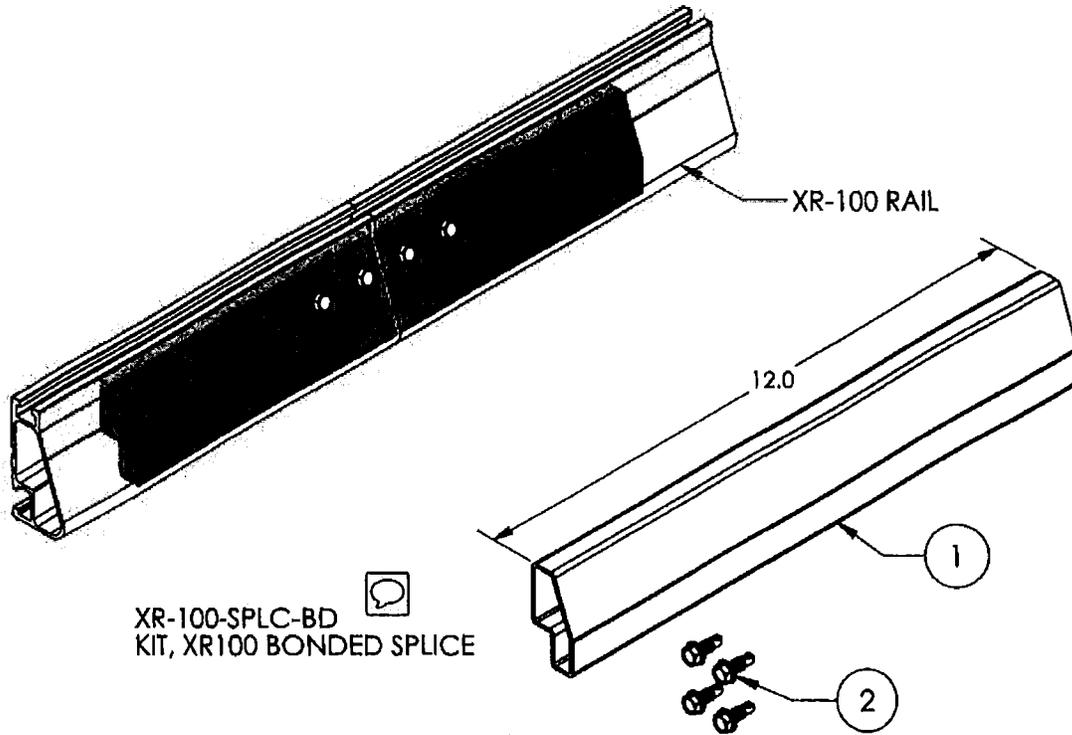
UNIVERSAL FASTENING OBJECT

ITEM NO.	DESCRIPTION	QTY. IN KIT
UFO-CL-001	KIT, 4PCS, UNIVERSAL MODULE CLAMP, CLEAR	4
UFO-CL-001-B	KIT, 4PCS, UNIVERSAL MODULE CLAMP, BLACK	4

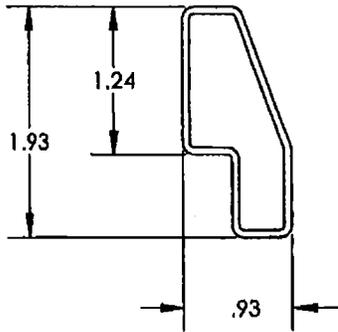


Property	Value
Material	300 Series Stainless Steel
Finish	Clear and Black

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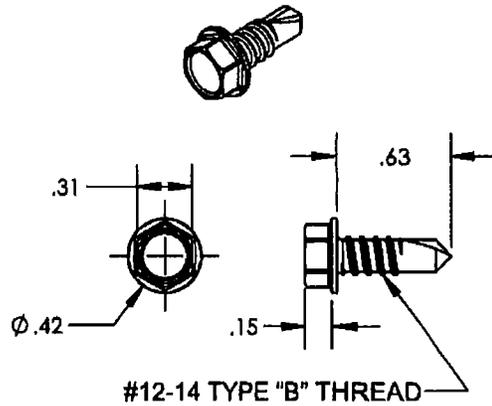


**1) Splice, XR100, Mill 12" long**



Property	Value
Material	6000 Series Aluminum
Finish	Mill

**2) Screw, Self Drilling**



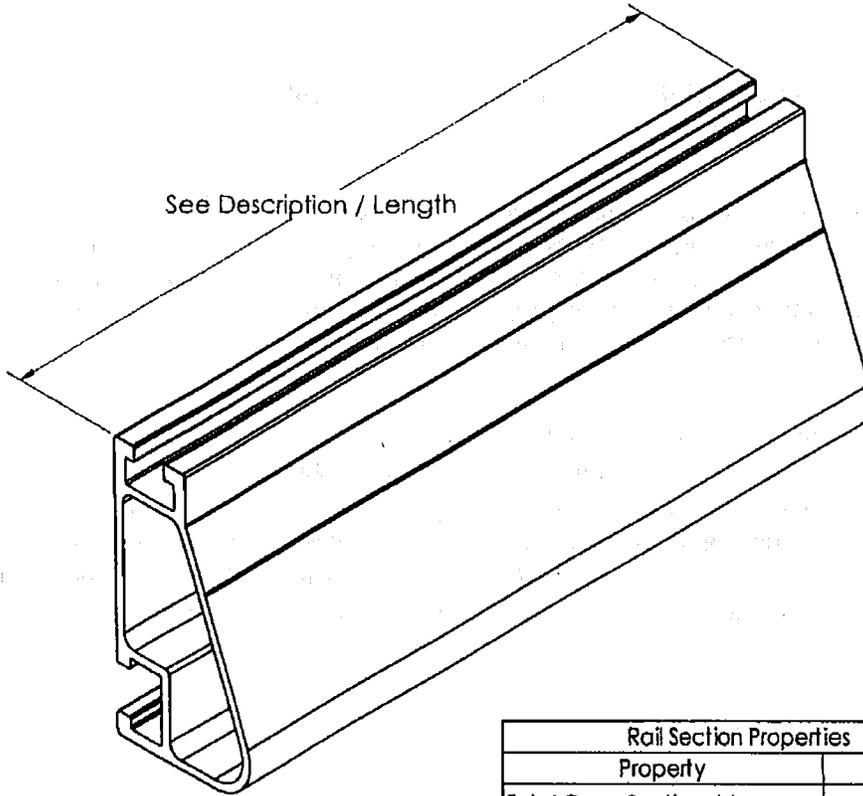
Property	Value
Material	300 Series Stainless Steel
Finish	Clear



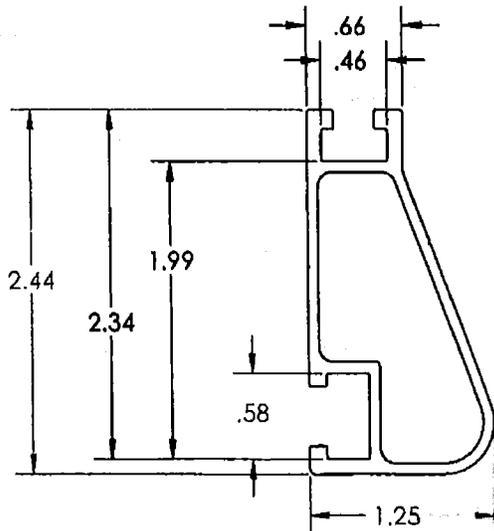
# XR100 Rail

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See Description / Length



Rail Section Properties	
Property	Value
Total Cross-Sectional Area	0.582 in <sup>2</sup>
Section Modulus (X-axis)	0.297 in <sup>3</sup>
Moment of Inertia (X-axis)	0.390 in <sup>4</sup>
Moment of Inertia (Y-axis)	0.085 in <sup>4</sup>
Torsional Constant	0.214 in <sup>3</sup>
Polar Moment of Inertia	0.126 in <sup>4</sup>



APPROVED MATERIALS:  
6005-T6, 6005A-T61, 6105-T5, 6N01-T6  
(34,000 PSI YIELD STRENGTH MINIMUM)

Clear Part Number	Black Part Number	Description / Length	Material	Weight
XR-100-132A	XR-100-132B	XR100, Rail 132" (11 Feet)	6000-Series Aluminum	7.50 lbs.
XR-100-168A	XR-100-168B	XR100, Rail 168" (14 Feet)		9.55 lbs.
XR-100-204A	XR-100-204B	XR100, Rail 204" (17 Feet)		11.60 lbs.



1495 Zephyr Avenue  
Hayward, CA 94544  
(800) 227-9523  
IronRidge.com

## Limited Warranties and Disclaimer

**For products sold after June 1, 2018**, IronRidge provides, to the original purchaser of the Products from IronRidge, and any subsequent owner of the Products, subject to assignability below ("Purchaser"), the following warranties for "Products" (defined as products manufactured by IronRidge, including BX Chassis but excluding other polymeric components) and installed properly and used for the purpose for which the Products are designed (collectively the "Warranty"), commencing on the earlier of:

- a) the date of complete installation of the Products or
- b) 30 days after the initial purchase of the Products from IronRidge;
- c) for a period of five years, Products with finishes (excluding Products that are mill finished and excluding surface finish of BX Chassis) will be free of visible defects, peeling, or cracking; and
- d) for a period of 25 years, Products will be free of defects in materials and manufacturing which materially impair the use of the Product for the purpose for which it was designed.

### The Warranty excludes:

- a) any defect that has not been reported to IronRidge in writing (i) within the warranty periods set forth above and (ii) within 60 days after discovery of such defect;
- b) normal wear, or damage resulting from misuse, overloading, abuse, improper installation (including failure to follow professional instruction and certification), negligence, or accident, or from force majeure acts including any natural disasters, extreme weather, war, or criminal acts;
- c) Products that have been altered, modified or repaired without written authorization from IronRidge or its authorized representative;
- d) damage to or caused by, or defects in, parts or materials not sold by IronRidge (irrespective of IronRidge documentation);
- e) Products installed, used or maintained in a manner contrary to IronRidge documentation; and
- f) damage to the Products during shipment, storage, installation or use.

**The finish warranty above does not apply** to surface oxidation or any foreign residue deposited on the Product finish, or to Products installed in corrosive atmospheric conditions, and is void if the practices specified by AAMA 609 & 610-02 – "Cleaning and Maintenance for Architecturally Finished Aluminum", or ASTM A780/A780M - 09 "Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings", as applicable, are not followed.



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Hayward, CA 94544  
(800) 227-9523  
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**The determination of the existence of a valid Warranty claim** or the applicability of any exclusion set forth above will be made by IronRidge in its sole discretion. Any waiver of or failure to claim a warranty exclusion will not create a continuing waiver or any expectation of non-enforcement of any such exclusion. In the event of breach of or non-compliance with the warranties set forth above, IronRidge's sole obligation and liability, and Purchaser's sole and exclusive remedy, shall be correction by IronRidge or its authorized representative of defects by repair, replacement, or credit, at IronRidge's sole discretion, provided Purchaser submits written proof of purchase and the date thereof within the applicable warranty period. Such repair, replacement or credit will not cause the warranty periods above to be reset, will completely satisfy and discharge IronRidge's liability and obligation with respect to the Warranty, and will not create an expectation of Warranty coverage in the future. Refurbished Product may be used to repair or replace the defective components. Transportation, installation, labor, or any other costs or losses associated with failure of Warranty compliance, or Product replacement or repair, are not covered by this Warranty and are not reimbursable.

**The Warranty is assignable by Purchaser and any subsequent owner of the Products**, provided that the Products remain installed at the original installation location, and provided that any subsequent owner agrees in writing to be bound by the terms of this IronRidge Limited Product Warranty document. Change in ownership of the Products or assignment of this Warranty will not cause the warranty periods above to be reset. Any subsequent owners to whom the Warranty is assigned shall be considered a subsequent "Purchaser" for purposes of this Warranty during the period of ownership of the Product(s).

**Except as set forth above**, IronRidge sells the Products on an "AS IS" basis, which may not be free of errors or defects, and ALL EXPRESS OR IMPLIED REPRESENTATIONS AND WARRANTIES, INCLUDING ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUALITY, WORKMANLIKE EFFORT, CORRESPONDENCE TO DESCRIPTION, DESIGN, TITLE OR NON-INFRINGEMENT, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR TRADE PRACTICE, ARE HEREBY DISCLAIMED. IN NO EVENT WILL IRONRIDGE BE LIABLE FOR ANY INDIRECT, PUNITIVE, SPECIAL, INCIDENTAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH, RELATED TO OR ARISING OUT OF THE WARRANTY OR THE PRODUCTS, OR OTHERWISE BE LIABLE FOR INTERRUPTION OF BUSINESS, COST OF COVER, LOSS OF PROFITS, LOSS OF REVENUE, LOSS OF USE, OR OTHER ECONOMIC ADVANTAGE, REGARDLESS OF THE THEORY OF LIABILITY, EVEN IF IRONRIDGE HAS BEEN PREVIOUSLY ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IronRidge will not be liable for claims by Purchaser for damages suffered by Purchaser's customers, or claims of third parties. IronRidge's maximum aggregate liability for all claims and obligations relating to or arising from the Warranty is limited to the original purchase price of the nonconforming Products. Liability for damages shall be so limited and excluded, regardless of the validity or efficacy of any remedy and even if any remedy falls of its essential purpose.



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Hayward, CA 94544  
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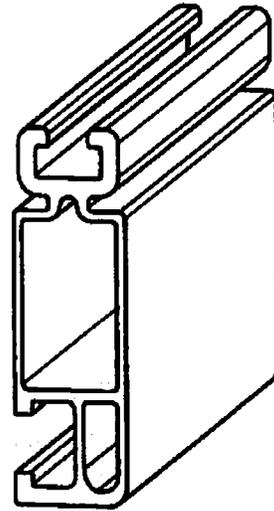
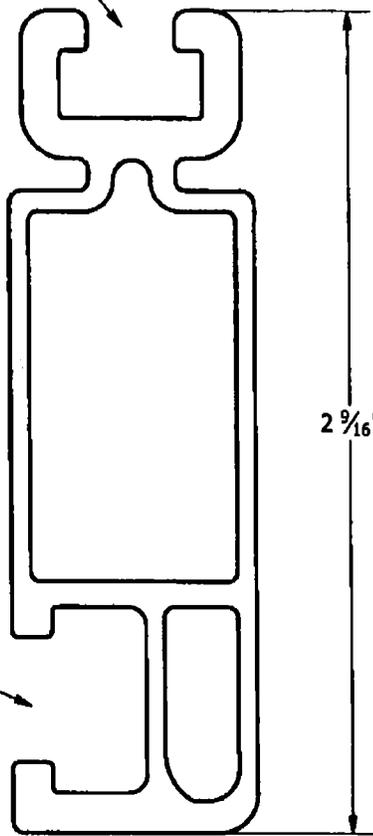
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**Third Party Claims; Indemnification.** IronRidge shall have no liability for any injuries or damages to persons or property resulting from incorrect or improper installation, use, delivery or maintenance of the Products by or for Purchaser or Purchaser's agent, customer or vendor, or for any claims or demands brought against IronRidge or Purchaser by any employee of Purchaser, client of Purchaser, end-user of the Product or other party, even if IronRidge has been advised of the possibility of such claims or demands, resulting from incorrect or improper installation, use, delivery or maintenance of the Products (collectively, "Third Party Claims"). This limitation applies to all materials provided by IronRidge during and after the Warranty Period. Purchaser hereby agrees to indemnify and hold IronRidge harmless against any and all such Third Party Claims, as well as any and all liabilities, losses, costs or expenses arising therefrom.

**Force Majeure.** IronRidge shall not be responsible for delays or failures in its performance resulting from acts or omissions beyond its reasonable control, whatever the source or cause.

WOPR  
WOPR

1/4" BOLT LOCATION



3/8" BOLT LOCATION

2 9/16"

PART # TABLE

P/N	DESCRIPTION	LENGTH
320132M	SM RAIL 132" MILL	132"
310132C	SM RAIL 132" CLR	132"
320168M	SM RAIL 168" MILL	168"
310168C	SM RAIL 168" CLR	168"
320168D	SM RAIL 168" DRK	168"
320208M	SM RAIL 208" MILL	208"
310208C	SM RAIL 208" CLR	208"
320240M	SM RAIL 240" MILL	240"
310240C	SM RAIL 240" CLR	240"
310240D	SM RAIL 240" DRK	240"

**UNIRAC**

1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	STANDARD RAIL
REVISION DATE:	9/11/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS

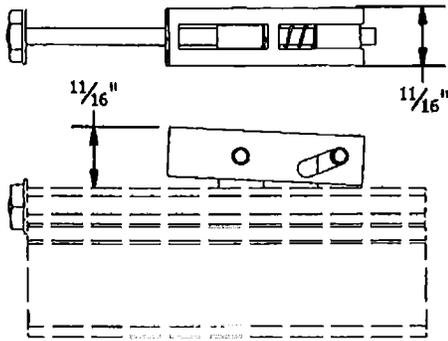
LEGAL NOTICE

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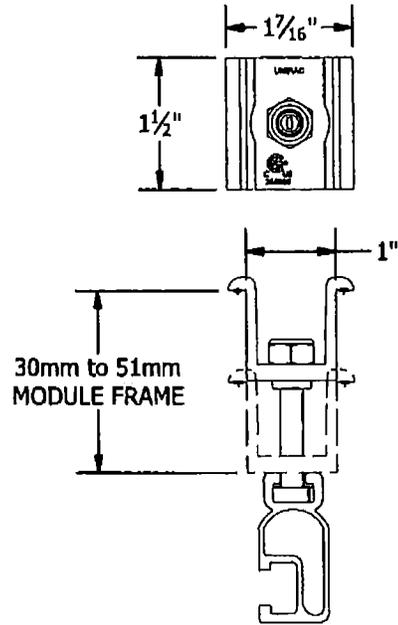
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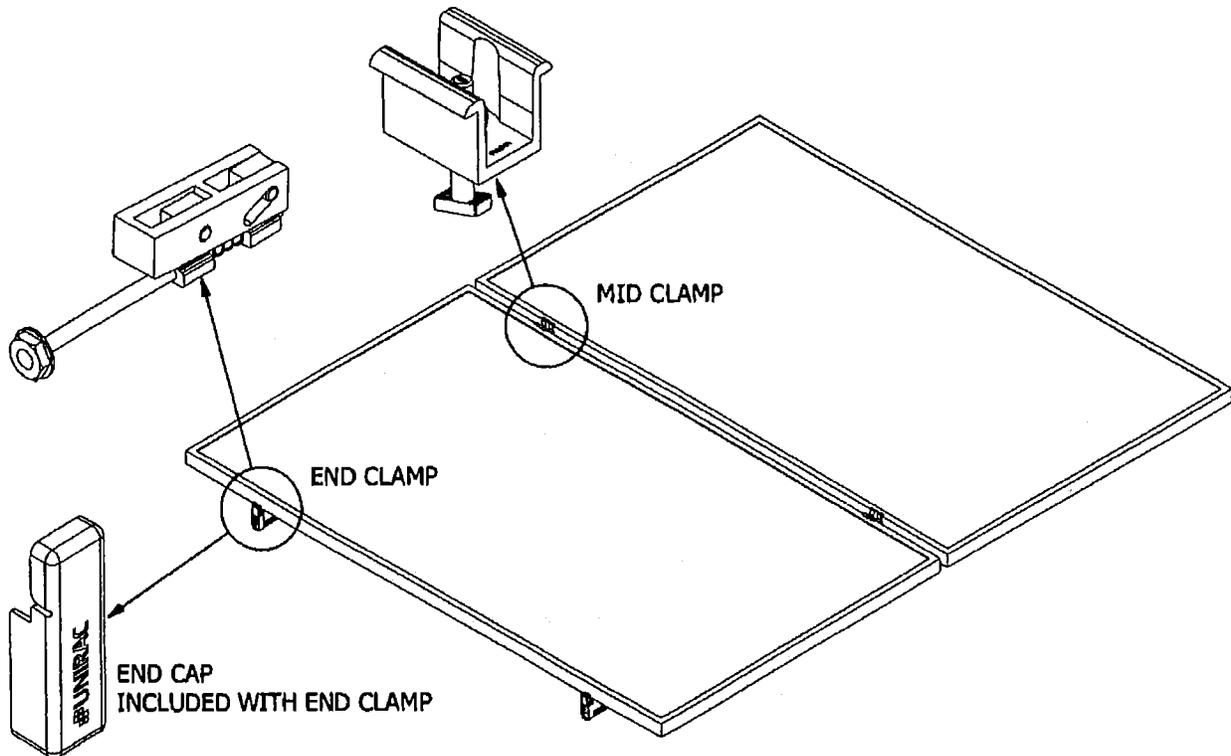
PRO SERIES END CLAMP



PRO SERIES MID CLAMP



PART # TABLE	
P/N	DESCRIPTION
302035M	ENDCLAMP PRO
302030M	MIDCLAMP PRO - MILL
302030D	MIDCLAMP PRO - DRK



**UNIRAC**

1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
WWW.UNIRAC.COM

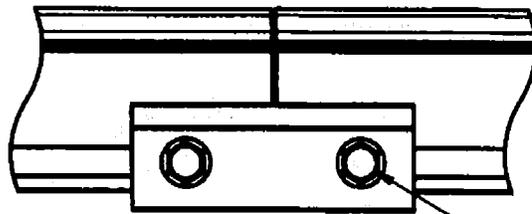
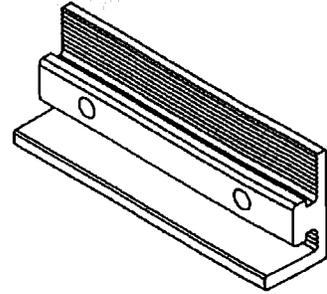
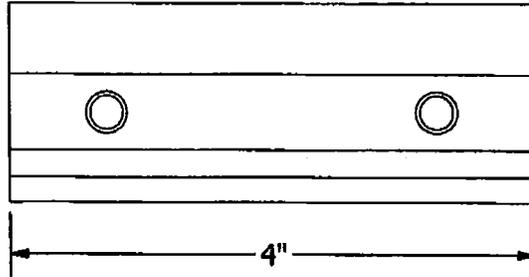
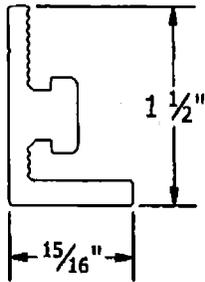
PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	PRO SERIES BONDING CLAMPS
REVISION DATE:	10/26/2017

DRAWING NOT TO SCALE  
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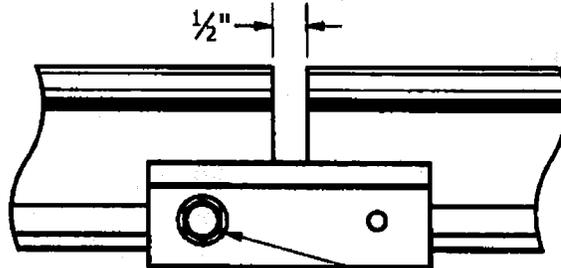
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### BONDING SPLICE BAR



5/16"-18 TYPE F THREAD CUTTING SCREWS INCLUDED

TYPICAL SPLICE BAR DETAIL



NOTE THAT ONLY 1 SCREW IS USED AT AN EXPANSION JOINT. THE SPLICE BAR DOES NOT BOND ACROSS AN EXPANSION JOINT. SEE INSTALLATION GUIDE FOR INSTRUCTION.

TYPICAL EXPANSION JOINT DETAIL

PART # TABLE	
P/N	DESCRIPTION
303019M	BND SPLICE BAR PRO SERIES MILL
303019D	BND SPLICE BAR PRO SERIES DRK

**UNIRAC**

1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BONDING SPLICE BAR PRO SERIES
REVISION DATE:	9/17/2019

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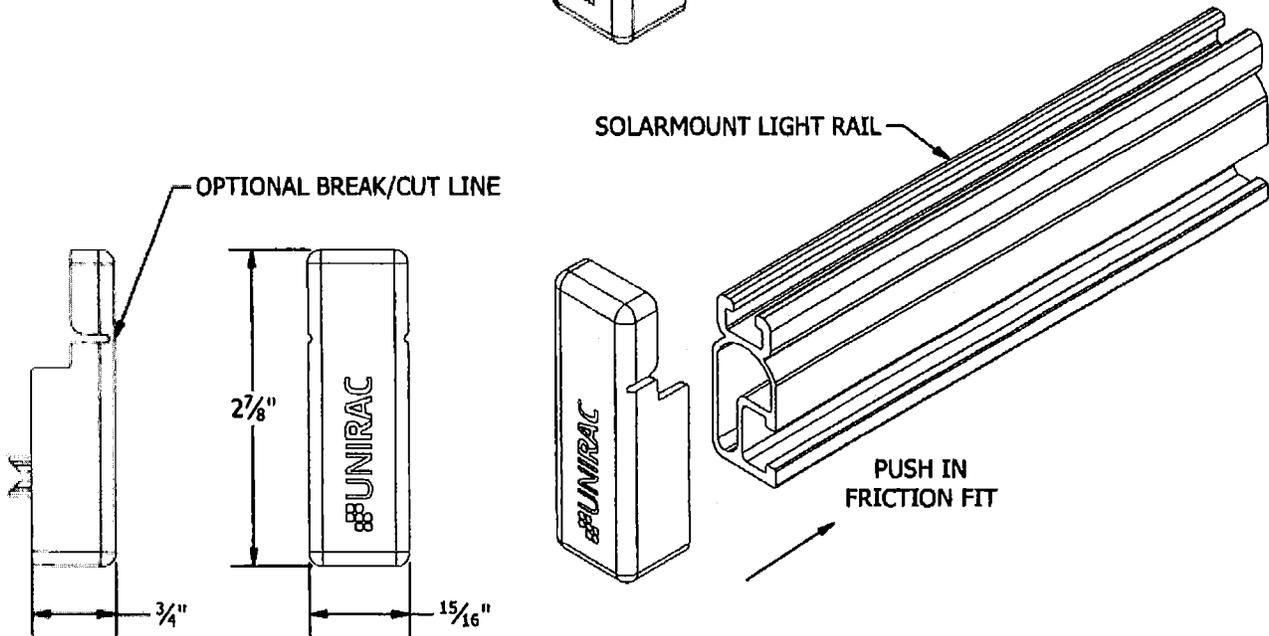
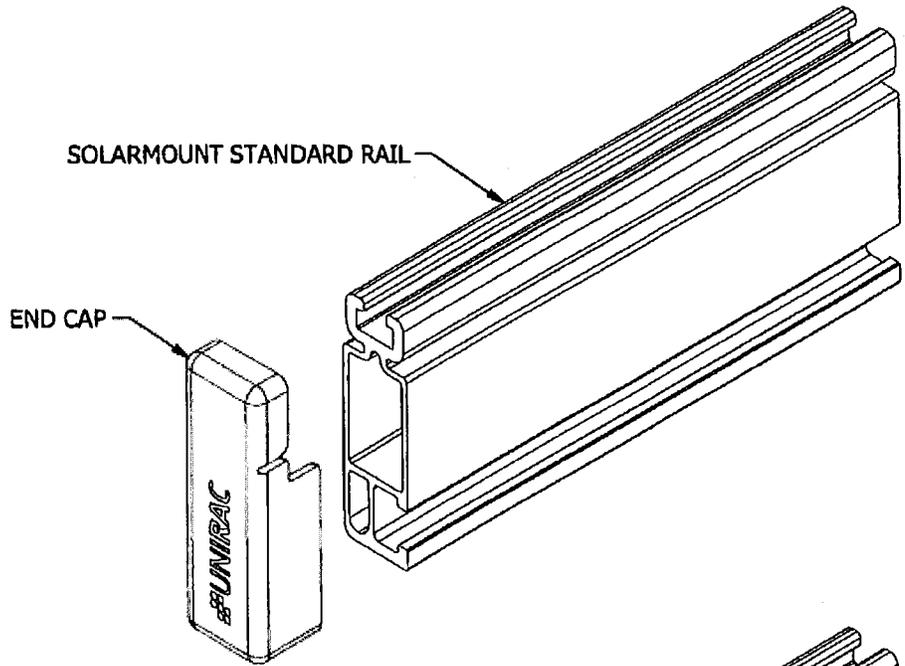
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**NOTES:**

1. END CAP INCLUDED WITH EVERY END CLAMP.
2. END CAP FITS SOLARMOUNT LIGHT AND STANDARD RAIL PROFILES.

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**UNIRAC**  
 1411 BROADWAY BLVD. NE  
 ALBUQUERQUE, NM 87102 USA  
 PHONE: 505.242.6411  
 WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	END CAPS
REVISION DATE:	9/27/2017

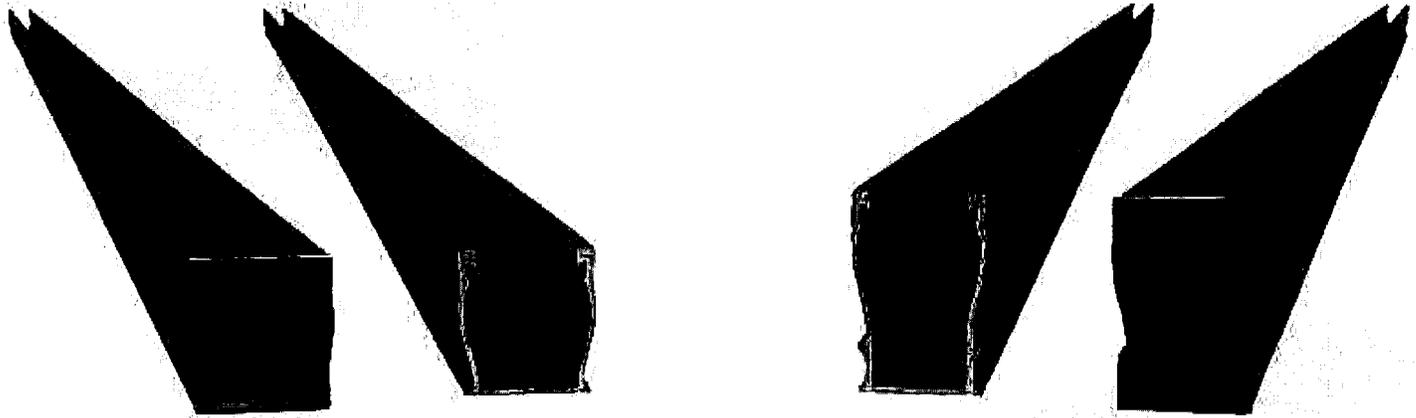
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**SM-P04**  
 SHEET

# Ultra Rail



## The Ultimate Value in Rooftop Solar



Industry leading Wire Management Solutions



Mounts available for all roof types

Single Tool Installation



All SnapNrack Module Clamps & Accessories are compatible with both rail profiles

**Start Installing Ultra Rail Today**

**RESOURCES**  
**DESIGN**  
**WHERE TO BUY**

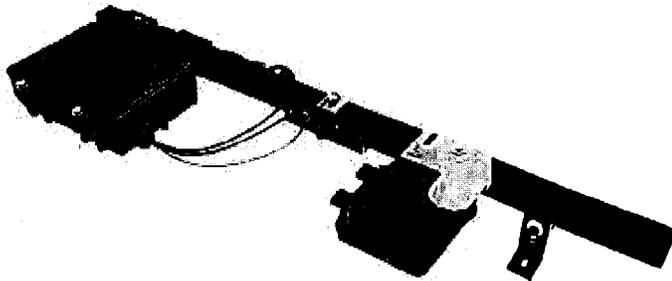
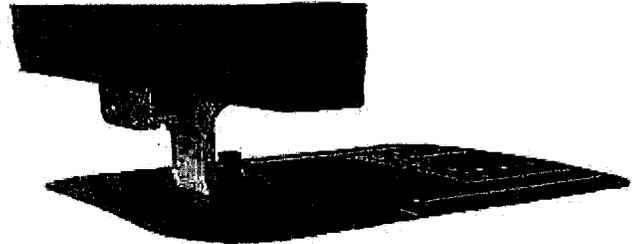
[snapnrack.com/resources](http://snapnrack.com/resources)  
[snapnrack.com/configurator](http://snapnrack.com/configurator)  
[snapnrack.com/where-to-buy](http://snapnrack.com/where-to-buy)

# SnapRack Ultra Rail System

A sleek, straightforward rail solution for mounting solar modules on all roof types. Ultra Rail features two rail profiles; UR-40 is a lightweight rail profile that is suitable for most geographic regions and maintains all the great features of SnapRack rail, while UR-60 is a heavier duty rail profile that provides a larger rail channel and increased span capabilities. Both are compatible with all existing mounts, module clamps, and accessories for ease of install.

## The Entire System is a Snap to Install

- New Ultra Rail Mounts include snap-in brackets for attaching rail
- Compatible with all the SnapRack Mid Clamps and End Clamps customers love
- Universal End Clamps and snap-in End Caps provide a clean look to the array edge

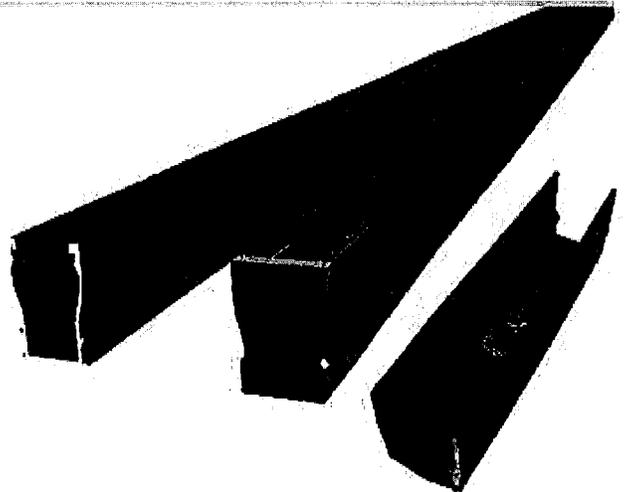


## Unparalleled Wire Management

- Open rail channel provides room for running wires resulting in a long-lasting quality install
- Industry best wire management offering includes Junction Boxes, Universal Wire Clamps, MLPE Attachment Kits, and Conduit Clamps
- System is fully bonded and listed to UL 2703 Standard

## Heavy Duty UR-60 Rail

- UR-60 rail profile provides increased span capabilities for high wind speeds and snow loads
- Taller, stronger rail profile includes profile-specific rail splice and end cap
- All existing mounts, module clamps, and accessories are retained for the same great install experience



# Quality. Innovative. Superior.

SnapRack Solar Mounting Solutions are engineered to optimize material use and labor resources and improve overall installation quality and safety.

877-732-2860

[www.snapnrack.com](http://www.snapnrack.com)

[contact@snapnrack.com](mailto:contact@snapnrack.com)

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A. Photovoltaic System

5. Other Components

a. Enphase OC

b. SMA OC

c. TIGO

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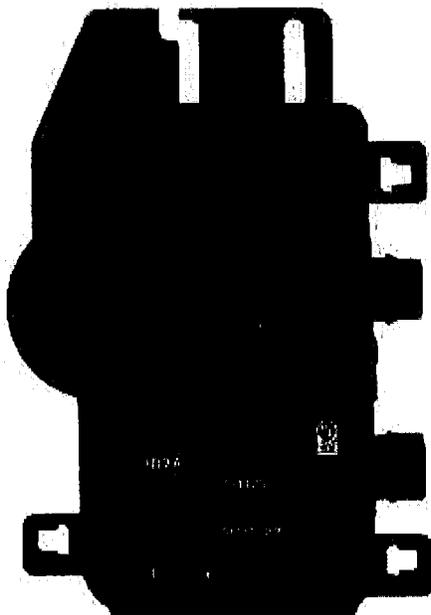
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# Enphase IQ 7A Microinverter

The high-powered smart grid-ready **Enphase IQ 7A Micro™** dramatically simplifies the installation process while achieving the highest system efficiency for systems with 60-cell and 72-cell modules.

Part of the Enphase IQ System, the IQ 7A Micro integrates with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

The IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.



## High Power

- Peak output power 366 VA @ 240 VAC and 295 VA @ 208 VAC

## Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

## Efficient and Reliable

- Optimized for high powered 60-cell and 72-cell modules
- Highest CEC efficiency of 97%
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

## Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Envoy and Internet connection required
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)



To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)



# Enphase IQ 7A Microinverter

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INPUT (DC)	IQ7A-72-2-US	
Commonly used module pairings <sup>1</sup>	295 W–460 W +	
Module compatibility	60-cell, 66-cell, and 72-cell PV modules	
Maximum input DC voltage	58 V	
Power point tracking voltage range <sup>2</sup>	18 V–58 V	
Min/Max start voltage	33 V / 58 V	
Max DC short circuit current (module I <sub>sc</sub> ) <sup>3</sup>	15 A	
Overvoltage class DC port	II	
DC port backfeed current	0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT (AC)	@ 240 VAC	@ 208 VAC
Peak output power	366 VA	295 VA
Maximum continuous output power	349 VA	290 VA
Nominal (L-L) voltage/range <sup>4</sup>	240 V / 211–264 V	208 V / 183–229 V
Maximum continuous output current	1.45 A (240 VAC)	1.39 A (208 VAC)
Nominal frequency	60 Hz	
Extended frequency range	47–68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms	
Maximum units per 20 A (L-L) branch circuit <sup>5</sup>	11 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III	
AC port backfeed current	18 mA	
Power factor setting	1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging	
EFFICIENCY	@240 VAC	@208 VAC
CEC weighted efficiency	97.0 %	96.5%
MECHANICAL		
Ambient temperature range	-40°C to +60°C	
Relative humidity range	4% to 100% (condensing)	
Connector type: DC (IQ7A-72-2-US)	MC4	
Dimensions (HxWxD)	212 mm x 175 mm x 30.2 mm (without bracket)	
Weight	1.08 kg (2.38 lbs)	
Cooling	Natural convection – No fans	
Approved for wet locations	Yes	
Pollution degree	PD3	
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure	
Environmental category / UV exposure rating	NEMA Type 6 / outdoor	
FEATURES		
Communication	Power Line Communication (PLC)	
Monitoring	Enlighten Manager and MyEnlighten monitoring options Compatible with Enphase IQ Envoy	
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.	
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.	

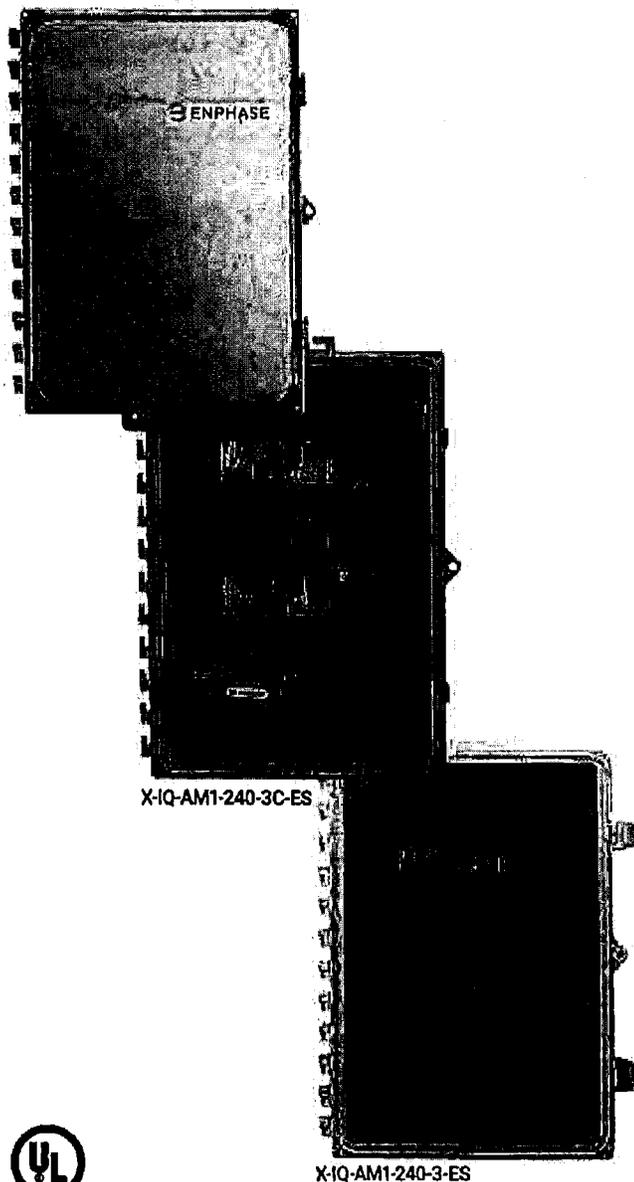
1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.
2. CEC peak power tracking voltage range is 38 V to 43 V.
3. Maximum continuous input DC current is 10.2A.
4. Voltage range can be extended beyond nominal if required by the utility.
5. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)



# Enphase IQ Combiner 3-ES/3C-ES

*WORR*  
WORR X-IQ-AM1-240-3-ES  
X-IQ-AM1-240-3C-ES



The Enphase IQ Combiner 3-ES/3C-ES™ with Enphase IQ Envoy™ and integrated LTE-M1 cell modem (included only with IQ Combiner 3C-ES) consolidates interconnection equipment into a single enclosure and streamlines PV and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

## Smart

- Includes IQ Envoy for communication and control
- Includes LTE-M1 cell modem (included only with IQ Combiner 3C-ES)
- Includes solar shield to match Ensemble esthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

## Simple

- Reduced size from IQ Combiner+ (X-IQ-AM1-240-2)
- Centered mounting brackets support single stud mounting
- Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

## Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included
- UL listed



To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)



# Enphase IQ Combiner 3-ES / 3C-ES

## MODEL NUMBER

IQ Combiner 3-ES (X-IQ-AM1-240-3-ES)	IQ Combiner 3-ES with Enphase IQ Envoy printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the Encharge storage system and Enpower smart switch and to deflect heat.
IQ Combiner 3C-ES (X-IQ-AM1-240-3C-ES)	IQ Combiner 3C-ES with Enphase IQ Envoy printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect LTE-M1 (CELLMODEM-M1), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the Encharge storage system and Enpower smart switch and to deflect heat.

## ACCESSORIES and REPLACEMENT PARTS

(not included, order separately)

Ensemble Communications Kit (COMMS-CELLMODEM-M1)	Includes COMMS-KIT-01 and CELLMODEM-M1 with 5-year data plan for Ensemble sites
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for Combiner 3-ES / 3C-ES
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3-ES / 3C-ES (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3-ES / 3C-ES

## ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envoy breaker included
Production metering CT	200 A solid core pre-installed and wired to IQ Envoy
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers

## MECHANICAL DATA

Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	<ul style="list-style-type: none"> <li>• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors</li> <li>• 60 A breaker branch input: 4 to 1/0 AWG copper conductors</li> <li>• Main lug combined output: 10 to 2/0 AWG copper conductors</li> <li>• Neutral and ground: 14 to 1/0 copper conductors</li> </ul> Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)

## INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1 4G based LTE-M1 cellular modem (included only with IQ Combiner 3C-ES) Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)

## COMPLIANCE

Compliance, Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)

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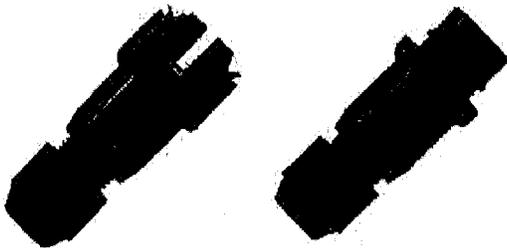
# Enphase Q Cable Accessories

The **Enphase Q Cable™** and accessories are part of the latest generation Enphase IQ System™. These accessories provide simplicity, reliability, and faster installation times.



## Enphase Q Cable

- Two-wire, double-insulated Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- New cable numbering and plug and play connectors speed up installation and simplify wire management
- Link connectors eliminate cable waste



## Field-Wireable Connectors

- Easily connect Q cables on the roof without complex wiring
- Make connections from any open connector and center feed any section of cable within branch limits
- Available in male and female connector types

# Enphase Q Cable Accessories

## CONDUCTOR SPECIFICATIONS

Certification	UL3003 (raw cable), UL 9703 (cable assemblies), DG cable
Flame test rating	FT4
Compliance	RoHS, OIL RES I, CE, UV Resistant, combined UL for Canada and United States
Conductor type	THHN/THWN-2 dry/wet
Disconnecting means	The AC and DC bulkhead connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.

## Q CABLE TYPES / ORDERING OPTIONS

Connectorized Models	Size / Max Nominal Voltage	Connector Spacing	PV Module Orientation	Connector Count per Box
Q-12-10-240	12 AWG / 277 VAC	1.3 m (4.2 ft)	Portrait	240
Q-12-17-240	12 AWG / 277 VAC	2.0 m (6.5 ft)	Landscape (60-cell)	240
Q-12-20-200	12 AWG / 277 VAC	2.3 m (7.5 ft)	Landscape (72-cell)	200

## ENPHASE Q CABLE ACCESSORIES

Name	Model Number	Description
Raw Q Cable	Q-12-RAW-300	300 meters of 12 AWG cable with no connectors
Field-wireable connector (male)	Q-CONN-10M	Make connections from any open connector
Field-wireable connector (female)	Q-CONN-10F	Make connections from any Q Cable open connector
Cable Clip	Q-CLIP-100	Used to fasten cabling to the racking or to secure looped cabling
Disconnect tool	Q-DISC-10	Disconnect tool for Q Cable connectors, DC connectors, and AC module mount
Q Cable sealing caps (female)	Q-SEAL-10	One needed to cover each unused connector on the cabling
Terminator	Q-TERM-10	Terminator cap for unused cable ends
Enphase EN4 to MC4 adaptor <sup>1</sup>	ECA-EN4-S22	Connect PV module using MC4 connectors to IQ micros with EN4 (TE PV4-S SOLARLOK). 150mm/5.9"
Enphase EN4 non-terminated adaptor <sup>1</sup>	ECA-EN4-FW	For field wiring of UL certified DC connectors. EN4 (TE PV4-S SOLARLOK) to non-terminated cable. 150mm/5.9"
Enphase EN4 to MC4 adaptor (long) <sup>1</sup>	ECA-EN4-S22-L	Longer adapter cable for EN4 (TE PV4-S SOLARLOK) to MC4. Use with split cell modules or PV modules with short DC cable. 600mm/23.6"
Replacement DC Adaptor (MC4)	Q-DCC-2	DC adaptor to MC4 (max voltage 100 VDC)
Replacement DC Adaptor (UTX)	Q-DCC-5	DC adaptor to UTX (max voltage 100 VDC)

1. Qualified per UL subject 9703.

 <p><b>TERMINATOR</b> Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-10)</p>	 <p><b>SEALING CAPS</b> Sealing caps for unused aggregator and cable connections (Q-BA-CAP-10 and Q-SEAL-10)</p>
 <p><b>DISCONNECT TOOL</b> Plan to use at least one per installation, sold in packs of ten (Q-DISC-10)</p>	 <p><b>CABLE CLIP</b> Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (Q-CLIP-100)</p>

To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)

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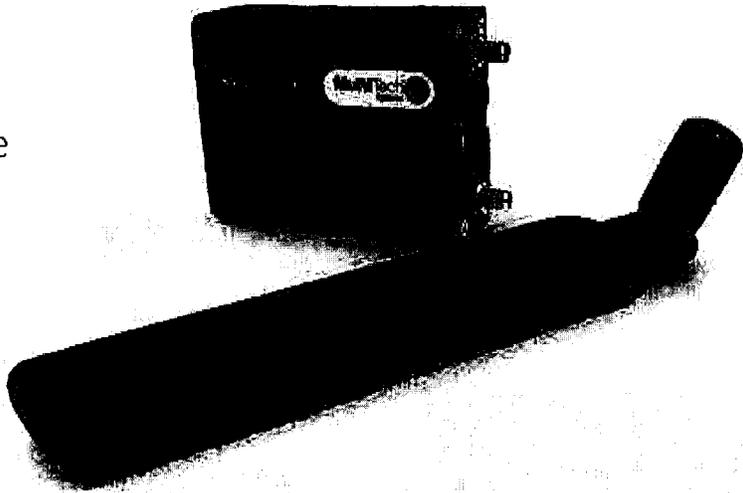
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# Plug-and-play cellular monitoring

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The Enphase **Mobile Connect** cellular modems deliver easy, reliable networking for Enphase Systems - with three plans to meet your needs.



## Mobile Connect Options

### SKU: CELLMODEM-01

- 3G Coverage
- 5-year pre-paid AT&T data plan
- 5-year equipment warranty
- Up to 60 microinverters

### SKU: CELLMODEM-M1

- LTE-M coverage
- 5-year pre-paid AT&T data plan
- 5-year equipment warranty
- Up to 60 microinverters
- Requires Envoy software 4.10.XX or later

### SKU: CELLMODEM-03

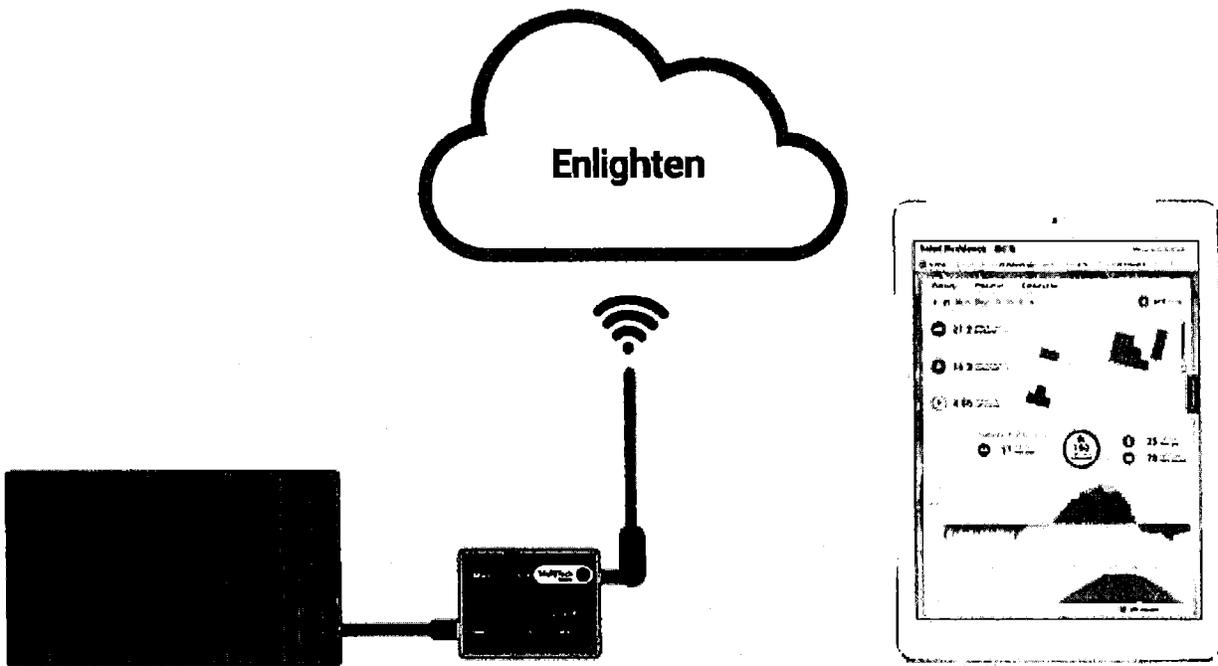
- 3G and 4G LTE Coverage
- 12-year pre-paid AT&T data plan
- 5-year equipment warranty
- Up to 60 microinverters



Mobile Connect is provided by AT&T and available in the US, Puerto Rico, US Virgin Islands, Canada and Mexico. Visit [ATT.com](http://ATT.com) for a detailed coverage map.

# No Internet? No problem!

Enphase's pre-configured cellular modem plugs into the Envoy-S or IQ-Envoy USB port for one-minute set up.



1. The Envoy S or IQ Envoy stores 15-minute, microinverter, meter and Enphase Battery performance data.
2. Mobile Connect reports 15-minute data to Enlighten four times a day.
3. Historical performance is presented in both Enlighten Manager and MyEnlighten.

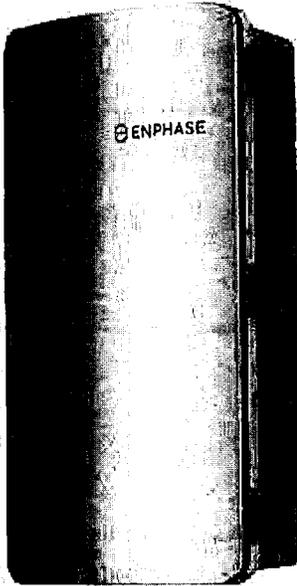
For more information, contact your Enphase authorized distributor.

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# Enphase Enpower

The Enphase Enpower™ smart switch connects the home to grid power, the Encharge storage system, and solar PV. It provides microgrid interconnection device (MID) functionality by automatically detecting and seamlessly transitioning the home energy system from grid power to backup power in the event of a grid failure. It consolidates interconnection equipment into a single enclosure and streamlines grid independent capabilities of PV and storage installations by providing a consistent, pre-wired solution for residential applications.



## Reliable

- Durable NEMA type 3R enclosure
- Ten-year limited warranty

## Smart

- Controls safe connectivity to the grid
- Automatically detects grid outages
- Provides seamless transition to backup

## Simple

- Connects to the load or service equipment<sup>1</sup> side of the main load panel
- Centered mounting brackets support single stud mounting
- Supports conduit entry from the bottom, bottom left side, and bottom right side
- Supports whole home and partial home backup and subpanel backup
- Up to 200A main breaker support
- Includes neutral-forming transformer for split phase 120/240V backup operation

<sup>1</sup> Enpower is not suitable for use as service equipment in Canada

# Enphase Enpower

## MODEL NUMBER

EP200G101-M240USDD

Enphase Enpower smart switch with neutral-forming transformer (NFT), Microgrid Interconnect Device (MID), breakers, and screws. Streamlines grid-independent capabilities of PV and storage installations.

## ACCESSORIES and REPLACEMENT PARTS

XA-E3-PCBA-ENS

Replacement Enpower controller printed circuit board

EP200G-NA-HD-200A

Eaton type BR circuit breaker hold-down screw kit, BRHDK125

EP200G-HNDL-R1

Enpower installation handle kit (order separately)

Circuit breakers (as needed)<sup>2,3</sup>

Not included, must order separately:

BRK-100A-2P-240V

• Main breaker, 2 pole, 100A, 25kAIC, CSR2100

BRK-125A-2P-240V

• Main breaker, 2 pole, 125A, 25kAIC, CSR2125N

BRK-150A-2P-240V

• Main breaker, 2 pole, 150A, 25kAIC, CSR2150N

BRK-175A-2P-240V

• Main breaker, 2 pole, 175A, 25kAIC, CSR2175N

BRK-200A-2P-240V

• Main breaker, 2 pole, 200A, 25kAIC, CSR2200N

BRK-20A-2P-240V-B

• Circuit breaker, 2 pole, 20A, 10kAIC, BR220B

BRK-30A-2P-240V

• Circuit breaker, 2 pole, 30A, 10kAIC, BR230B

BRK-40A-2P-240V

• Circuit breaker, 2 pole, 40A, 10kAIC, BR240B

BRK-60A-2P-240V

• Circuit breaker, 2 pole, 60A, 10kAIC, BR260

BRK-80A-2P-240V

• Circuit breaker, 2 pole, 80A, 10kAIC, BR280

## ELECTRICAL SPECIFICATIONS

Assembly rating

Continuous operation at 100% of its rating

Nominal voltage / range (L-L)

240 VAC / 100 - 310 VAC

Voltage measurement accuracy

±1% V nominal (±1.2V L-N and ±2.4V L-L)

Auxiliary contact for load control and excess PV control

24V, 1A

Nominal frequency / range

60 Hz / 56 - 63 Hz

Frequency measurement accuracy

±0.1 Hz

Maximum continuous current rating

160A

Maximum input overcurrent protection device

200A

Maximum output overcurrent protection device

200A

Maximum overcurrent protection device rating for storage branch circuit<sup>4</sup>

80A

Maximum overcurrent protection device rating for PV combiner branch circuit<sup>4</sup>

80A

Neutral Forming Transformer (NFT)

- Breaker rating (pre-installed): 40A between L1 and Neutral; 40A between L2 and Neutral
- Continuous rated power: 3600VA
- Maximum continuous unbalance current: 30A @ 120V
- Peak rated power: 8800VA for 30 seconds
- Peak unbalanced current: 80A @ 120V for 30 seconds

## MECHANICAL DATA

Dimensions (WxHxD)

50cm x 91.6cm x 24.6cm (19.7 in x 36 in x 9.7 in)

Weight

38.5 kg (85 lbs)

Ambient temperature range

-40° C to +50° C (-40° F to 122° F)

Cooling

Natural convection, plus heat shield

Enclosure environmental rating

Outdoor, NEMA type 3R, polycarbonate construction

Altitude

To 2500 meters (8200 feet)

## WIRE SIZES

Connections

(All lugs are rated to 90°C)

- Main lugs and backup load lugs
- CSR breakers
- BR breakers (wire provided)
- AC combiner lugs, Encharge lugs, and generator lugs
- Neutral (large lugs)

Cu/Al: 1 AWG - 300 KCMIL

Cu/Al: 2 AWG - 300 KCMIL

6 AWG

14 AWG - 2 AWG

Cu/Al: 6 AWG - 300 KCMIL

Neutral and ground bars

Large holes (5/16-24 UNF)

14 AWG - 1/0 AWG

Small holes (10-32 UNF)

14 AWG - 6 AWG

## COMPLIANCE

Compliance

UL 1741, UL 1741 SA, UL 1741 PCS, UL1998, UL869A<sup>5</sup>, UL67<sup>5</sup>, UL508<sup>5</sup>, UL50E<sup>5</sup>  
CSA 22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003, AC156.

2. Compatible with BRHDK125 Hold-Down Kit to comply with 2017 NEC 710.15E for back-fed circuit breakers.

3. The Enpower is rated 22 kAIC

4. Not included. Installer must provide properly rated breaker per circuit breaker list above.

5. Sections from these standards were used during the safety evaluation and included in the UL 1741 listing.

To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)

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# JMS-F SUNSPEC RAPID SHUTDOWN DEVICE

W  
WORR  
WORR



IMAGE FOR ILLUSTRATIVE PURPOSES ONLY

### Cost-effective

- Simple plug-and-play installation
- No additional components necessary, reducing balance of system costs

### Simple and robust

- Power line based communication certified for compatibility with the SunSpec signal for rapid shutdown
- Shuts down PV module whenever SunSpec signal is interrupted

### Safe and certified

- Certified and listed for compliance to:
  - UL 1741 Rapid Shutdown System Equipment
  - NEC 2017 690.12(B)(2) Module Level Shutdown

### Reduced risk

- Technical support from SMA's #1 ranked service organization
- Fully SunSpec certified solution when paired with an SMA SunSpec certified inverter

## JMS-F SUNSPEC RAPID SHUTDOWN DEVICE

The easy module level rapid shutdown solution

The SunSpec Certified Rapid Shutdown System (model JMS-F), available from SMA, is the most cost-effective and reliable solution for fulfilling NEC 2017 module level shutdown requirements. The module-level device is certified for compatibility with the SunSpec communication signal and SMA inverters, making compliance simple and easy. By using the existing DC lines between the inverter and PV array for power line communications, installation and labor are significantly reduced. No additional wires or communication equipment is needed. The solution also features up to 50% fewer internal components vs alternatives, resulting in greater lifetime reliability.

**Technical data**

**Input (DC)**

Rated DC Input power  
Maximum PV module open circuit voltage  
Minimum Input voltage  
Maximum continuous input current  $I_{MPP}$   
Maximum short-circuit input current  $I_{SC}$

**Output (DC)**

Output power range  
Maximum output voltage  
Standby output voltage  
Maximum system voltage  
Allowable series string connections

**Mechanical**

Dimensions L / W / H in mm (in)  
Weight (including cables)  
Input / output connector  
Output wire length  
Operating temperature range  
Enclosure rating  
Relative humidity

**Features and compliance**

Certification  
Communication mode  
SunSpec Rapid Shutdown Communication Protocol  
Rapid shutdown time  
Warranty (contact SMA Service Line)

SunSpec certified SMA inverters

**JMS-F**

600 Wp  
60 V  
10 V  
15 A  
15 A

0 W to 600 W  
60 V  
1 V  
1500 V  
6 to 30 JMS-F devices

89 x 88.5 x 23.1 (3.5 x 3.48 x 0.9)  
0.95 lb (435 g)  
MC4  
1.2 m  
-40°C to +75°C (-40°F to +167°F)  
Type 4X (as per UL 50E)  
0% to 100%

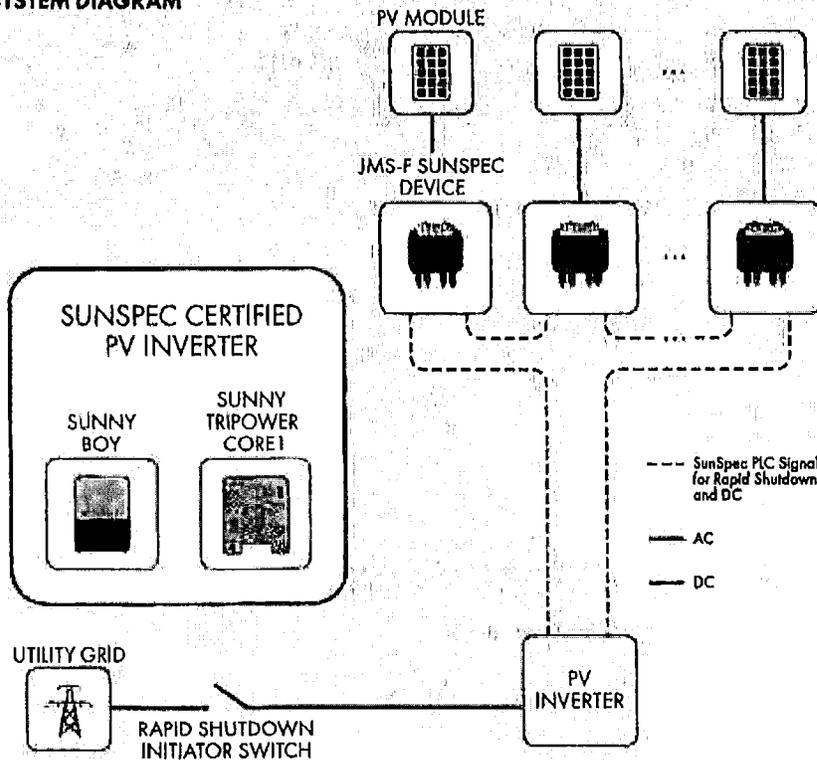
UL 1741 Rapid Shutdown Equipment  
Power Line Communication (PLC)  
SunSpec certified  
10 seconds  
25 years

Sunny Boy US (SBx.x-1 SP4US-41)  
Sunny Tripower CORE1-US (STP xx-US-41)

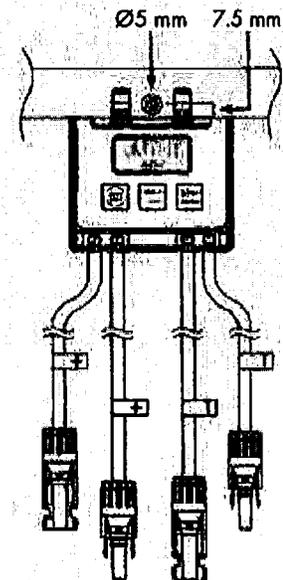
Type designation  
SMA part number  
Package quantity

JMS-F  
11981400.01  
40

**SYSTEM DIAGRAM**



**BRACKET DIMENSIONS**



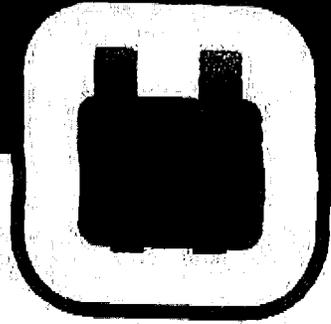
Toll Free +1 888 4 SMA USA  
www.SMA-America.com

**SMA America, LLC**

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# Tigo

Flex MLPE



WDRR  
WDRR

## TS4-A-2F

### PV Module Advanced Add-On

The TS4-A-2F (Fire Safety) is the advanced add-on rapid shutdown solution that brings smart module functionality to standard PV modules for higher reliability. Ensure safety by upgrading existing PV systems or by adding safety features to new installations.

The TS4-A-2F complies with NEC 2017 690.12 Rapid Shutdown specifications when installed with the Tigo RSS Transmitter or an inverter with built-in Tigo certified transmitter.

#### Included Features



Fire Safety

Enhanced **safety** for NEC 690.12 rapid shutdown compliance

#### Easy Installation

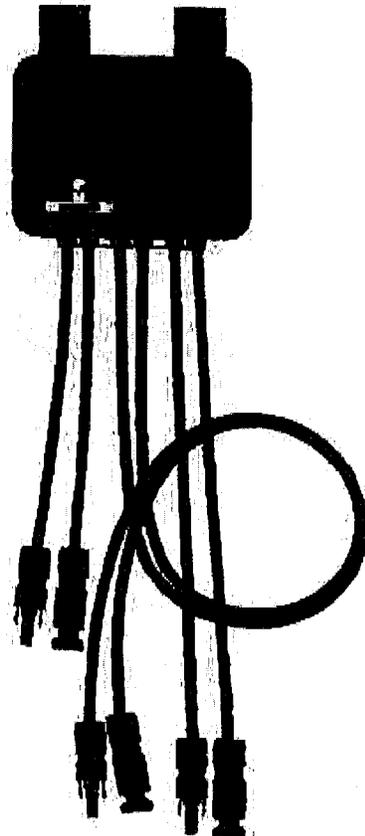
Snap to standard module frame or remove brackets for rack mounting

#### PLC Signaling

Control rapid shutdown with the Tigo RSS Transmitter

#### Automatic Shutdown

PV array enters rapid shutdown in event of AC grid loss



# TS4-A-2F SPECIFICATIONS

## Environmental

Operating Temperature Range -40°C to +70°C (-40°F to +158°F)  
 Outdoor Rating IP68, NEMA 3R

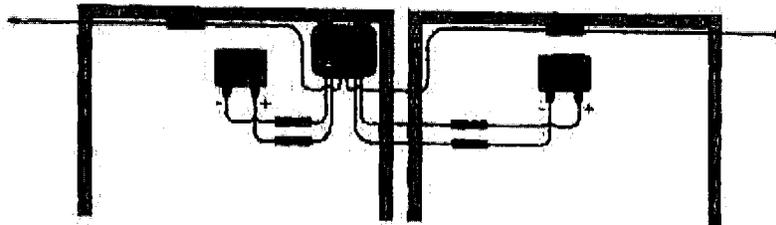
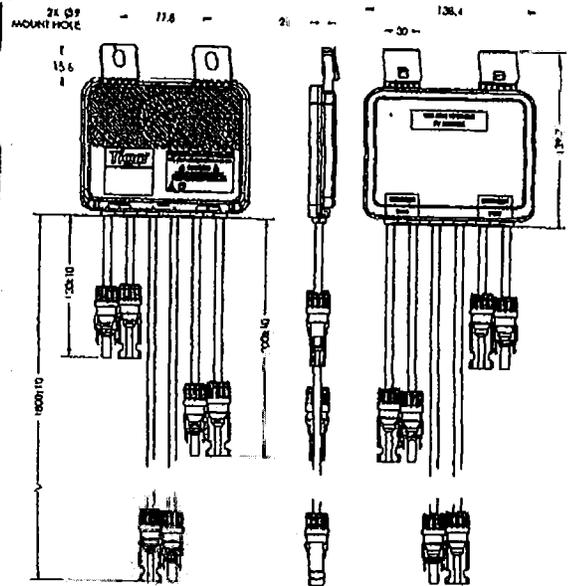
## Mechanical

Dimensions 138.4mm x 139.7mm x 22.9mm  
 Weight 590g

## Electrical

Voltage Range (per input) 16 - 90V  
 Maximum Current (per input) 15A  
 Maximum Power (total) 1000W  
 Output Cable Length 1.2m or 2.2m  
 Connectors MC4 (standard)  
 Communication Type PLC  
 Rapid Shutdown UL Listed (NEC 2014 & 2017 690.12) Yes

Rapid shutdown activation of TS4-A-2F requires RSS Transmitter.



Installation example: Serial connection of two PV modules to a TS4-A-2F

## ORDERING INFORMATION

### Standard

- 484-00252-12 1500V UL, 1.2m cable, MC4
- 484-00252-22 1500V UL, 2.2m cable, MC4

**For sales info:**  
[sales@tigoenergy.com](mailto:sales@tigoenergy.com) or 1.408.402.0802

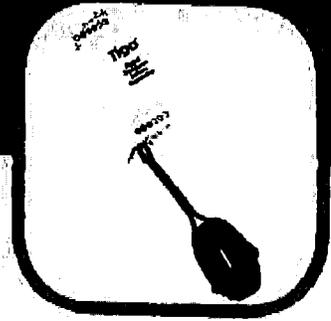
**For product info:**  
 Visit [tigoenergy.com/products](http://tigoenergy.com/products)

**For technical info:**  
 Visit [support.tigoenergy.com](http://support.tigoenergy.com)

For additional info and product selection assistance, use Tigo's online design tool at [tigoenergy.com/design](http://tigoenergy.com/design)



# Tigo Flex MLPE



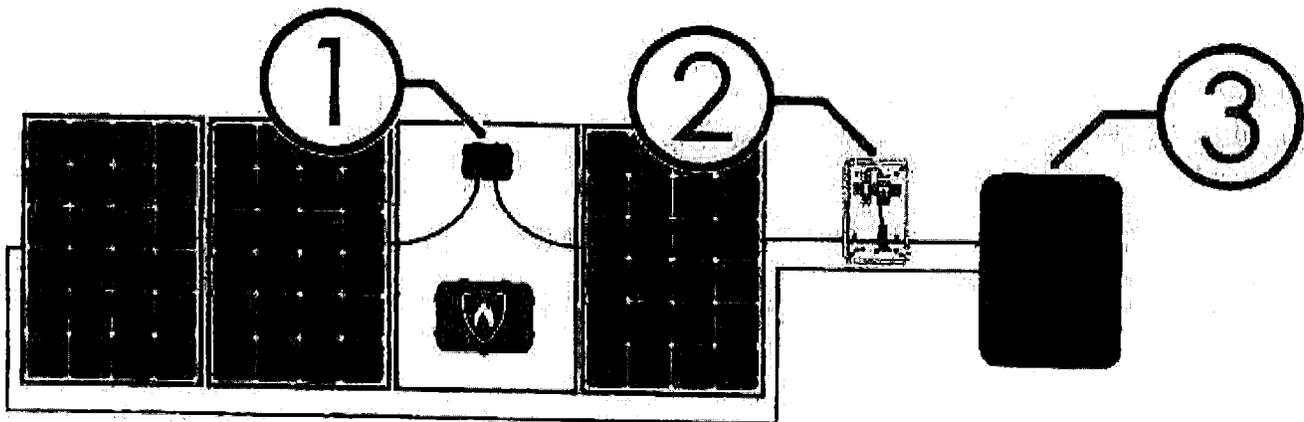
## WDRR WDRR RSS TRANSMITTER

### Rapid Shutdown with TS4-F

The Tigo Rapid Shutdown System (RSS) Transmitter is part of a rapid shutdown solution when paired with Tigo TS4-F (Fire Safety), a PV module rapid shutdown unit. While powered on, the RSS Transmitter sends a signal to the TS4-F units to keep their PV modules connected and supplying energy.

TS4-F units automatically enter rapid shutdown mode when the RSS Transmitter is switched off and resume energy production when power is restored to the RSS Transmitter. This solution complies with NEC 690.12 specifications for 2014 and 2017 and supports the SunSpec-defined signaling for rapid shutdown. The RSS Transmitter and TS4-F are compatible with many inverters and modules.

TS4-F and the RSS Transmitter require no separate commissioning process.

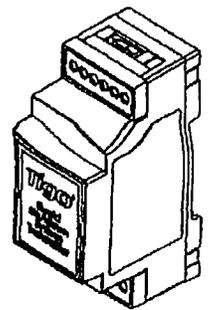
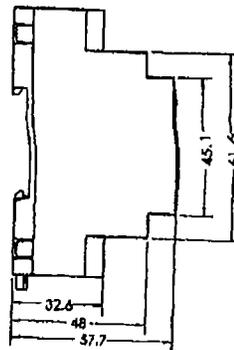


1. Modules equipped with Tigo TS4-F (Fire Safety)
2. Tigo RSS Transmitter
3. Inverter



# RSS TRANSMITTER

- Meets NEC 690.12 requirements
- Module-level deactivation with TS4-F
- Automatic or manual shutdown
- Supports SunSpec signaling



All dimensions in mm

WORR  
WORR

<b>Input</b>
Input Voltage: 12V <sub>dc</sub>
Input Current: 1A
Avg Supply Power: 0.85W
Recommended Power Supply Rating: 12V <sub>dc</sub> and 2A
<b>RSS Core</b>
Max Current: 150A per core (single core) / 300A (dual core)
Max MPPT String Voltage: 1500V <sub>dc</sub>
Internal Opening for Wire: 2.5mm
Outside Dimensions: 59mm
Max Number of Strings per Core: 10
Max String Length: 30 modules
<b>Environmental</b>
Temperature: 0°C to 65°C

## ORDERING OPTIONS

- 490-00100-20 RSS Transmitter PCBA, Dual RSS Core
- 490-00000-20 RSS Transmitter DIN Rail, Dual RSS Core
- 492-00000-20 RSS Transmitter Kit, DIN Rail PS, Dual RSS Core, Outdoor

For more information on Tigo products:  
[www.tigoenergy.com/products](http://www.tigoenergy.com/products)

For technical information:  
<http://support.tigoenergy.com>

For sales and ordering information:  
[sales@tigoenergy.com](mailto:sales@tigoenergy.com) or 1.408.402.0802

For additional info and product selection assistance, use Tigo's online design tool at [www.tigoenergy.com/design](http://www.tigoenergy.com/design)



**Tigo**<sup>®</sup>

## B. Water Storage

### 1. Water Tanks:

- a. EcoTanke
- b. La Cisterna
- c. Pro -Tank
- d. Roto Solutions
- e. Tanker
- f. Tuff Tank

### 2. Pressurized Tanks:

- a. American Water Heaters
- b. Pressure Wave

### 3. Jet Pump:

- a. Wayne
- b. Brown USA JP

### 4. Miscellaneous plumbing materiales

- a. Buoy
- b. Level Sensor
- c. Copper & Fittings

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WDRR

## B. Water Storage

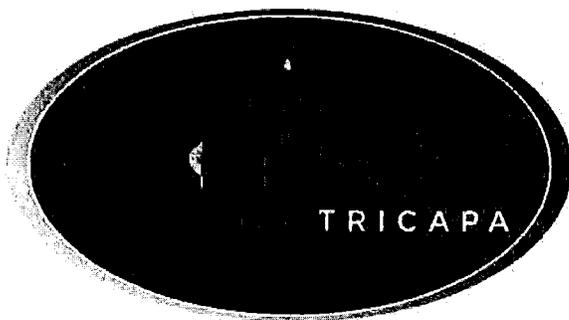
### 1. Water Tanks:

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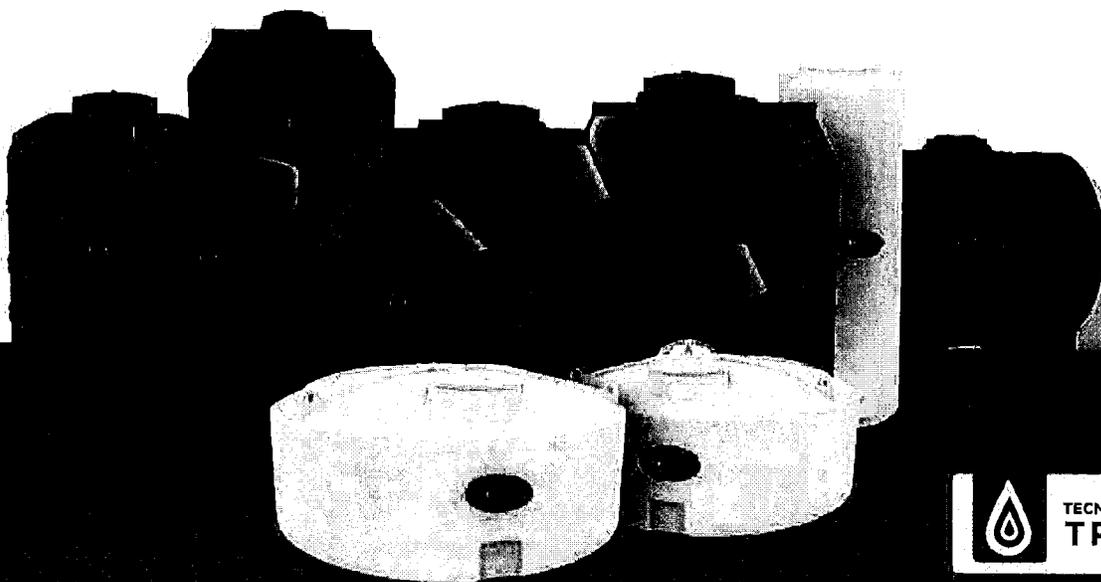
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WDRR  
WDRR

WDRR  
WCEP



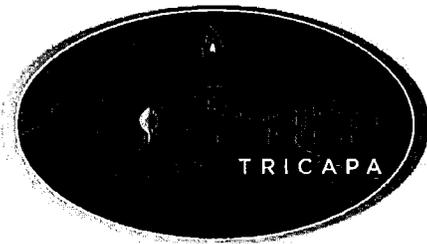
# CATÁLOGO DE PRODUCTOS



## ECOTANKE

Ecotanque, nace con la mejor tecnología de fabricación Tricapa, su material de especial resistencia y protección para almacenaje de líquidos lo convierte en los tanques cisterna con mayor duración y garantía de fabricante. Ecotanque ofrece la más completa línea de modelos que brindan soluciones para sus proyectos:

- RESIDENCIALES
- TRANSPORTE DE LIQUIDOS
- PROPIEDAD HORIZONTAL
- INDUSTRIAS



## MERCADOS



DOMICILIO



NEGOCIOS



SALUD



HOTELES



EDUCACIÓN



INDUSTRIAS

## BENEFICIOS

- Protección UV total
- Durabilidad Tricapa
- Garantía de Calidad 10 años



W

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WDRR

# TECNOLOGÍA ● ● ● TRICAPA

## **CAPA EXTERNA**

Resina resistente a los rayos UV, en color azul o blanca.

## **CAPA INTERMEDIA NEGRA**

Resistente a los rayos UV que impide la transmisión de luz a la cámara del tanque. Esto evita la acumulación de algas.

## **CAPA INTERNA BLANCA:**

Resina con protección UV aprobada por la FDA, para garantizar un interior antimicrobiano.

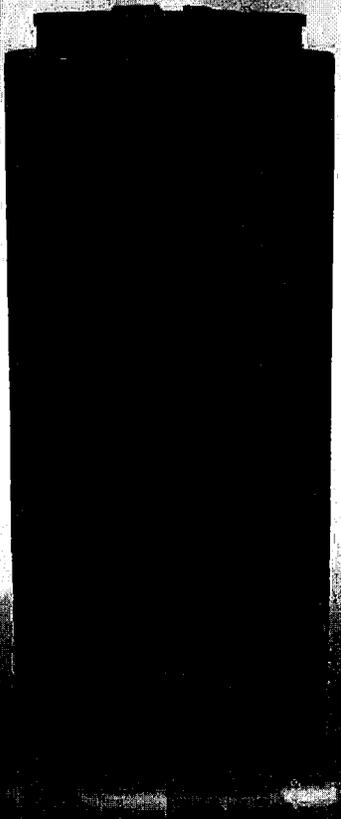


W

WORLD  
WATER



# TANQUES



**60 GALONES**

20.5" Diámetro

46" Altura

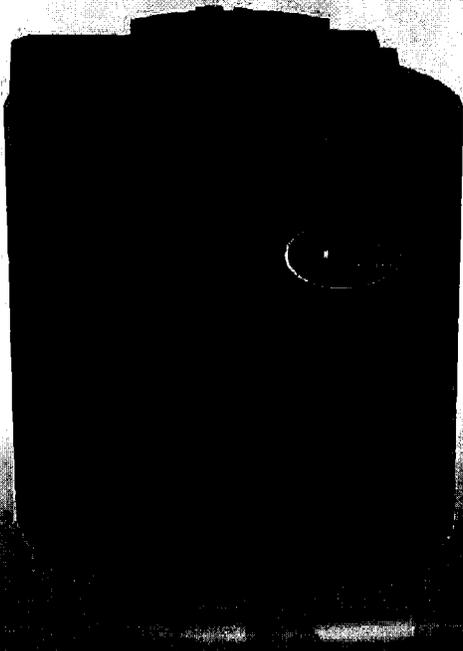
500 Lbs. Peso Lleno

Resina aprobada por la **FDA**





# TRICAPA



**150 GALONES**

34" Diámetro  
40" Altura  
1278 Lbs. Peso Lleno

Resina aprobada por la **FDA**



W

WICK  
WATER



- CAPA EXTERIOR AZUL
- CAPA INTERMEDIA NEGRA
- CAPA INTERNA BLANCA

# TANQUES



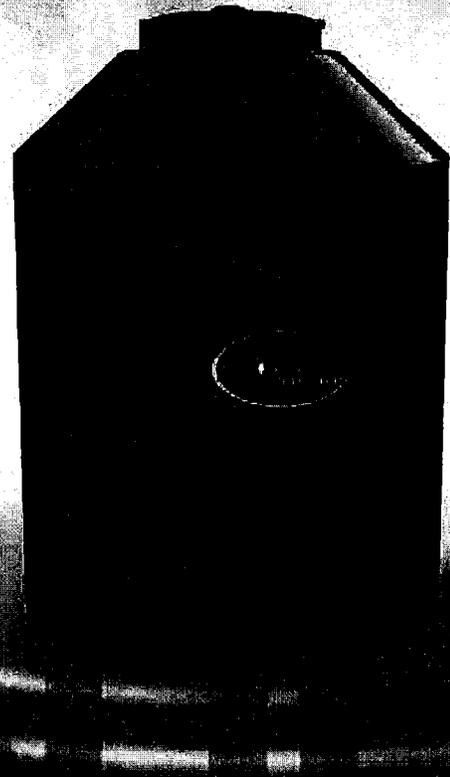
**200 GALONES**

39.5" Diámetro

42" Altura

1,704 Lbs. Peso Lleno

Resina aprobada por la **FDA**



12

TECNOLOGÍA ●●●  
**TRICAPA**

- CAPA EXTERIOR AZUL
- CAPA INTERMEDIA NEGRA
- CAPA INTERNA BLANCA

# INNOVES



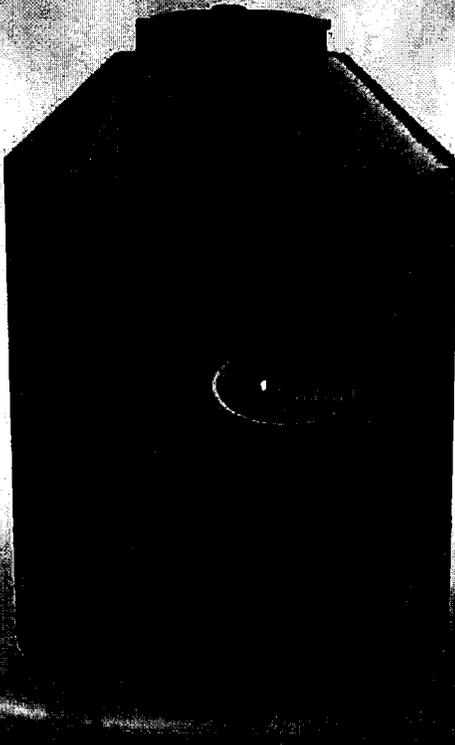
## 250 GALONES

40" Diámetro

54" Altura

2,130 Lbs. Peso Lleno

Resina aprobada por la **FDA**

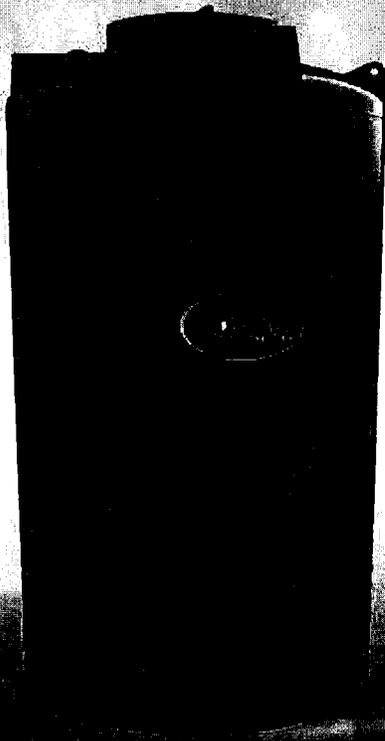


62

WOKA  
WOKA



# TANQUES



**300 GALONES**

40.5" Diámetro

62.5" Altura

2,552 Lbs. Peso Lleno

Resina aprobada por la **FDA**



TRICAPA

# TRICAPA



**410 GALONES**

50.25" Diámetro

51.75" Altura

3,489 Lbs. Peso Lleno

Resina aprobada por la **FDA**



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WATER



- CAPA EXTERIOR AZUL
- CAPA INTERMEDIA NEGRA
- CAPA INTERNA BLANCA

# TANQUES



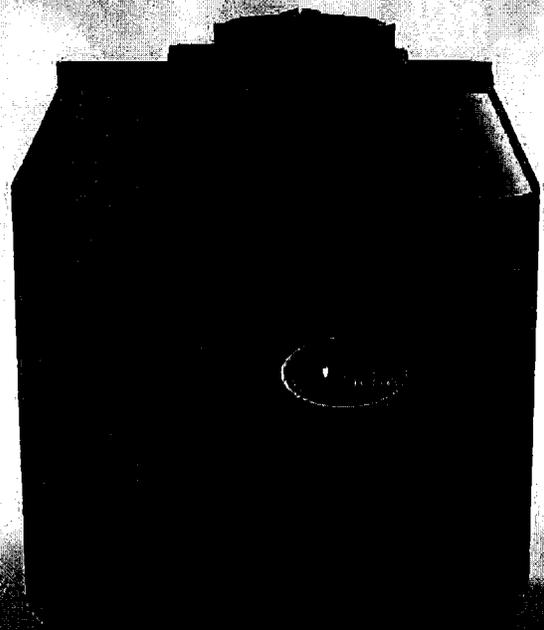
**500 GALONES**

54" Diámetro

59.5" Altura

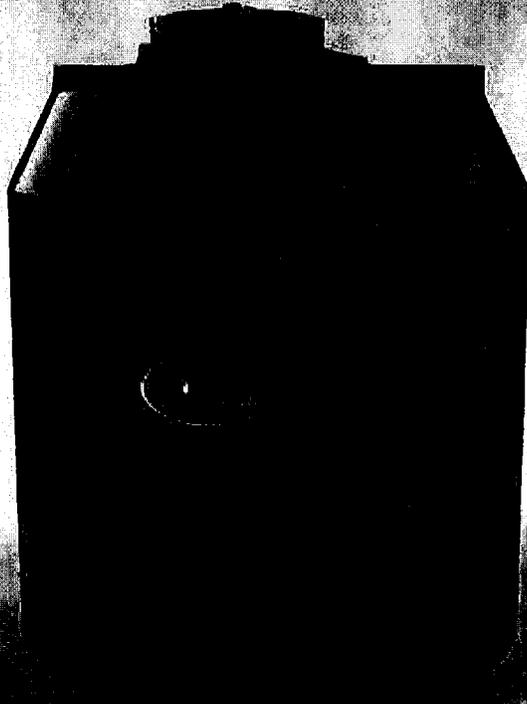
4,245 Lbs. Peso Lleno

Resina aprobada por la **FDA**





# TRICAPA



**600 GALONES**

56" Diámetro

61.25" Altura

5,094 Lbs. Peso Lleno

Resina aprobada por la **FDA**



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WICK

# TANQUE HORIZONTAL



**630 GALONES**

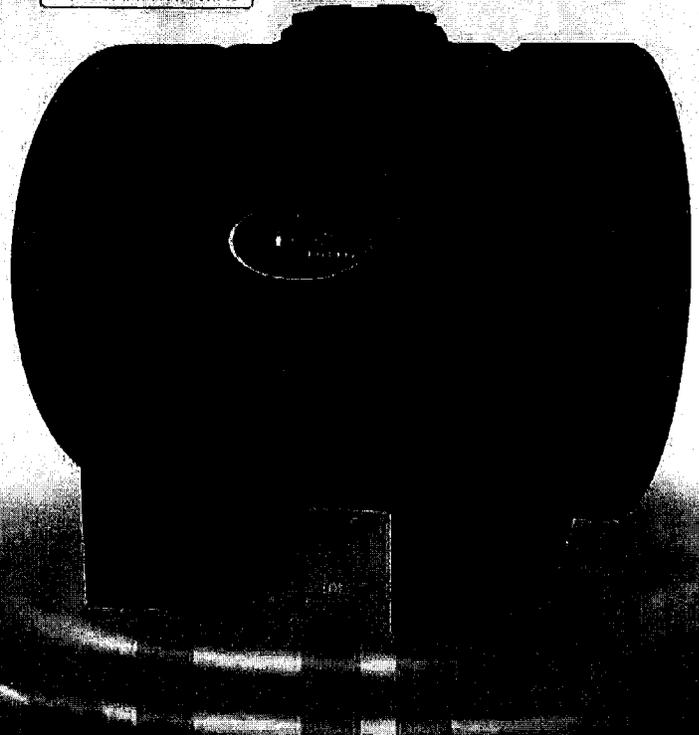
55" Diámetro

75" Longitud

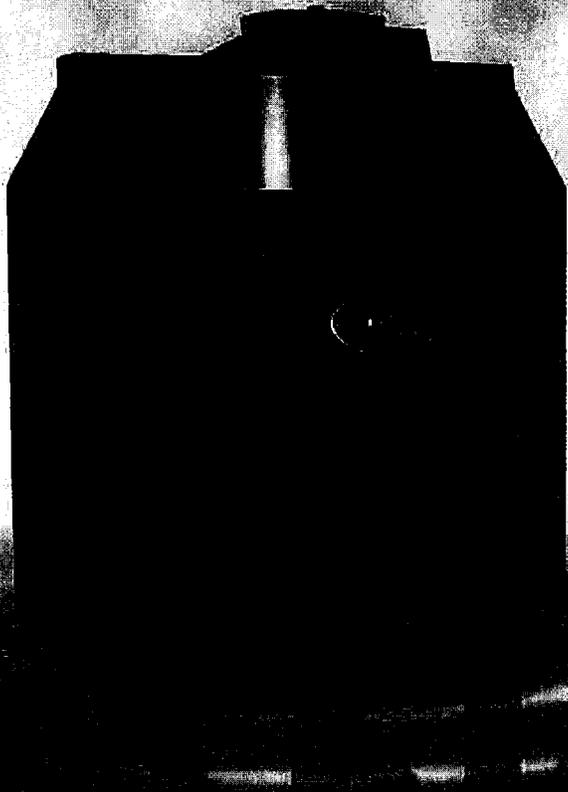
55" Altura

5,420 Lbs. Peso Lleno

Resina aprobada por la **FDA**



• PODRÍA UTILIZARSE PARA ALMACENAMIENTO DE AGUA, DIESEL, ACEITE Y OTROS LÍQUIDOS CON BASE REFORZADA PARA MAYORES APILABILIDAD



**1000 GALONES**

67.5" Diámetro

70.5" Altura

8,500 Lbs. Peso Lleno

Resina aprobada por la **FDA**



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WATER



- CAPA EXTERIOR AZUL
- CAPA INTERMEDIA NEGRA
- CAPA INTERNA BLANCA

# TANQUES



**1500 GALONES**

80" Diámetro

77" Altura

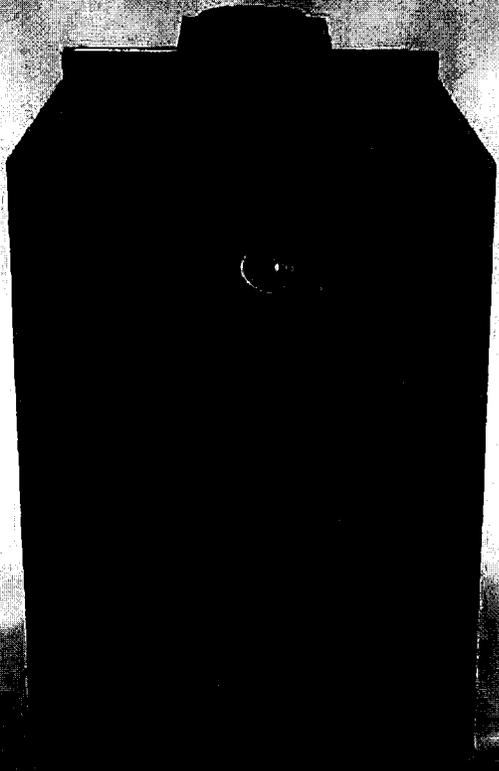
12,765 Lbs. Peso Lleno

Resina aprobada por la **FDA**





# TRILAPA



**2500 GALONES**

83.5" Diámetro  
129" Altura  
21,350 Lbs. Peso Lleno  
Resina aprobada por la **FDA**



62

WIKIPEDIA



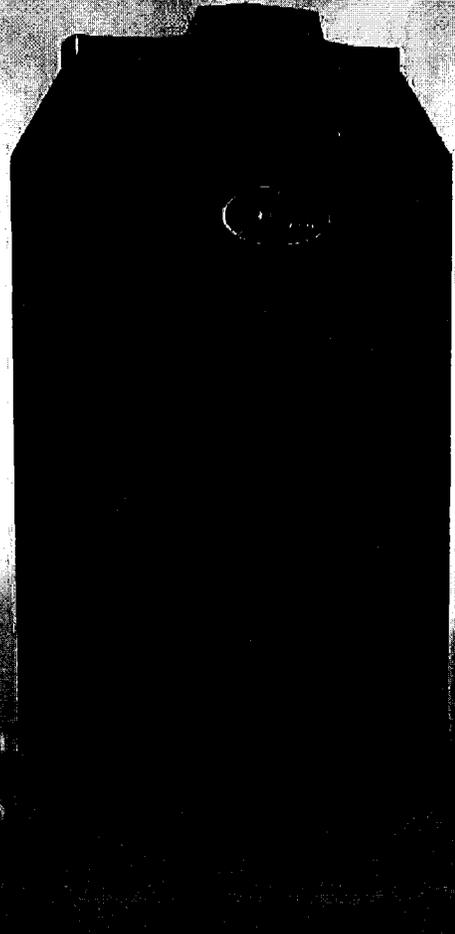
- CAPA EXTERIOR AZUL
- CAPA INTERMEDIA NEGRA
- CAPA INTERNA BLANCA

# TANQUES



**5000 GALONES**

99.5" Diámetro  
163" Altura  
42,750 Lbs. Peso Lleno  
Resina aprobada por la **FDA**



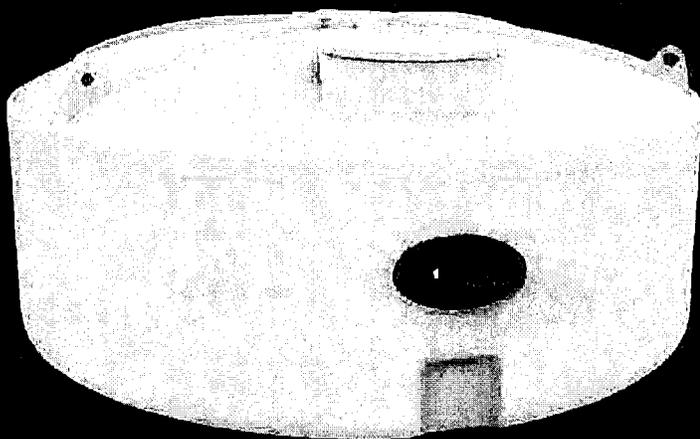
28



# LOW PROFILE



- CAPA EXTERIOR BLANCA
- CAPA INTERMEDIA NEGRA
- CAPA INTERNA BLANCA



## 500 GALONES

74" Diámetro

32" Altura

4,250 Lbs. Peso Lleno

Resina aprobada por la FDA



W



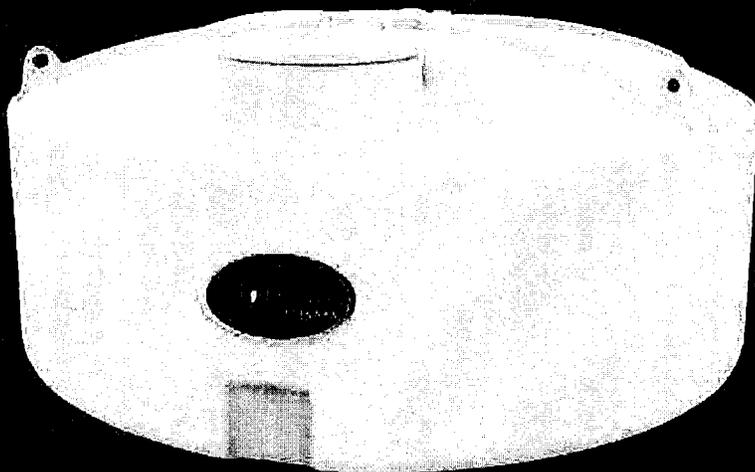
- CAPA EXTERIOR BLANCA
- CAPA INTERMEDIA NEGRA
- CAPA INTERNA BLANCA

# LOW PROFILE



## 700 GALONES

83" Diámetro  
 34" Altura  
 5,950 Lbs. Peso Lleno  
 Resina aprobada por la 

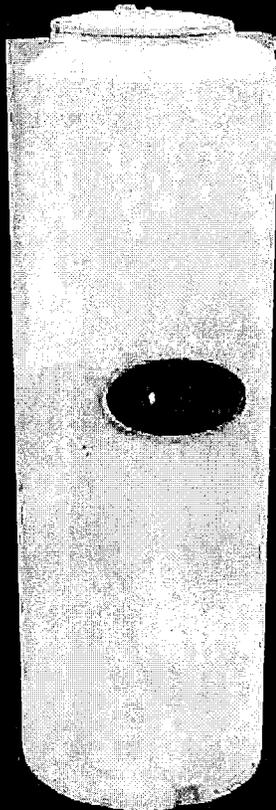




# TANQUE TORRE



- CAPA EXTERIOR BLANCA
- CAPA INTERMEDIA NEGRA
- CAPA INTERNA BLANCA



**150 GALONES**

24.5" Diámetro

72" Altura

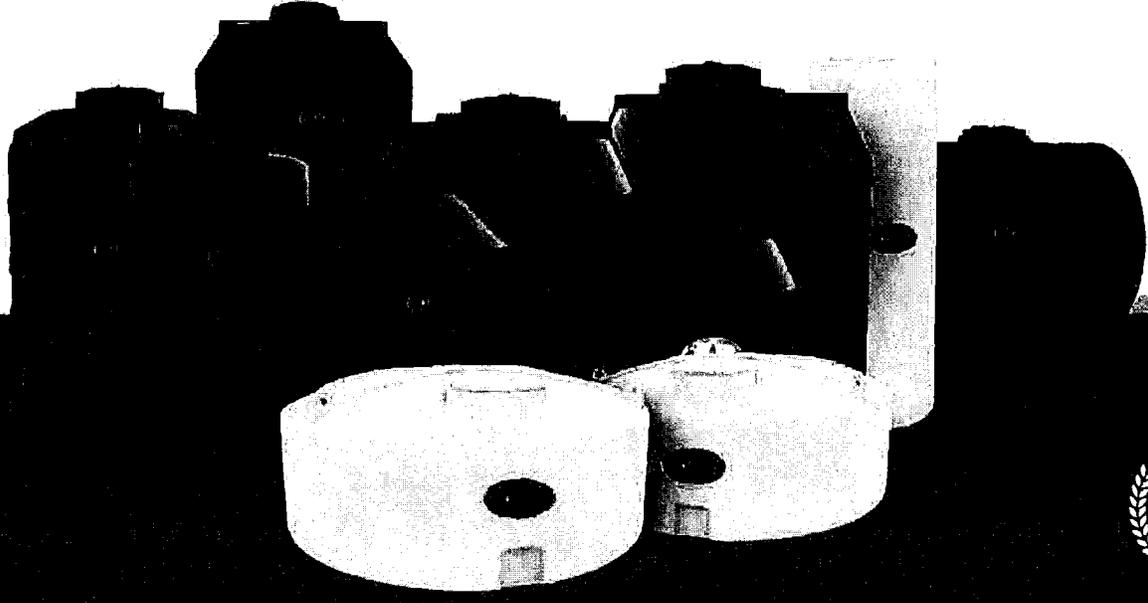
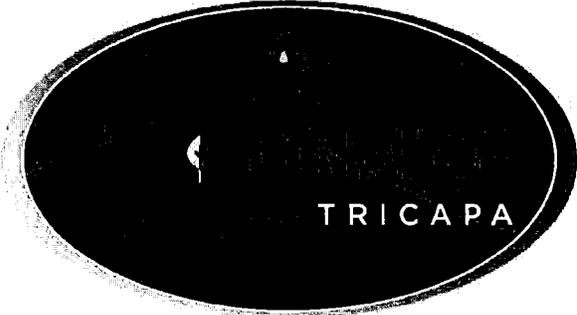
1,286 Lbs. Peso Lleno

Resina aprobada por la 

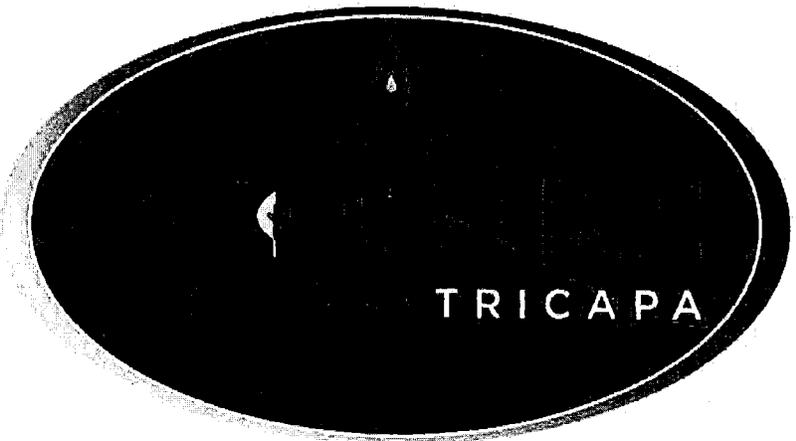


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**HQJ PLUMBING SUPPLIES**  
T. 787.849.1520

**Website:**  
[www.plomeriahqj.com](http://www.plomeriahqj.com)

**Dirección Física**  
Plaza Monserrate  
Hormigueros, Puerto Rico 00660

**Dirección Postal**  
P.O BOX 781, Hormigueros  
Puerto Rico 00660

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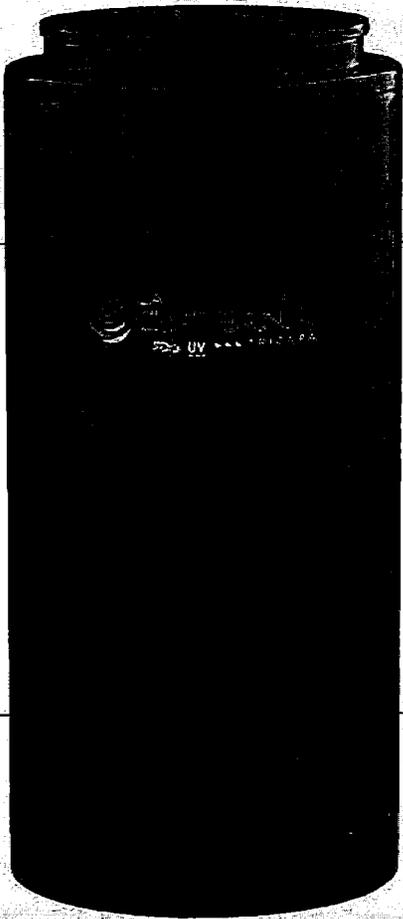


5  
AÑOS  
garantía

FDA APPROVED UV PROTECTION

TRICAPA

 **LA  
CISTERNA**



**5**  
**AÑO**  
garantía

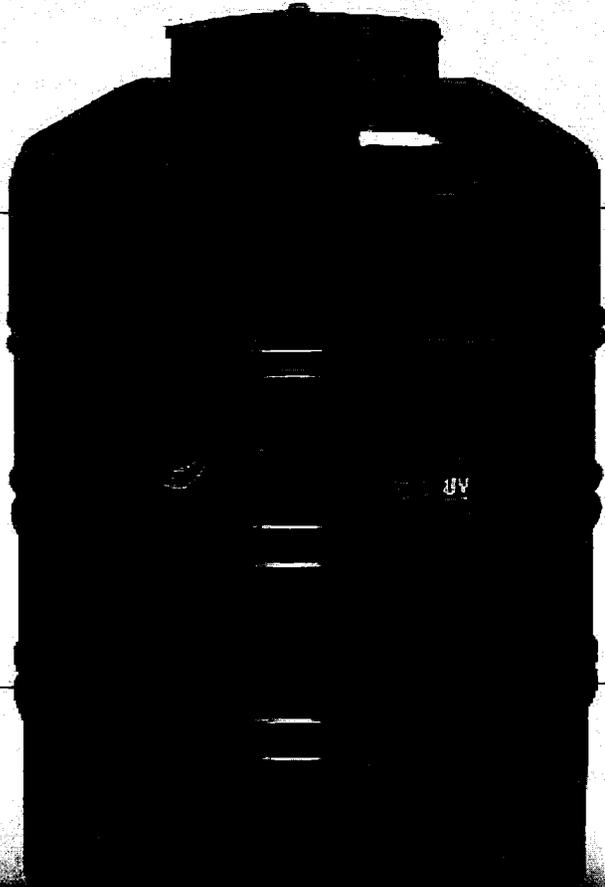
**60 GLS**  
●●●

SHOW  
M  
P



FDA UV  
APPROVED PROTECTION

TRICAPA



5  
AÑO  
garantía

150 GLS  
● ● ●

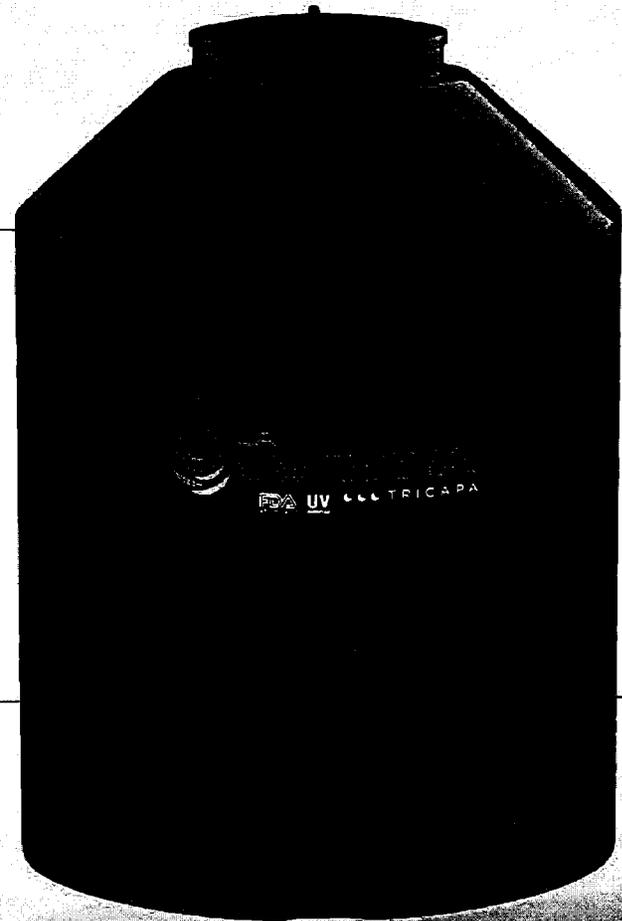
FDA APPROVED UV PROTECTION

CCC TRICAPA

LA CISTERNA

5 AÑO garantía

200 GLS



FDA APPROVED UV PROTECTION

TRICAPA

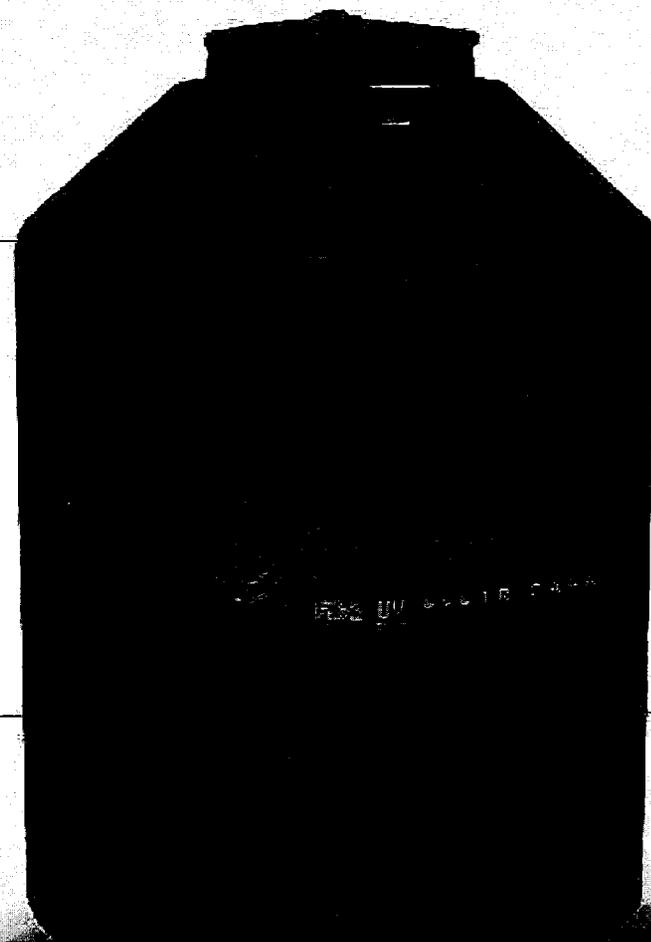
LA CISTERNA

5 AÑO garantía

250 GLS



diámetro  
altura  
Lbs. Peso Lleno



FDA APPROVED UV PROTECTION

 **LA  
CISTERNA**

**FDA** **UV**  
APPROVED PROTECTION

**TRICAPA**

**5**  
**AÑOS**  
garantía

**300 GLS**  
●●●

FDA APPROVED UV PROTECTION

COE TRICAPA

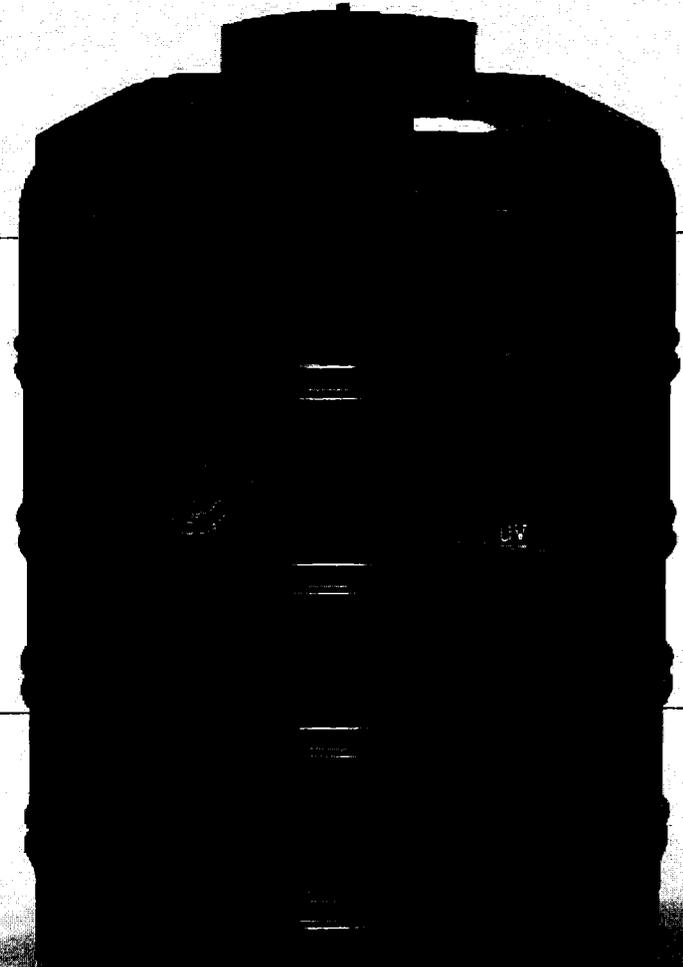
LA CISTERNA

5 AÑO garantía

350 GLS



diámetro  
ra  
s. Peso Lleno



W  
M



FDA APPROVED UV PROTECTION

ESTRICA PA



5 AÑOS garantía

410 GLS  
● ● ●

FDA APPROVED UV PROTECTION

TRICAPA

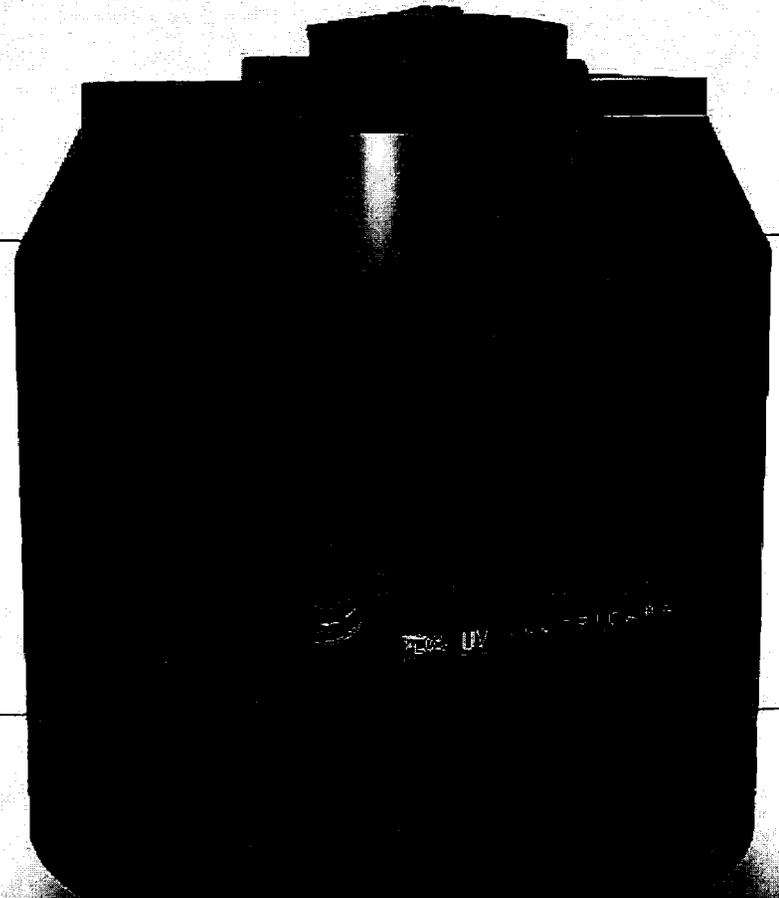
LA CISTERNA



500 GLS



Lleno

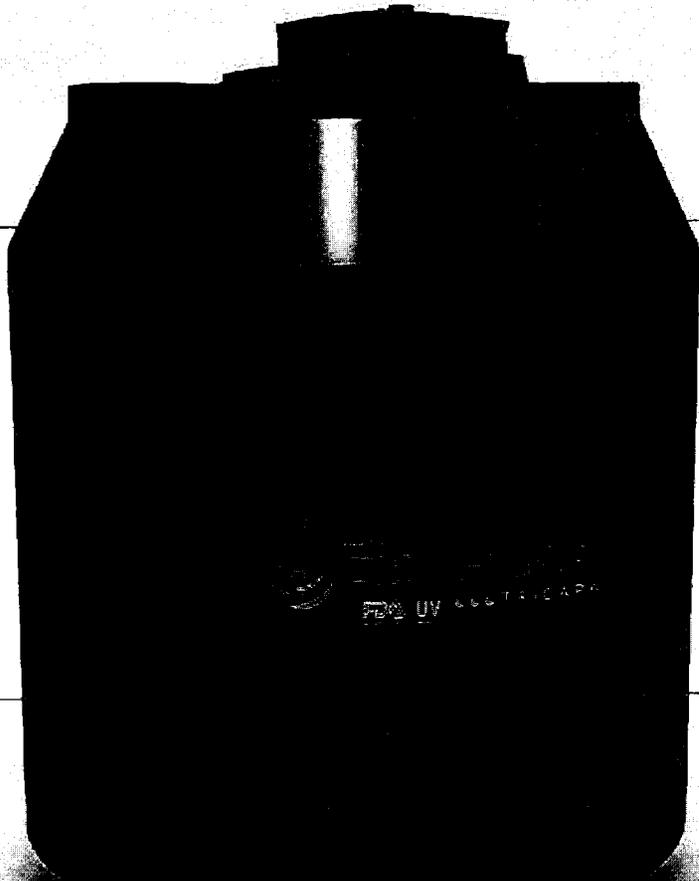


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FDA APPROVED UV PROTECTION

●●● TRICAPA



5 AÑO garantía

600 GLS  
●●●

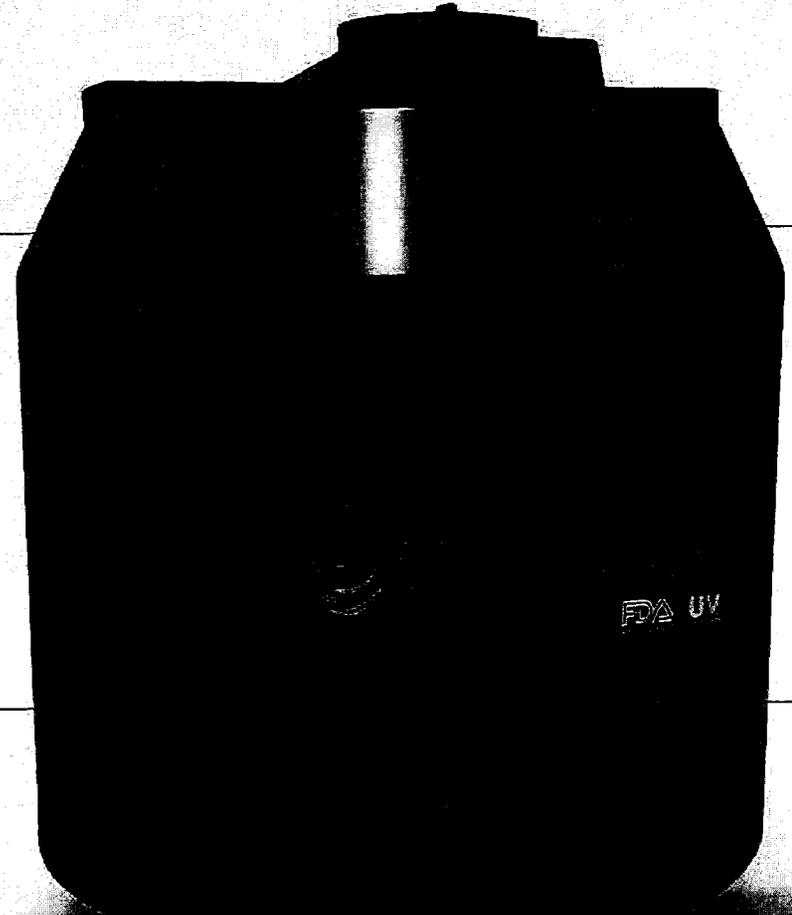
**FDA** **UV**  
APPROVED PROTECTION

TRICAPA

 **LA CISTERNA**

**5**  
**AAÑO**  
garantía

**1000 GLS**  
● ● ●



FDA UV  
APPROVED PROTECTION

TRICAPA

LA  
CISTERNA

5  
AÑO  
garantía

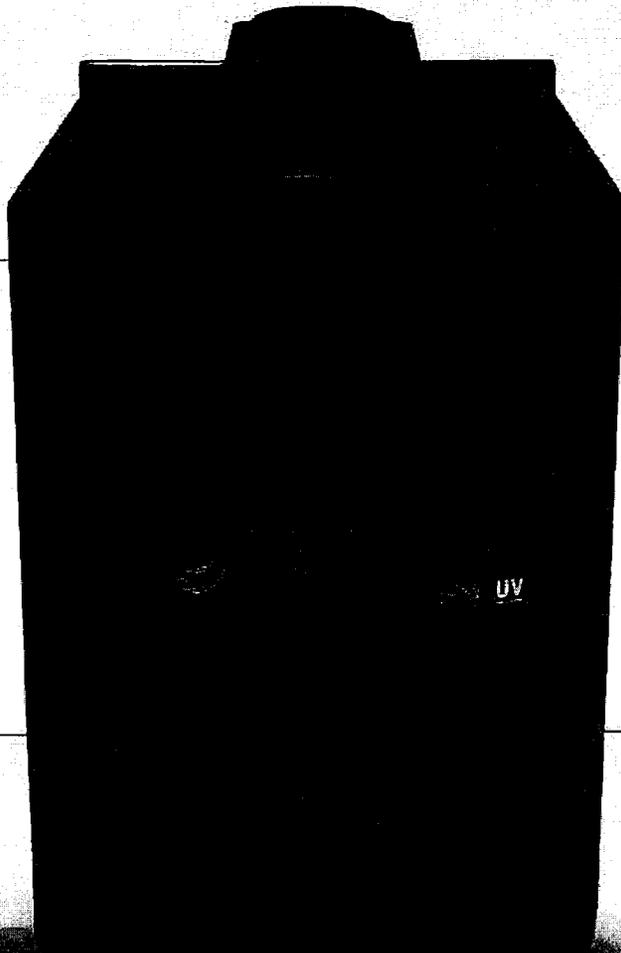
1500 GLS  
●●●





FDA APPROVED UV PROTECTION

TRICAPA



**2500 GLS**



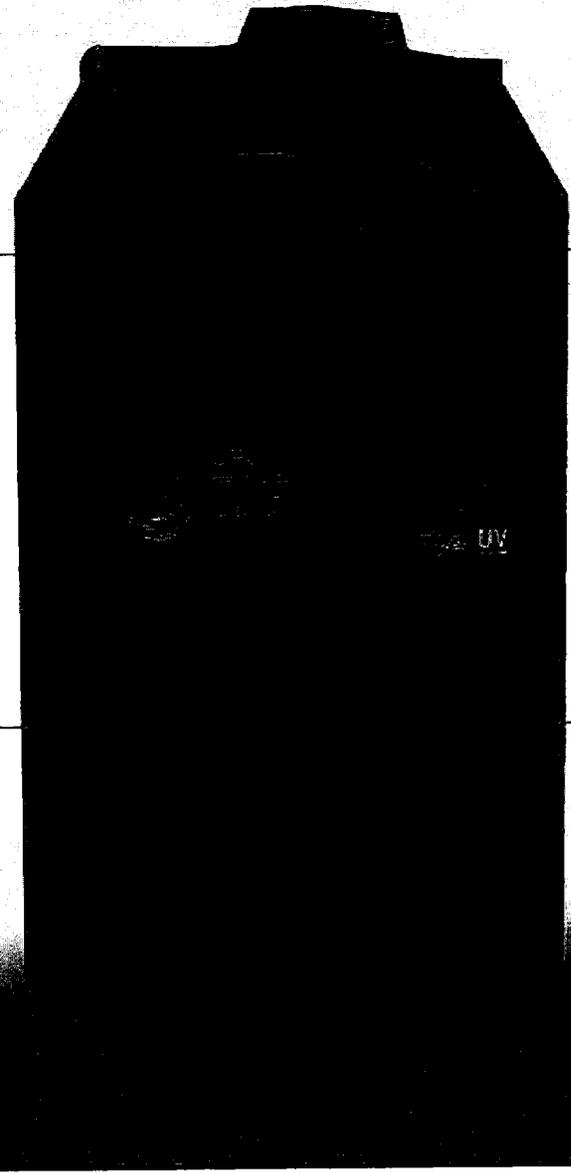
FDA APPROVED UV PROTECTION

TRICAPA

LA CISTERNA

5 AÑO garantía

5000 GLS



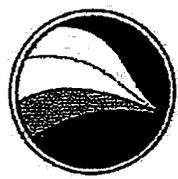
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WDRR

W



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WDRR



# PRO-TANK®

Water Storage System

## 450 Gallons Water Tank



Item# 500-96-110

- Built under the "Rotomoldeo" System, the most modern system in machinery in terms of quality controls.

- Polyethylene triple layer tank approximately 3/8 "thick. The outer layers prevents ultraviolet rays from degrading the cistern, while the inner layer creates an excellent thermal protection, avoiding fungus and sediments.

- Constructed with medium density polyethylene and resin, approved by the FDA # 21CFR177.1520. Made in Puerto Rico

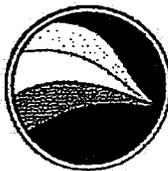
Dimensions: 42.5 "High, 59" Diameter. 1/2 "inlet and 1/4" female thread outlet. Cover of 16 "diameter in the stop secured with 8 screws that allows easy access to the interior. Approximate weight: 80 lbs. Includes handles for easy handling and installation

Excellent weight distribution per square inch. Approximately 1 pound per square inch.

- 5 years warranty on the manufacture of the tank. The warranty does NOT include: Valves, reduced, "Bushing", or installation materials



WDRR  
WORK



# PRO-TANK®

Water Storage System

## 500 Gallons Water Tank



Item# 500-96-210

- Built under the "Rotomoldeo" System, the most modern system in machinery in terms of quality controls.

Polyethylene triple layer tank approximately 3/8 "thick. The outer layers prevents ultraviolet rays from degrading the cistern, while the inner layer creates an excellent thermal protection, avoiding fungus and sediments.

- Constructed with medium density polyethylene and resin, approved by the FDA # 21CFR177.1520. Made in Puerto Rico

Dimensions: 32 "High, 74" Diameter. 1/2 "inlet and 1-1 / 4" female thread outlet. Cover of 16 "diameter in the stop secured with 8 screws that allows easy access to the interior. Approximate weight: 99 lbs. Includes handles for easy operation and installation.

Excellent weight distribution per square inch. Approximately 1 pound per square inch.

- 5 years warranty on the manufacture of the tank. The warranty does NOT include: Valves, reduced, "Bushing", or installation materials



**Polímeros Mexicanos**

Los Mejores Compuestos para el Rotomoldeo

Febrero, 2021

**Atención:  
TANKER INC**

Nos complace informarle que nuestros productos **Rotolene® Natural** y **Rotolene® Natural Industrial** son copolímeros de polietileno lineal de media densidad grado hexeno, térmicamente estabilizados y cuentan con protección UV 8; además cumplen con los requerimientos de la F.D.A. de U.S.A., utilizando materia prima específica para su elaboración de acuerdo con:

- Resina base: 21 CFR 177.1520 (c) 3.1a.

Los materiales pueden ser usados en productos para el contacto con alimentos, respecto a las restricciones citadas en los estándares arriba indicados.

Si requiere más información acerca de estos materiales, por favor, siempre libre de contactar a su equipo de Polímeros Mexicanos.



**Carolina García H.**

*Jefe de Investigación y Desarrollo*  
Polímeros Mexicanos  
[carolina.garcia@polimers.com](mailto:carolina.garcia@polimers.com)

**Itzel Janal Vera T.**

*Gerente de Investigación y Desarrollo*  
Polímeros Mexicanos  
[itzel.vera@polimers.com](mailto:itzel.vera@polimers.com)

Polímeros Mexicanos no es responsable por la idoneidad de los productos en aplicación final. Las declaraciones reglamentarias se aplican solamente a las resinas base, cualquier cambio en la formulación (adición de pigmentos y/o aditivos) ya sea mezclado en seco o en compuesto, puede anular cualquier cumplimiento de las resinas base. Es responsabilidad del fabricante del artículo o del empacador de alimentos, determinar si los productos son adecuados y de conformidad para su uso previsto.

**POLÍMEROS MEXICANOS S.A. DE C.V.**

Monte Alto 10 y 21, Col. Parque Industrial Izcalli,  
Cd. Nezahualcóyotl, Edo. de México, México, C.P. 57810.  
tel. +52 (55)5858 0555

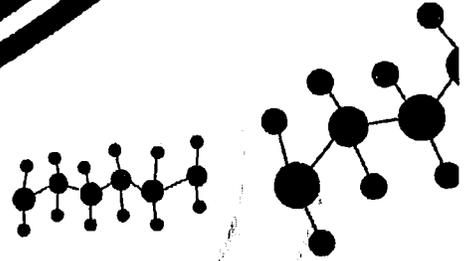
[www.polimers.com](http://www.polimers.com)

Meet the unbeatable

**ROTOLENE<sup>®</sup>**

The resin that has it all

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WORR



Call at +52 (55) 5858 0555

[www.polimers.com](http://www.polimers.com)

[www.rotopolymers.com](http://www.rotopolymers.com)

# ROTOLENE®

## 1. Product Description.

Medium Density Polyethylene specially designed for applications requiring convenient processability and aesthetics combined with low warpage and good mechanical properties. This material is fully heat and UVB stabilized resulting in a wide processing latitude, good color retention and long-life expectancy.

Available: Natural 35 mesh powder.

**2. Applications:** For Rotational molding of Intermediate Bulk Containers (IBCs), toys, general purpose custom molding, water tanks, marine parts, indoor consumer articles.

Natural resin, which is used as a base in color compounds complies with:

- U.S. FDA\* as specified in 21 CFR 177.1520 (c)3,1a
- European Commission Regulation\* (EU) No 10/2011

## 3. Typical Characteristics:

TEST	ASTM	SI	US
MELT INDEX @190°C/2.16 kg	ASTM D1238	5.0 g/10 min	5.0 g/10 min
DENSITY	ASTM D1505 Reference	0.935g/cm <sup>3</sup>	0.935 g/cm <sup>3</sup>
	MA-O1 Internal Method		
TENSILE STRENGTH AT YIELD <sup>1</sup> @2 in/min (50 mm/min) specimen bar Type I	ASTM D638	2,553 psi	17.6 MPa
FLEXURAL MODULUS <sup>1</sup> @-1% Secant	ASTM D790B	85,572 psi	590 MPa
LOW TEMPERATURE IMPACT TEST <sup>2</sup> @-40°F (-40°C), 0.125 in (3.18 mm) specimen	ARM	53 ft/lb	72 J
ESCR <sup>1</sup> @ 122 °F (50°C), 10 % Igepal, F50 @ 122 °F (50°C), 100 % Igepal, F50	ASTM D1693	> 185 hr > 1,000 hr	> 185 hr > 1,000 hr
DEFLECTION TEMPERATURE UNDER LOAD <sup>1</sup> 66 psi (0.45 MPa), Unannealed 264 psi (1.8 MPa), Unannealed	ASTM D648	142 °F 100 °F	61 °C 38 °C

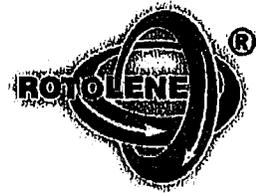
**Notes:**

<sup>1</sup>Plaque molded and tested in accordance with ASTM D4976.

<sup>2</sup>Rotational Molded.

\*Regulatory statements apply only to the natural resin. It is the responsibility of the article producer or food packager to determine that the article is suitable and compliance for its intended use. Any pigment or additive addition, either dry-blending or compounding, may void any base resin compliance.

The technical information of uses and applications recommended are based on the typical test results of each product. Polimeros Mexicanos is not responsible for the use or the results based on this information. All users must run their own test to determine their suitability.



Fecha de revisión: Mayo 2019  
Sustituye a: Mayo 2016

## ROTOLENE® NATURAL

### 1. Descripción del Producto.

Polietileno de Media Densidad diseñado especialmente para aplicaciones que requieren conveniente procesabilidad y estética combinadas con bajo alabeo y buenas propiedades mecánicas. Este material está térmicamente estabilizado y cuenta con protección UVB, dando como resultados una amplia latitud de procesamiento, buena retención de color y una expectativa de larga vida útil.

Disponible: Polvo Natural Malla-35.

### 2. Aplicaciones.

Para proceso de Rotomoldeo en fabricación de contenedores intermedios a granel (IBCs), juguetes, partes personalizadas de uso general, tanques de agua, piezas marinas, artículos para interiores. La resina natural, utilizada como base en compuestos de color cumple con:

- U.S. FDA\* como indicado en la sección 21 CFR 177.1520 (c)3.1a
- Regulación de la Comisión Europea\* (EU) No 10/2011

### 3. Propiedades Típicas.

TEST	MÉTODO BASADO EN	VALOR NOMINAL (Sistema Inglés)	VALOR NOMINAL (SI)
INDICE DE FLUIDEZ @ 160°C / 216 kg	ASTM D1238	6.0 g/10 min	5.0 g/10 min
DENSIDAD	ASTM D1505 Referencia	0.935 g/cm <sup>3</sup>	0.935 g/cm <sup>3</sup>
	IMA-01 Método Interno		
RESISTENCIA DE TENSIÓN A LA CEDENCIA @ 2 in/min (50 mm/min) a 66 psi (4.55 MPa)	ASTM D638	2,653 psi	17.6 MPa
MÓDULO DE FLEXIÓN @ 1/8 segundos	ASTM D790B	85,572 psi	590 MPa
IMPACTO A BAJA TEMPERATURA <sup>2</sup> @ -40°F (-40°C), 0.125 in (3.18 mm)	ARM	53 ft/lb	72 J
ESCR <sup>1</sup> @ 122 °F (50°C), 10 % Igepal, F50 @ 122 °F (50°C), 100 % Igepal, F50	ASTM D1693	> 185 hr > 1,000 hr	> 185 hr > 1,000 hr
TEMPERATURA DE FLEXIÓN BAJO CARGA <sup>1</sup> 66 psi (0.45 MPa) 264 psi (1.8 MPa)	ASTM D648	142 °F 100 °F	61 °C 38 °C

Notas:

<sup>1</sup>Placa moldeada y probada de acuerdo con ASTM D4976.

<sup>2</sup>Moldeado por Rotomoldeo.

\*Las declaraciones regulatorias se aplican solo a la resina natural. Es responsabilidad del fabricante del artículo o del empaquetador de alimentos determinar si el artículo es adecuado y de conformidad para su uso previsto. Cualquier adición de pigmento o aditivo, ya sea mezclado en seco o compuesto, puede alterar cualquier cumplimiento de la resina base.

La información técnica de usos y aplicaciones recomendadas se basa en los resultados de las pruebas típicas de cada producto. Polímeros Mexicanos no es responsable del uso o de los resultados basados en esta información. Todos los usuarios deben ejecutar sus propias pruebas para determinar su idoneidad.

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MONTE ALTO No. 21, PARQUE INDUSTRIAL IZCALLI CD. NEZAHUALCÓYOTL EDO. DE MÉX. C.P. 57810  
TEL: (55) 58 58 05 55 FAX: 51 13 25 37 polimers.com



POLÍMEROS MEXICANOS

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WDRR



Fecha de revisión: Mayo 2019  
Sustituye a: Mayo 2016

## ROTOLENE® INDUSTRIAL NATURAL

### 1. Descripción del Producto.

Polietileno de Media Densidad diseñado especialmente para aplicaciones que requieren conveniente procesabilidad y estética combinadas con bajo alabeo y buenas propiedades mecánicas. Este material está térmicamente estabilizado y cuenta con protección UV8, dando como resultados una amplia latitud de procesamiento, buena retención de color y una expectativa de vida útil larga.

Disponible: Polvo Natural Malla-35.

### 2. Aplicaciones.

Para proceso de Rotomoldeo en fabricación de Contenedores Intermedios a granel (IBCs), tanques para la industria agrícola, tanques de agua, juguetes, piezas marinas y partes personalizadas de uso general.

La resina natural, utilizada como base en compuestos de color cumple con:

- U.S. FDA\* como indicado en la sección 21 CFR 177.1520 (c)3.1a
- Regulación de la Comisión Europea\* (EU) No:10/2011

### 3. Propiedades Típicas.

TEST	MÉTODO BASADO EN	VALOR NOMINAL (Sistema Inglés)	VALOR NOMINAL (SI)
INDICE DE FLUIDEZ @180°C/2.16 kg	ASTM D1238	3.6 g/10 min	3.6 g/10 min
DENSIDAD	ASTM D1505 Referencia MA-D1 Método Interno	0.938 g/cm <sup>3</sup>	0.938 g/cm <sup>3</sup>
RESISTENCIA DE TENSIÓN A LA CEDENCIA @ 1 in/min (60 mm/min) probeta Tipo I	ASTM D635	2,568 psi	17.7 MPa
MODULO DE FLEXIÓN @ 21% de carga	ASTM D790B	98,816 psi	682 MPa
IMPACTO A BAJA TEMPERATURA* @ -40°F (-40°C) 0.125 in (3.18 mm)	ARM	64 ft/lb	73 J
ESCR* 10 % Igepal, F50 100 % Igepal, F50	ASTM D1693	> 145 hr > 1,000 hr	> 145 hr > 1,000 hr
TEMPERATURA DE FLEXIÓN BAJO CARGA <sup>1</sup> 66 psi (0.45 MPa) 264 psi (1.8 MPa)	ASTM D848	143.6 °F 102.2 °F	62 °C 39 °C

Notas:

<sup>1</sup>Placa moldeada y probada de acuerdo con ASTM D4976.

<sup>2</sup>Moldeado por Rotomoldeo.

\*Las declaraciones regulatorias se aplican solo a la resina natural. Es responsabilidad del fabricante del artículo o del empaquetador de silmentos determinar si el artículo es adecuado y de conformidad para su uso previsto. Cualquier adición de pigmento o aditivo, ya sea mezclado en seco o compuesto, puede anular cualquier cumplimiento de la resina base.

La información técnica de usos y aplicaciones recomendadas se basa en los resultados de las pruebas típicas de cada producto. Polímeros Mexicanos no es responsable del uso o de los resultados basados en esta información. Todos los usuarios deben ejecutar sus propias pruebas para determinar su idoneidad.

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**Rotofoam**<sup>®</sup>  
Alto Rendimiento

Fecha de revisión: Junio 2019  
Sustituye a: Noviembre 2018

## ROTOFOAM<sup>®</sup> AR

### 1. Descripción del Producto.

Poliétileno de Media Densidad con aditivos espumantes especialmente formulado para usar como capa interna y/o intermedia, proporcionando una espuma con estructura rígida, celda uniforme y un acabado liso. Este material proporciona un gran espesor, durabilidad y piezas rígidas. Térmicamente estabilizado y con protección UV8.

Disponibles: Polvo de color blanco, azul y negro. Malla-35.

### 2. Aplicaciones.

Para proceso de Rotomoldeo en fabricación de piezas que requieren mayor rigidez y peso más ligero. Muy efectivo cuando se usa como capa interior para tanques de agua.

### 3. Propiedades Típicas.

PRUEBA	MÉTODO	UNIDADES	VALOR NOMINAL
<b>PROPIEDADES DE LA RESINA BASE</b>			
ÍNDICE DE FLUIDEZ @190°C/216 kg	ASTM D1238	g/10 min	5.0
DENSIDAD	ASTM D1505 Referencia	g/cm <sup>3</sup>	0.935
	MA-01 Método Interno		
<b>PROPIEDADES DE LA ESPUMA</b>			
DENSIDAD DE LA ESPUMA	Método Interno	g/cm <sup>3</sup>	0.272 – 0.320
APARIENCIA FINAL	Visual	Visual	Acabado liso con estructura de celda uniforme.
TEMPERATURA DE REACCIÓN <sup>1</sup>	Método Interno	°C	165 – 195
GASES DE DESCOMPOSICIÓN	Método Interno	N/A	Principalmente N <sub>2</sub> , además CO, CO <sub>2</sub> , NH <sub>3</sub> y vapor de H <sub>2</sub> O.

Nota 1:  
<sup>1</sup>Moldeo en flama abierta.

La información técnica de usos y aplicaciones recomendadas se basa en los resultados de las pruebas típicas de cada producto. Polímeros Mexicanos no es responsable del uso o de los resultados basados en esta información. Todos los usuarios deben ejecutar sus propias pruebas para determinar su idoneidad.

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**Polímeros Mexicanos**  
Los Mejores Compuestos para el Rotomoldeo

POLÍMEROS MEXICANOS

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# CON CAPACIDAD EVALUADA

(SYSTEM FOR THE CERTIFICATION OF FIRMS OF ASSESSED CAPABILITY)

SISTEMA PARA LA CERTIFICACIÓN DE FIRMAS

RIF: J-00093267-0



Nº 9001-800-14-12-2016

Fecha de certificación / Certification date: 2016-12-02

Fecha de renovación / Recertification date: 2019-12-02

Fecha de expiración / Valid until: 2022-12-01

Fecha de modificación / Modification date:

El Fondo para la Normalización y Certificación de la Calidad (FONDONORMA),  
a través de su Gerencia de Certificación, certifica que:

*The Fondo para la Normalización y Certificación de la Calidad (FONDONORMA),  
through its Certification Management, certifies that:*

## RESINGLAS INDUSTRIAL, C.A. (RESINCA)

Localizada en / Located in:

Calle La Pedrera, Carretera Vieja Valencia-Tocuyito, Local RESINCA, Nº S/N, Sector Altos del Vigía,  
Tocuyito, Edo. Guayana, Venezuela

Tiene establecido y mantiene un Sistema de Gestión de Calidad con los requisitos de:  
*Has implementado y mantiene un Sistema de Gestión de Calidad con los requisitos de:*

Norma Internacional

International Standard

ISO 9001:2015

ISO 9001:2015

Sistemas de gestión de calidad -  
Requisitos

Quality management systems -  
Requirements

Para la(s) línea(s) de bienes o servicios indicada(s) a continuación

*For the following line(s) of goods or services:*

DISEÑO, DESARROLLO, FABRICACIÓN Y  
COMERCIALIZACIÓN DE PRODUCTOS PLÁSTICOS  
POR ROTOMOLDEO PARA LOS SECTORES:  
INDUSTRIAL, AGRICOLA Y DE SOLUCIONES  
AMBIENTALES

DESIGN, DEVELOPMENT, MANUFACTURE AND  
COMMERCIALIZATION OF PLASTIC PRODUCTS  
BY ROTOMOLDING FOR THE INDUSTRIAL,  
AGRICULTURAL AND ENVIRONMENTAL SOLUTION  
SECTOR

Este certificado se otorga sujeta al correspondiente Contrato de Servicio de Certificación  
*This certificate is granted subject to the corresponding Certification Contract*



Código CISS: SO19FN848C

Este certificado es válido al momento de emitirse y continúa válido si el mismo puede  
verificarse en el Registro en línea de Certificación por FONDONORMA en  
<http://www.fondonorma.org.ve> (Certificación por Certificación Sistema  
de Gestión).

La validez de esta certificación está sujeta a las auditorías anuales de  
certificación.

*This certificate is valid at the time of issue. To verify its validity, please visit the FONDONORMA on-  
line Certification Register at <http://www.fondonorma.org.ve> (Certification by Certification System  
of Management).*

*The validity of this certificate is subject to the performance of annual certification audits.*

Dirección de FONDONORMA (FONDONORMA address)

*Domy*

# Polímeros Mexicanos

Los Mejores Compuestos para el Rotomoldeo

Febrero, 2021

## Atención: RESINGLAS INDUSTRIAL C.A.

Nos complace informarle que nuestros productos **Rotolene® Natural** y **Rotolene® Natural Industrial** son copolímeros de polietileno lineal de media densidad grado hexeno, térmicamente estabilizados y cuentan con protección UV 8; además cumplen con los requerimientos de la F.D.A. de U.S.A., utilizando materia prima específica para su elaboración de acuerdo con:

- Resina base: 21 CFR 177.1520 (c) 3.1a.

Los materiales pueden ser usados en productos para el contacto con alimentos, respecto a las restricciones citadas en los estándares arriba indicados.

Si requiere más información acerca de estos materiales, por favor síéntase libre de contactar a su equipo de Polímeros Mexicanos.

Atentamente:

Los Mejores Compuestos para el Rotomoldeo

**Carolina García H.**  
Jefe de Investigación y Desarrollo  
Polímeros Mexicanos  
[carolina.garcia@polimers.com](mailto:carolina.garcia@polimers.com)

**Itzel Janai Vera T.**  
Gerente de Investigación y Desarrollo  
Polímeros Mexicanos  
[itzel.vera@polimers.com](mailto:itzel.vera@polimers.com)

Polímeros Mexicanos no es responsable por la idoneidad de los productos en aplicación final. Las declaraciones reglamentarias se aplican solamente a las resinas base, cualquier cambio en la formulación (adición de pigmentos y/o aditivos) ya sea mezclado en seco o en compuesto, puede anular cualquier cumplimiento de las resinas base. Es responsabilidad del fabricante del artículo o del empaquetador de alimentos, determinar si los productos son adecuados y de conformidad para su uso previsto.

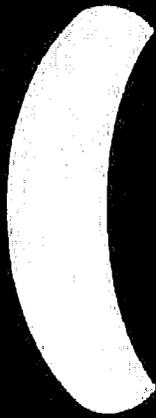
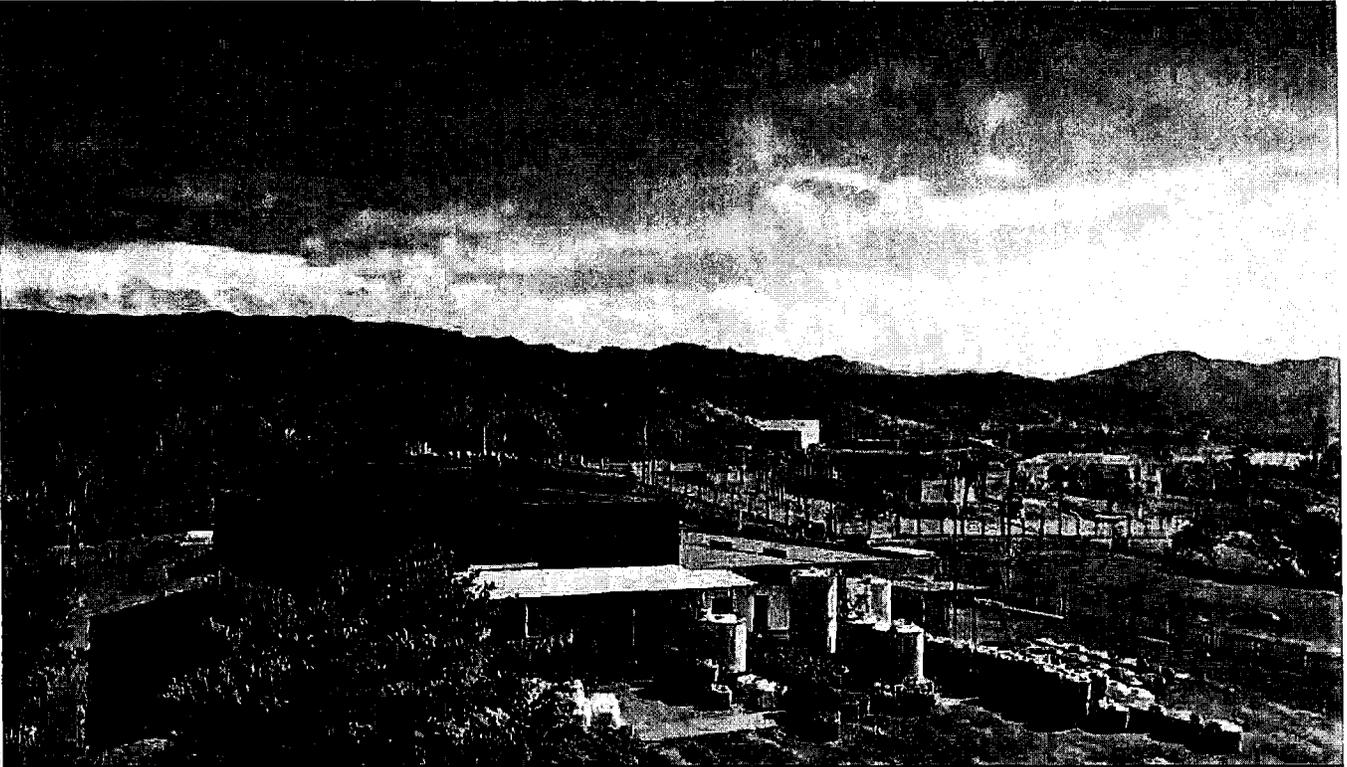
## POLÍMEROS MEXICANOS S.A. DE C.V.

Monte Alto 10 y 21, Col. Parque Industrial Izcalli,  
Cd. Nezahualcóyotl, Edo. de México, México, C.P. 57810.  
tel. +52 (55)5868 0555

[www.polimers.com](http://www.polimers.com)

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PR, LLC

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## COMMITTED TO QUALITY FOR LIFETIME

For more almost 60 years, our team has specialized in manufacturing polyethylene plastic products characterized by their durability and quality. Our expertise are water tank solutions ranging from 90 gallons up to 1,650 gallons.

Located in Ponce, Puerto Rico, RotoSolutions PR, LLC inaugurated its rotational molding ("rotomolding") plant with the acquisition of two large Italian rotomolding machines which feature especially designed aluminum molds and use the very latest rotational molding technology.

These are carousel-type machines equipped with a closed oven station and computer-driven multi-axis movement for producing high-quality rotomolded products. Both machines are specifically used to manufacture water tanks and other related products, all made with a linear low-density polyethylene (LLDPE) resin, a polymer with excellent molecular weight used for rotomolded products that demand outstanding physical performance.

Our high-impact UV-stabilized resin is repairable and recyclable, meets FDA food contact requirements, and is available in different quantities. Also, at RotoSolutions we provide our clients with the alternative to choose the color of the products. For example, our water tanks have four standard colors: white, blue, gray and black, while our flowerpots come in three standard colors: clay, gray and green. Custom colors are available at an extra cost.

We also manufacture and distribute large-sized road delineators, waste containers, recycling bins, water garden hoses, flowerpots, among other products. To learn more about our product lines, please visit [www.rotopr.com](http://www.rotopr.com).

# CORPORATE VALUES

## OPERATIONAL WELLBEING

We truly believe people are key for the success of any company, which is why our top priority, is to promote a loyal, engaged, highly integrated and professional work team by providing our staff members with the necessary resources to achieve constant self-improvement and a safe work environment. We also strive to distinguish ourselves by encouraging good fellowship and productivity.

## QUALITY

Quality is our middle name. We offer high-quality services that meet and even exceed the standards established by the industry. We consistently continue to improve our processes, machinery, and services to effectively meet the needs of our customers.

## INNOVATION

As a company, we are constantly growing and evolving. Our innovative approach allows us to create and use new products, processes, and technologies that prove our competitiveness in the global market.

## ENVIRONMENTAL CONSERVATION

We are committed to fostering a safe and healthy environment by promoting recycling programs and developing products that protect our planet's natural resources, especially water.

## COMMUNITY SERVICE

We always look forward to being part of the community, promoting educational efforts and sporting events that foster a sense of unity among its members and encourage strong family ties for a better quality of life.

# OUR PRODUCTS' ADVANTAGES

- Polyethylene Plastic Material
- Lightweight
- Impact Resistance
- UV Light Resistance
- FDA Approved Materials
- Easy to Transport
- Easy to Install
- Innovative Tap Cap
- Water Level Indicator
- Will Not Corrode
- Fused PET Plastic Fittings

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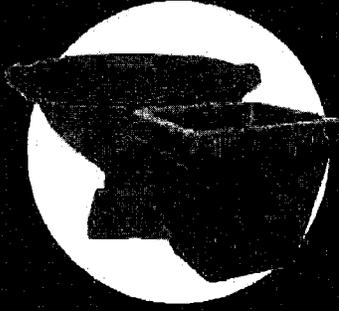
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# PRODUCT LINES



WATER TANKS



FLOWER POTS



DIESEL TANKS



JERSEY SAFETY  
BARRIERS



WASTE CONTAINERS  
& RECYCLING BINS



GARDEN  
WATER HOSE

PO Box 800356, Coto Laurel, Puerto Rico 00780-0356  
787.840.0363 • [vassallof@rotopr.com](mailto:vassallof@rotopr.com)

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### ABOUT US

In 2017, ROTOSOLUTIONSPR,LLC inaugurated its rotomolding manufacturing plant with the acquisition of two large-size rotomolding machines and specially designed aluminum molds using the latest technology from Italy.

- o Carrousel-closed oven-type machines
- o Computer-controlled three-axis movement

### OUR PROMISE

**High-quality products, always.**

We offer high-quality products that meet or exceed the standards established by our industry. The continuous improvement of our processes and services allow us to effectively satisfy the needs of our customers.

**Continuous Innovation.**

We are growing and constantly evolving. We are at the fore front creating and using technologies that prove our competitiveness in the global market.

**Environmentally Conscious.**

We are committed to the conservation of the environment by promoting recycling programs and developing products that protect the natural resources of our planet.

## Advantages of our product line: WATERTANKS

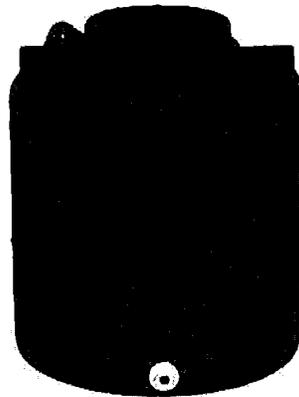
- |                               |                  |                       |                      |                            |                   |
|-------------------------------|------------------|-----------------------|----------------------|----------------------------|-------------------|
| Polyethylene Plastic Material | Lightweight      | Impact Resistance     | Sun Light Resistance | FDA Approved Materials     | Easy to Transport |
| Easy to Install               | Threaded Top Cap | Water Level Indicator | Will not Corrode     | Fused FPT plastic fittings |                   |

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Item	Description
RS-WT450-LP	450-gallon low profile water tank
RS-WT-550-LP	550-gallon low profile water tank



Item	Description
RS-WT90	90-gallon water tank - cylinder
RS-WT125	125-gallon water tank -cylinder
RS-WT200	200-gallon water tank-cylinder
RS-WT400	400-gallon water tank-cylinder
RS-WT500	500-gallon water tank -cylinder
RS-WT600	600-gallonwater tank-cylinder
RS-WT1000	1000-gallon water tank-cylinder



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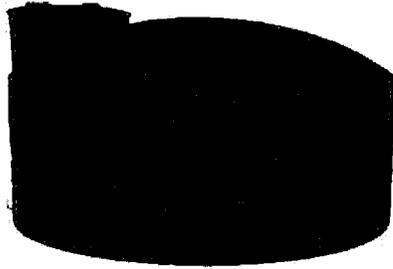
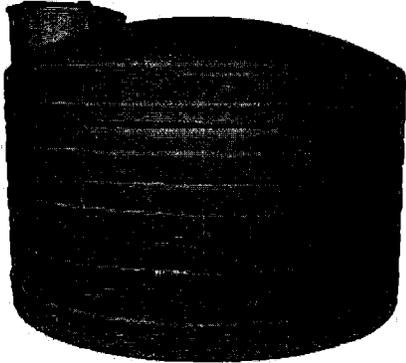
Item	Description
RS-WTH450	450-gallon water tank - horizontal
RS-WTH800	800-gallon water tank -horizontal
RS-WTH1650	1650-gallon water tank-horizontal



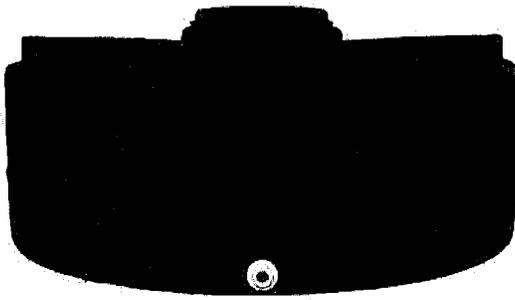
Item	Description
RS-WT150	150-gallon water tank-Cylinder

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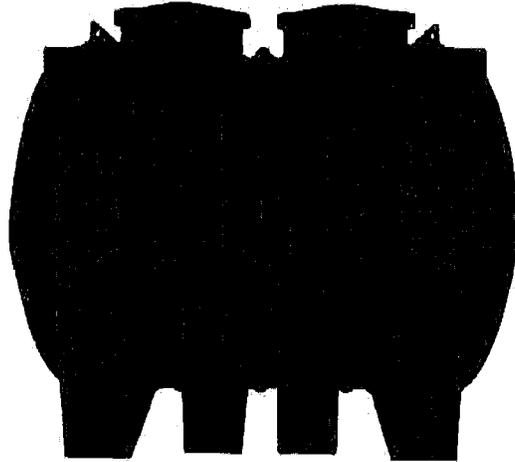
Item	Description
RS-ECO530	530-gallons- water tank - Cylinder
RS-ECO660	660-gallon - water tank -Cylinder
RS-ECO800	800- gallons-Cylinder
RS-ECO1200	1200-gallons-Cylinder



Item	Description
RS-WT250	250 -gallons water tank - cylinder

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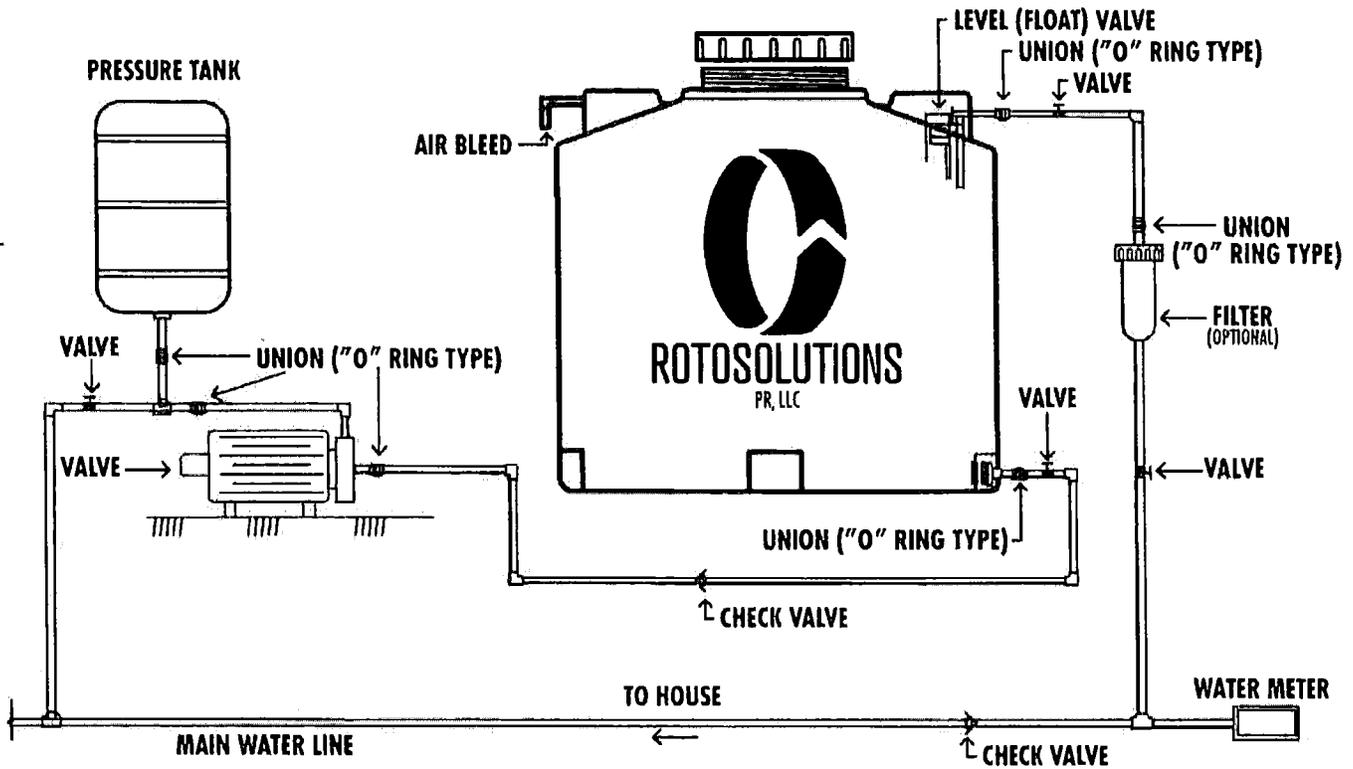
<b>Item</b>	<b>Description</b>
RS-RET800	800-gallon retention tank
RS-RET1650	1650-gallon retention tank

Roto-molded polyethylene tanks are designed to provide exceptional strength and stress crack resistance. **ROTOTANKS** are durable, lightweight, easy to install and maintain. Most **ROTOTANKS** have molded in volume markers and convex bottom for improved drainage. The great majority of our **ROTOTANKS** have built in ribs around the cylindrical body for additional strength. These qualities make them the ideal alternative for your water needs and prolonged outdoor exposure. They are manufactured as a one-piece construction providing structural stability and leak resistance, while insulating the water from the elements found in the external environment.

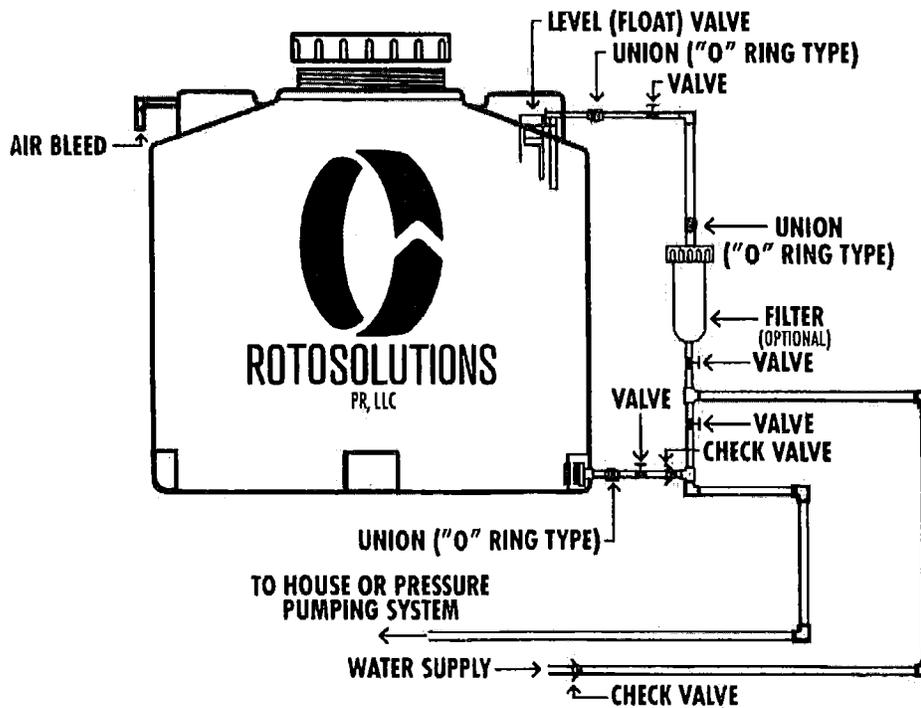
All of **ROTOTANKS** are manufactured with a **MEDIUM DENSITY POLYETHYLENE** and **FDA APPROVED**. Also, all **ROTOTANKS** come in four standard colors: **White, Blue, Gray and Black**, with an inlet hole for level valve of **5/8"**, a top ventilation hole **5/8"**, and a bottom outlet fem thread of **1 1/4"**.

	Capacity Gallons	Part #	Type	Top Opening Size (In.)	Height (In.)	Width (In.)	Diameter (In.)	Length (In.)	Weight (Empty)	Weight (Full)	Wall Thick. Approx.
1	125	RS-WT-125	CYLINDRICAL	14"	40	-	35	-	40	1,082	0.180
2	150	RS-WT-150	VERTICAL	14"	65	-	27	-	42	1,125	0.180
3	200	RS-WT-200	CYLINDRICAL	14"	39	-	43	-	42	1,709	0.180
4	250	RS-WT-250	CYLINDRICAL	14"	27	-	62	-	63	2,063	0.180
5	400	RS-WT-400	CYLINDRICAL	14"	46	-	56	-	83	3,416	0.210
6	450	RS-WTH-450	HORIZONTAL	14"	48	45	-	68	110	3,693	0.210
7	500	RS-WT-500	CYLINDRICAL	14"	54	-	60	-	100	4,267	0.250
8	600	RS-WT-600	CYLINDRICAL	14"	52	-	64	-	120	5,117	0.280
9	1000	RS-WT-1000	CYLINDRICAL	14"	66	-	75	-	189	8,522	0.320
10	1000	RS-WTS-1000	STACKABLE	14"	67	-	81	-	300	8,633	0.320
11	450	RS-WTLP-450	LOW PROFILE	14"	24	57	-	120	151	3,886	-
12	550	RS-WTLP-550	LOW PROFILE	14"	25	61	-	123	180	5,096	-
13	800	RS-WT-800	HORIZONTAL	25.6"	65	60	-	74	400	5,120	.450
14	1650	RS-WT-1650	HORIZONTAL	25.6"	78	74	-	90	843	14,592	0.610
15	530	RS-ECO-530	CYLINDRICAL	21"	37	-	70	-	85	4,493	0.230
16	660	RS-ECO-660	CYLINDRICAL	21"	39	-	83	-	120	5,793	0.230
17	800	RS-ECO-800	CYLINDRICAL	21"	53	-	72	-	120	6,583	0.230
18	1200	RS-ECO-1200	CYLINDRICAL	21"	75	-	72	-	160	10,151	0.230

# PRESSURE SYSTEM



# GRAVITY SYSTEM





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**CONIC WATER TANK TANKER (1300LT) 345GAL**  
**SUPER TANQUE CONICO (1300LT) 345GAL TANKER**

**CONIC WATER TANK TANKER (1300LT) 345GAL**

It offers a blue anti-algae outer layer, while the white inner layer allows a quick inspection of the quality of the water contained in the tank while the two layers are added to increase the product's durability. height

4'.6"

**SUPER TANQUE CONICO (1300LT) 345GAL TANKER**

Ofrece una capa exterior antialgas color azul, mientras que la capa interna color blanco le permite realizar una rápida inspección de la calidad de el agua contenida en el tanque al tiempo que las dos capas se suma para aumentar la resistencia y durabilidad del producto. Altura 4'.6"

**50-096-047 CONIC WATER TANK TANKER (1300LT) 345GAL**  
**SUPER TANQUE CONICO (1300LT) 345GAL TANKER**



Approved for use in drinking water systems and for food processing, complies with the FDA standard for USA 21 CFR 177.1520 (c) 3.1a.

Aprobada para uso en sistemas de agua potable y para procesamiento de alimentos, cumple con el estándar de FDA para USA 21 CFR 177.1520 (c) 3.1a.

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**WATER TANK BLUE 400 GAL**  
**TANQUE DE AGUA 400 GAL AZUL**

**WATER TANK BLUE 400 GAL**

It offers a blue anti-algae outer layer, while the white inner layer allows a quick inspection of the quality of the water contained in the tank while the two layers are added to increase the product's durability. height 5'.15"

**TANQUE DE AGUA 400 GAL AZUL**

Ofrece una capa exterior antialgas color azul, mientras que la capa interna color blanco le permite realizar una rápida inspección de la calidad de el agua contenida en el tanque al tiempo que las dos capas se suma para aumentar la resistencia y durabilidad del producto. Altura 5'.15"

**50-096-045 WATER TANK BLUE 400 GAL**  
**TANQUE DE AGUA 400 GAL AZUL**



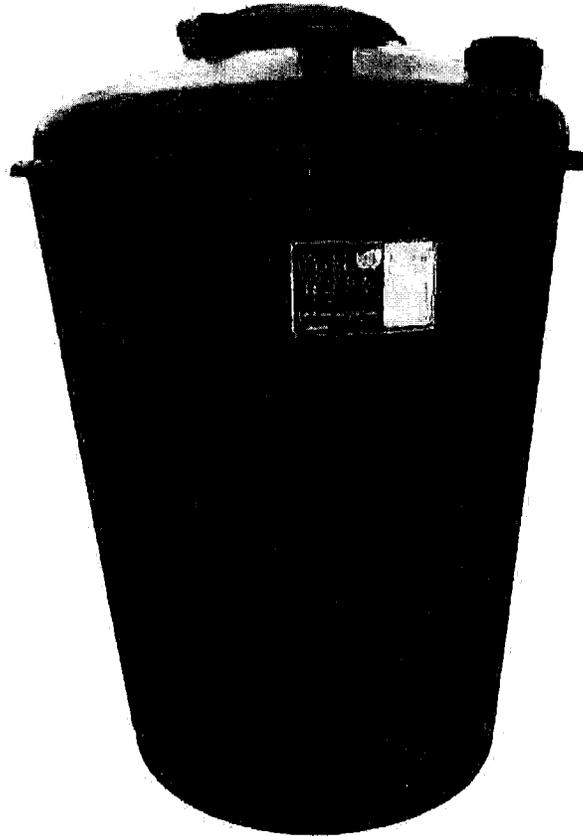
Aprobada para uso en sistemas de agua potable y para procesamiento de alimentos, cumple con el estandar de FDA para USA  
21 CFR 177.1520 (c) 3.1a.

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## Tanque de Agua de 400 Galones, Tuff Tank



Tanque de Agua de 400 Galones, Tuff Tank. Diseñado con una tapa de 18" de una pieza moldeada, tanque de agua construido con sistema de tres partes de capas de polietileno lineal de primer grado: capa externa (en color azul), capa media (color negro para bloquear la luz solar y evitar el crecimiento de algas) y la capa interna (color natural, aprobado por la FDA para su uso en agua potable y alimentos). Dimensiones del tanque: 52-1/2" de diámetro superior, 40-1/2" de diámetro inferior y 66-1/4" de altura.

Aprobada para uso en sistemas de agua potable y para procesamiento de alimentos, cumple con el estandar de FDA para USA 21 CFR 177.1520 (c) 3.1a.

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B. Water Storage

2. Pressurized Tanks:

a. American Water Heaters

b. Pressure Wave

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# Export Pump Tanks

*WORR*  
WORR **EXPORT PUMP TANK FEATURES**

- Drawn Steel Construction
- Diaphragm Operation
- Corrosion Resistant Base
- Lightweight
- Maximum Working Pressure 100 psi
- Pre-Charged at 25 psi



Certified to NSF/ANSI  
61-G and 372



# Export Pump Tanks

## EXPORT PUMP TANK PRE-PRESSURIZED DIAPHRAGM OPERATION

**WORR** American export pump tanks are designed for installation flexibility, and years of trouble-free service. Smooth, dependable diaphragm design and operation provides precise control of system operation cycles. Free-standing and in-line vertical tanks are available, as well as horizontal tanks with universal pump mounting bracket.

### HIGHER DRAWDOWN THAN COMPETITION!

The industry's most popular "standard" tank sizes are 32-gallon and 44-gallon. American offers 36 gallon and 52-gallon tanks in the same price range. A 36-gallon American delivers 12% higher drawdown than the industry standard. A 52-gallon American delivers 18% higher drawdown than standard.

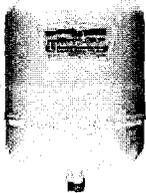


Projection welded air charge valve.

Butyl rubber parabolic diaphragm ensures separation of air and water. Steel retaining ring "seals" diaphragm directly to tank.

Powder coated water chamber, proven protection against internal corrosion.

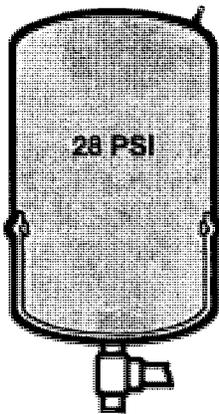
Rotating corrosion resistant base assures stability. Rotates for easy alignment to connection. Slotted and notched for proper airflow, reduced condensation.



### IN-LINE TANKS

In-Line Series tanks, available in 2, 4.6, and 7.3-gallon sizes and are designed to be supported by system piping (See Typical Installations, page 5).

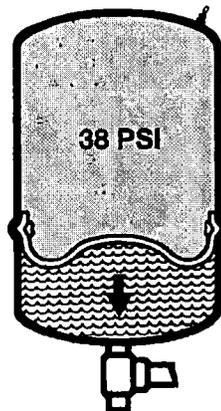
## PRE-PRESSURIZED PUMP TANK OPERATION CYCLES



### START-UP CYCLE\*

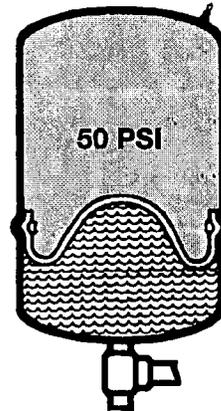
Diaphragm is pressed against the bottom of the chamber.

\*Based on 30-50 operating system.



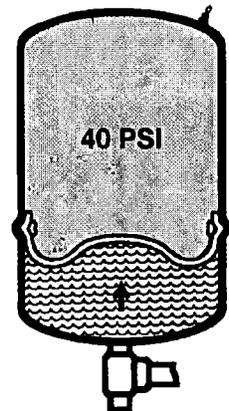
### FILL CYCLE\*

Water is pumped into the reservoir, which forces the diaphragm upward into the air chamber.



### HOLD CYCLE\*

Pump-cutoff pressure is attained. Diaphragm reaches its uppermost position. Reservoir is now filled to its rated capacity.



### DELIVERY CYCLE\*

Pump remains shut off while air pressure in top chamber forces diaphragm downward, delivering water to system.

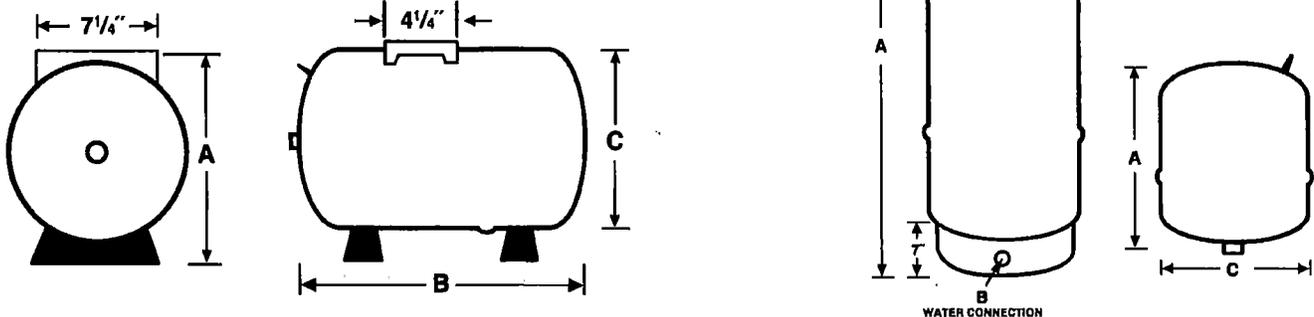


# Export Pump Tanks

## PRE-PRESSURIZED DIMENSIONS AND WEIGHTS

	Model Number	Volume (Gallons)	Dimensions in Inches			Weight (lbs)
			"A" Overall Height	"B" To Center of Water Inlet	"C" Diameter	
<b>ADX Series Free Standing</b> <small>WORR</small>	ADX-14	14.0	24-3/4	2-1/4	15-3/8	25.5
	ADX-20	20.0	32-3/4	2-1/4	15-3/8	30
	ADX-32	32.0	45-1/2	2-1/4	15-3/8	40
	ADX-36S	36.0	32-3/8	2-1/4	20	45
	ADX-52	52.0	38-5/8	2-1/4	23-3/8	77
	ADX-86	86.0	59	2-1/4	23-3/8	105
	ADX-96	96.0	63-3/8	2-1/4	23-3/8	111
	ADX-119	119.5	61-1/4	2-1/2	26	165
<b>ADX Series In-Line</b>	ADX-2	2.0	10-3/16	-	8-1/4	5
	ADX-5	4.8	14-3/4	-	11	9
	ADX-7	7.3	21-1/8	-	11	14
<b>ADXH Series Horizontal</b>				"B" Overall Length		
	ADXH-7	7.3	12-7/8	21-1/8	11	16
	ADXH-14	14.0	17-3/8	21-3/4	15-3/8	25-1/2
	ADXH-20	20.0	17-3/8	27-1/8	15-3/8	30

ADX-14, ADX-20, ADX-36S connection 1" Female.  
 ADX-52, ADX-86, ADX-96, ADX-119 connection 1- 1/4" Female.  
 In-line connection 3/4" Male.  
 ADXH-7 connection 3/4" Male. \* ADXH-14, ADXH-20 connection 1" Male.





# Export Pump Tanks

## PUMP TANK SIZING

### FREE-STANDING SELECTION CHARTS

The charts below allow you to easily select the right free-standing tank for standard size pumps between 2-1/2 and 30 gallons in capacity and for 20-40 psi, 30-50 psi and 40-60 psi pressure ranges. Minimum run times shown (from start-up) are 1 minute, 1-1/2 minutes and 2 minutes. For example, for a system that delivers 10 gpm at 30-50 psi, with a minimum run time of 1 minute, Chart 1 indicates that the proper tank is the ADX-36S.

### IF PROPER TANK SELECTION CANNOT BE MADE USING CHART 1, FOLLOW THIS PROCEDURE:

First find the "drawdown multiplier" by matching the pump start-up and shut-off pressures on Chart 2. For example, the multiplier for a 30-50 psi pressure range is .31. Next, insert the pump GPM capacity and desired minimum run time into this formula:

$$\frac{\text{PUMP GPM} \times \text{Min. Run Time}}{\text{Multiplier}} = \text{Minimum Tank Volume Required}$$

To assume dependable Drawdown Volumes, and in keeping with present industry practice, Drawdowns are based on Boyles Law.

For example, using a 10 GPM pump, a one-minute minimum run time, and a 30-50 psi pressure range, the formula is as follows:

$$\frac{10 \times 1}{.31} = 32.25 \text{ Minimum Tank Volume}$$

Then, using Chart 3, select the tank that has a minimum volume that meets or exceeds your minimum volume requirement, and supplies adequate drawdown at the required pressure range. Minimum drawdown equals Pump GPM x Minimum Run Time. Therefore, in the above example, select the ADX-36S 36-gallon tank. It provides adequate drawdown at 30-50 psi.

Chart 1-ADX Series Free-Standing Tank Selection Chart

Pump GPM	System Pressure Ranges-PSI								
	20-40			30-50			40-60		
	Minimum Run Times (Minutes)								
	1	1-1/2	2	1	1-1/2	2	1	1-1/2	2
2.5	ADX-14	ADX-14	ADX-14	ADX-14	ADX-14	ADX-20	ADX-14	ADX-20	ADX-20
5	ADX-14	ADX-20	ADX-36S	ADX-20	ADX-36S	ADX-36S	ADX-20	ADX-36S	ADX-52
7	ADX-20	ADX-36S	ADX-52	ADX-36S	ADX-36S	ADX-52	ADX-36S	ADX-52	ADX-86
10	ADX-36S	ADX-52	ADX-86	ADX-36S	ADX-52	ADX-86	ADX-52	ADX-86	ADX-86
12	ADX-36S	ADX-52	ADX-86	ADX-52	ADX-86	ADX-86	ADX-52	ADX-86	ADX-96
15	ADX-52	ADX-86	ADX-86	ADX-52	ADX-86	ADX-119	ADX-86	ADX-86	ADX-119
20	ADX-86	ADX-86	ADX-119	ADX-86	ADX-119	[2]ADX-86	ADX-86	ADX-119	[2]ADX-86
25	ADX-86	ADX-119	[2]ADX-86	ADX-86	[2]ADX-86	[2]ADX-86	ADX-96	[2]ADX-86	[2]ADX-96
30	ADX-86	[2]ADX-86	[2]ADX-86	ADX-119	[2]ADX-86	[2]ADX-119	ADX-119	[2]ADX-96	[2]ADX-119

Chart 2- Drawdown Volume Multiplier (Approximate)

Pump Shut-Off Pressure psi	Pump Start-Up Pressure-PSI							
	10	20	30	40	50	60	70	80
20	0.26							
30	0.41	0.22						
40		0.37	0.18					
50		0.46	0.31	0.15				
60			0.40	0.27	0.13			
70			0.47	0.35	0.24	0.12		
80				0.42	0.32	0.21	0.11	
90				0.46	0.38	0.29	0.19	0.10
100					0.44	0.35	0.26	0.17

Chart 3- Drawdown in Gallons

Model No.	Vol. In Gallons	20-40	30-50	40-60
ADX-2	2.0	0.7	0.6	0.5
ADX-5	4.6	1.7	1.4	1.2
ADX-7	7.3	2.7	2.3	2.0
ADX-14	14.0	5.2	4.3	3.8
ADX-20	20.0	7.4	6.2	5.4
ADX-32	31	11.4	9.6	8.4
ADX-36S	36.0	13.3	11.2	9.7
ADX-52	52.0	19.2	16.1	14.0
ADX-86	86.0	31.8	26.7	23.2
ADX-96	96.0	35.5	29.8	25.9
ADX-119	119.5	44.2	37.0	32.3

### RULE OF THUMB SYSTEM SIZING

The following water requirements figures are based on averages accepted by the industry. They represent typical household and farm animal water use requirements. Generally speaking, a reliable daily average water requirement is 100 gallons per day per person.

#### Average daily farm animal requirements

Gallons/Day	
Horse, Mule, Steer	12
Cow-Dry	15
Cow-Milking	35
Hog	4
Sheep	2
Chicken/100	6
Turkey/100	20

#### Average household water requirements (GPM) using industry-accepted 7-minute peak demand cycle

No. of Bathrooms	Type of Water Using Fixtures Installed	GPM Required
1	Sink, Toilet, Lavatory Tub/Shower	7
1 1/2	Same as Above but with Automatic Washer	10
2-2 1/2	Same as Above but with Automatic Dishwasher	14
3-4	Same as Above	17

#### Average home water requirements based on industry-accepted 7-minute peak demand cycle

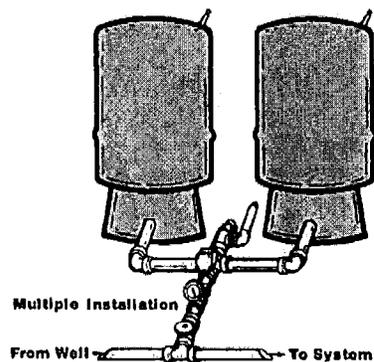
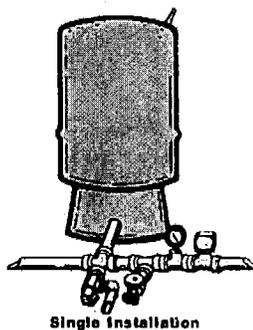
Unit	Flow Rate GPM	Requirement Gallons
Kitchen Sink	5	3
Toilet	4	5
Lavatory	4	2
Tub or Shower	5	35
Auto Wash Machine	5	35
Dishwasher	2	14
Garden Hose (1/2")	3	Depends upon cycle time
Lawn Sprinkler	3-7	
Water Softener	7	

## TYPICAL INSTALLATIONS

For multiple installations, manifold size is critical. If you have questions about sizes call our Technical Engineering Services Department at 1-800-999-9515.

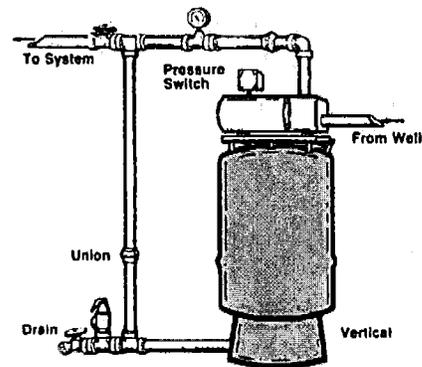
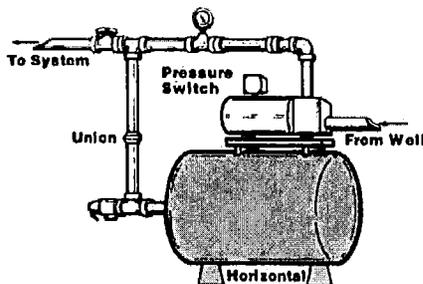
### FREE-STANDING SERIES\*

*WORR*  
WORR The standard installation, utilizing front entry, with gauge, relief valve and pressure switch installed in front of tank.



### FREE-STANDING SERIES WITH PUMP MOUNTED ON TANK\*

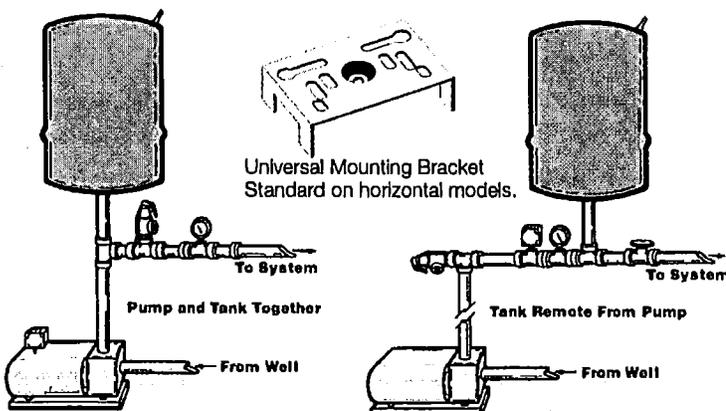
The pump can be mounted on tank using a universal mounting base. The pump and base can be strapped to the tank in the horizontal position, or mounted to the tank in a vertical position.



### IN-LINE SERIES\*

The In-Line Series is designed to be supported by system piping, either directly above the pump, or in a convenient place in the piping system as close to the pump as possible.

\* When pump and tank are in different locations, the pressure switch should be at the tank location. Or compensating adjustment must be made for pressure loss due to head of water, i.e., one psi for every two feet of elevation.

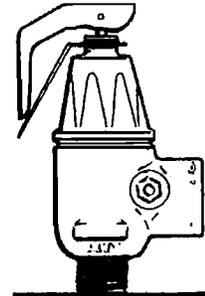
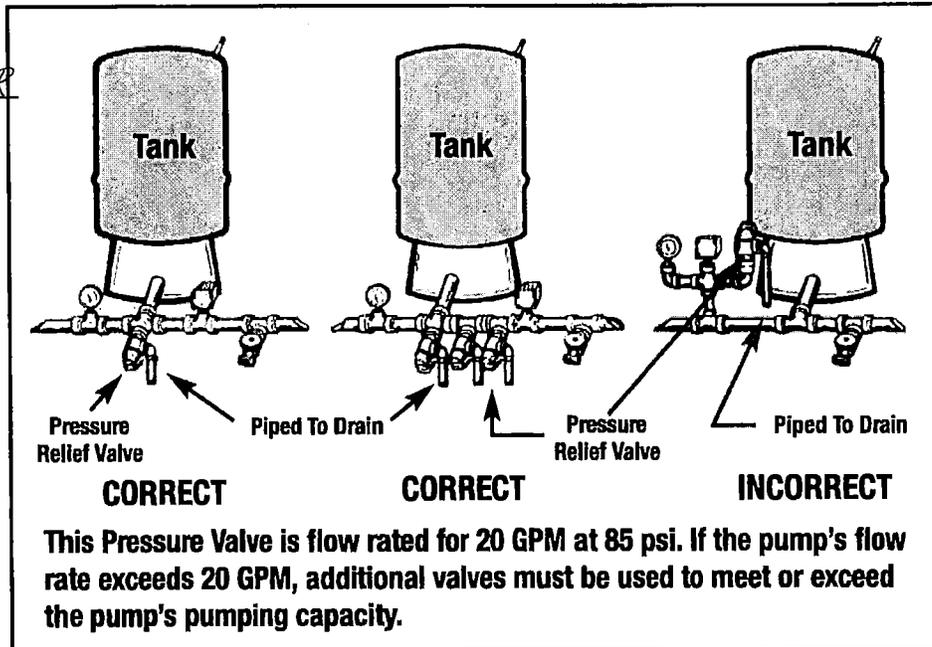


## PRESSURE RELIEF VALVE

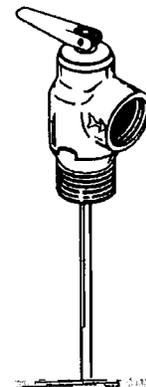
ONLY FOR INSTALLATION ON PUMP TANK OR EXPANSION TANK SYSTEMS

W

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- 75 pound setting
- 20 GPM at 85 psi
- 3/4" male inlet size
- 3/4" female outlet size

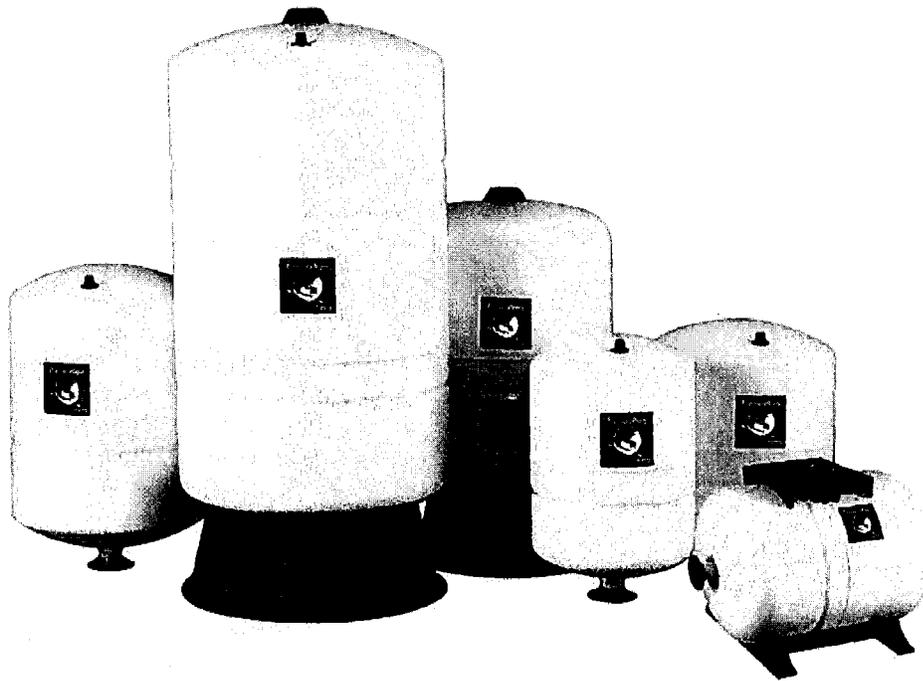


- 100 pound setting
- 20 GPM at 85 psi
- 3/4" male inlet size
- 3/4" female outlet size

For technical information call (800) 999-9515. American Water Heaters reserves the right to make product changes or improvements without prior notice.

PressureWave™

# PressureWave™ SERIES



## FEATURES

- Single diaphragm design
- CE/PED, WRAS, ACS, ISO:9001 approved
- Patented stainless steel water connection
- Virgin polypropylene liner
- Two part polyurethane, epoxy primed paint finish
- Leak free, o-ring sealed air valve cap
- Comprehensive testing
- No maintenance

PressureWave™ tanks are ideally suited for a wide range of applications, including booster systems, thermal expansion, irrigation systems, and hydraulic hammer arresting.

The PressureWave™ Series is constructed of a virgin polypropylene liner combined with an FDA approved high grade butyl diaphragm. This is held against the wall of the tank with a steel clench ring. The brass air valve, sealed by a threaded o-ring valve cap, prevents air leaks. Water enters the tank through a patented stainless steel water connection. The diaphragm and liner are both reinforced in specific wear areas for longer life. All internal parts including the air valve are rounded to prevent piercing of the diaphragm in extreme conditions. The water connection uniquely provides a dual water/air seal ensuring a complete leak free and maintenance free pressure vessel.

On the exterior the almond colored two-part polyurethane paint finish over an epoxy undercoating provides hundreds of hours of UV and salt spray protection.

PressureWave™ tanks are quality tested at several stages on the production line to insure the structural integrity of every tank.

PressureWave™ tanks represent the best value for the investment and are the best quality pressure vessels available today.

# SPECIFICATIONS

## PressureWave™ Series Models

BSP	NPT	Nominal Volume		Shipping (box) Volume		Shipping (box) Weight		Dimensions					
		liter	gal	m <sup>3</sup>	ft <sup>3</sup>	kg	lbs	A		B		C	
								cm	Inches	cm	Inches	cm	Inches
<b>Inline Models</b>													
PWB-2LX*	PWN-2LX*	2	0.5	0.06	2.12	13.60	29.98	20.90	8.23	12.60	4.96		
PWB-3LX*	PWN-3LX*	3	0.8	0.031	1.01	9.19	20.26	24.30	9.57	14.30	5.51		
PWB-4LX	PWN-4LX	4	1.1	0.01	0.35	1.74	3.84	26.10	10.28	16.20	6.38		
PWB-6LX*	PWN-6LX*	6	1.6	0.047	1.66	7.65	15.43	29.00	11.42	17.80	6.69		
PWB-8LX	PWN-8LX	8	2.1	0.014	0.49	2.47	5.45	31.56	12.32	20.20	7.95		
PWB-12LX	PWN-12LX	12	3.2	0.023	0.81	3.21	7.08	36.70	14.45	23.00	9.06		
PWB-18LX	PWN-18LX	18	4.8	0.03	1.06	4.07	8.97	36.70	14.45	27.90	10.98		
PWB-24LX	PWN-24LX	24	6.3	0.042	1.48	5.52	12.17	44.70	17.60	29.00	11.42		
PWB-35LX	PWN-35LX	35	9.3	0.056	1.98	7.28	16.05	48.10	18.90	31.80	12.52		
<b>Horizontal Models</b>													
PWB-8LH	PWN-8LH	8	2.1	0.013	0.46	2.46	5.42	31.30	12.32	23.20	9.13	11.60	4.57
PWB-12LH	PWN-12LH	12	3.2	0.024	0.85	3.56	7.84	36.70	14.45	26.00	10.24	13.25	5.12
PWB-20LH	PWN-20LH	20	5.3	0.04	1.41	4.99	11.00	44.70	17.60	29.20	11.57	14.50	5.79
PWB-24LH	PWN-24LH	24	6.3	0.047	1.65	6.00	13.23	44.70	17.60	32.10	12.64	16.10	6.34
PWB-35LH	PWN-35LH	35	9.3	0.061	2.15	7.80	17.20	48.10	18.94	35.30	13.90	17.90	7.05
PWB-60LH	PWN-60LH	60	15.9	0.09	3.18	11.51	25.37	53.00	20.87	42.40	16.69	21.50	8.46
PWB-80LH	PWN-80LH	80	21.1	0.13	4.59	16.22	35.76	72.60	28.58	42.40	16.69	21.50	8.46
PWB-100LH	PWN-100LH	100	26.4	0.16	5.65	19.84	43.74	72.00	28.35	47.50	18.70	24.50	9.65
<b>Vertical Models w/ base</b>													
PWB-35LV	PWN-35LV	35	9.3	0.063	2.22	7.70	16.98	55.50	21.85	31.80	12.52	12.00	4.72
PWB-60LV	PWN-60LV	60	15.9	0.098	3.46	11.28	24.87	62.00	24.41	38.90	15.31	12.70	5.00
PWB-80LV	PWN-80LV	80	21.1	0.13	4.59	16.24	35.80	81.50	32.09	38.90	15.31	12.70	5.00
PWB-100LV	PWN-100LV	100	26.4	0.16	5.65	19.72	43.47	80.40	31.65	43.00	16.93	12.90	5.08
PWB-130LV	PWN-130LV	130	34.3	0.21	7.42	26.65	58.75	107.40	42.28	43.00	16.93	12.90	5.08
PWB-150LV	PWN-150LV	150	40.0	0.28	9.89	34.63	76.30	93.80	36.38	53.00	20.87	13.85	5.45

Standard System Connection: 1"

All connections are stainless steel unless stated otherwise. Tank precharge: 1.9 bar / 28 psi

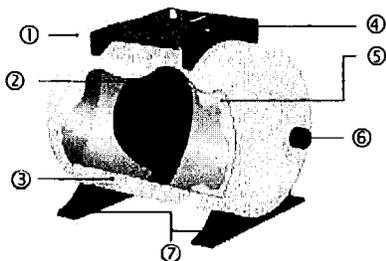
Maximum Working Pressure: 10 bar / 150 psi Maximum Working Temperature: 90° C / 194° F

Available in 16 and 25 bar as Max™ and UltraMax™ Series

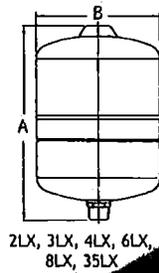
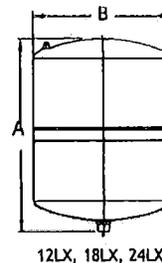
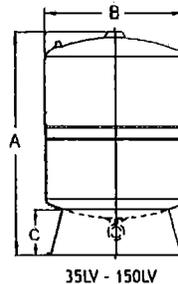
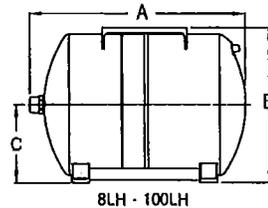
Available in smaller sizes as HydroGuard™ Series

\* PWB-2LX and PWN-2LX: 12 pcs/box, PWB-3LX and PWN-3LX: 6 pcs/box, PWB-6LX and PWN-6LX: 4 pcs/box

Note: Minor dimensional variation may occur



- ① Leak free, o-ring sealed air valve cap
- ② Single diaphragm design
- ③ Two part polyurethane, epoxy primed paint finish
- ④ Nylon Plastic Pump Stand
- ⑤ Virgin polypropylene liner
- ⑥ Patented stainless steel water connection
- ⑦ Plastic Tank Feet



B. Water Storage

3. Jet Pump:

a. Wayne

b. Brown USA JP

W

WDRR  
WDRR

# WAYNE®

MODEL: SWS50, 1/2 HP, MODEL: SWS75, 3/4 HP, MODEL: SWS100, 1 HP

WELL PUMP

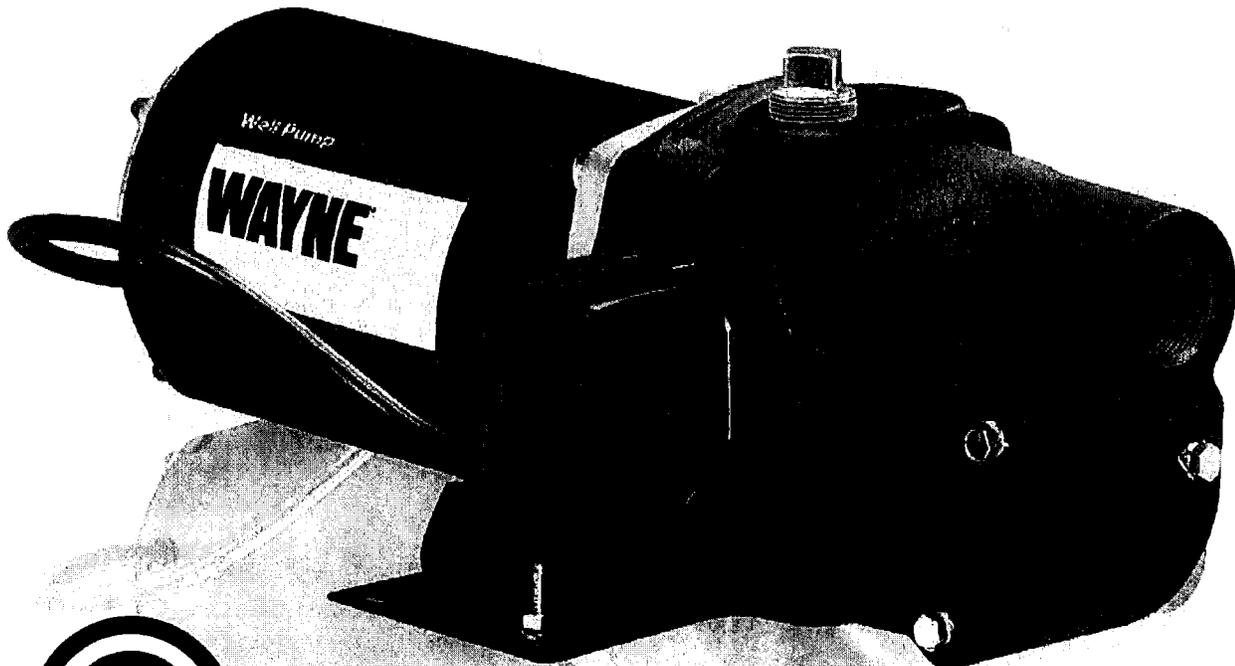
## WAYNE Shallow Well Jet Pump

### CONSTRUCTION

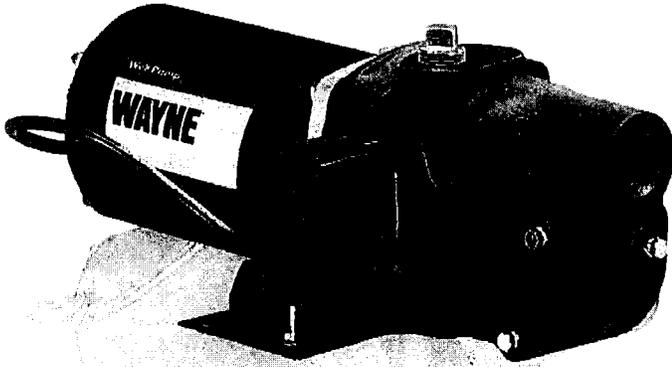
- Corrosion Resistant All Cast Iron Motor Housing
- 3/4 in. NPT Discharge
- Reliable Thermoplastic Impeller for Maximum Water Flow
- Dual Voltage 120 V / 240 V and a 30/50 Pressure Switch included

### BENEFITS

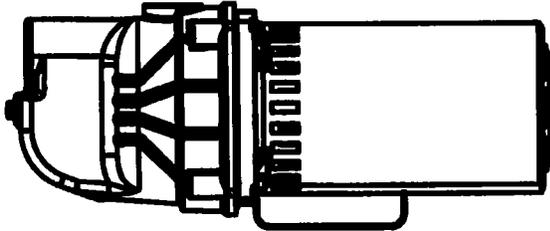
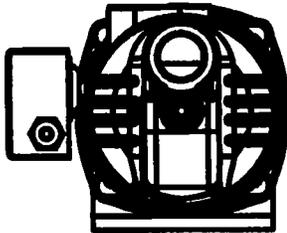
- This pump is assembled in the USA to deliver dependable performance that lasts for years.
- Fresh, clean, water is important to you and our pumps are designed to dependably deliver it to your home or business.
- Self priming and designed to reliably pump water from 25 ft. deep wells, or shallower.
- SWS50: Pump Part #56907
- SWS75: Pump Part #56914
- SWS100: Pump Part #56921



WELL PUMP



WORR  
WORR



# WAYNE SHALLOW WELL JET PUMP

**MODEL: SWS50, 1/2 HP, MODEL: SWS75, 3/4 HP, MODEL: SWS100, 1 HP**

## PUMP SNAPSHOT

- **HP** - SWS50, 1/2 HP | SWS75, 3/4 HP | SWS100, 1 HP
- **Construction** - Cast Iron
- **Switch Type** - N/A
- **Motor** - 120/240V Split Phase Oil-Filled
- **Impeller** - Centrifugal
- **Intake** - 1 1/4 in. NPT
- **Discharge** - 3/4 in.
- **Submersible** - N/A
- **SWS50 UPC** - 040066106117
- **SWS75 UPC** - 040066106131
- **SWS100 UPC** - 040066106155

## PUMP SPECIFICATIONS

- **Length** - 24 In.
- **Width** - 12 1/2 In.
- **Height** - 8 In.
- **Weight** - 43.6 Lbs.
- **Power Cord** - Wire in Field

## PERFORMANCE

- **SWS50** - 1/2 HP - Max Flow 711 GPH: 674 GPH @ 5ft.
- **SWS75** - 3/4 HP - Max Flow 779 GPH: 750 GPH @ 5ft.
- **SWS100** - 1 HP - Max Flow 1084 GPH: 1022 GPH @ 5ft.

## FLOW RATE: GALLONS PER HOUR

SWS50 - 1/2 HP	GPH @ 5'	GPH @ 10'	GPH @ 15'	GPH @ 20'
Gal/Hr @0 Max Flow 711	674 @ 30 PSI	638 @ 30 PSI	601 @ 30 PSI	565 @ 30 PSI
SWS75 - 3/4 HP	GPH @ 5'	GPH @ 10'	GPH @ 15'	GPH @ 20'
Gal/Hr @0 Max Flow 779	750 @ 30psi	721 @ 30 PSI	691 @ 30 PSI	662 @ 30 PSI
SWS100 - 1 HP	GPH @ 5'	GPH @ 10'	GPH @ 15'	GPH @ 20'
Gal/Hr @0 Max Flow 1084	1022 @ 30 PSI	960 @ 30 PSI	899 @ 30 PSI	837 @ 30 PSI

PERFORMANCE: SWS100, SWS75, SWS50							
MODEL	PSI	MAX FLOW	5'	10'	15'	20'	25'
SWS100	30	1084	1022	980	899	837	775
	40	799	737	675	613	561	490
	60	513	451	389	328	266	204
SWS75	30	779	750	721	691	662	633
	40	644	615	586	557	528	499
	50	510	481	451	422	393	364
SWS50	30	711	674	638	601	565	529
	40	543	508	470	433	397	361
	60	375	338	302	265	229	193



## 3 YEAR LIMITED WARRANTY

- Assembled In USA with Foreign and Domestic Parts
- 30/50 Pressure Switch Included





**1/2HP JET PUMP BROWN 127/240V BRWP500JSS**

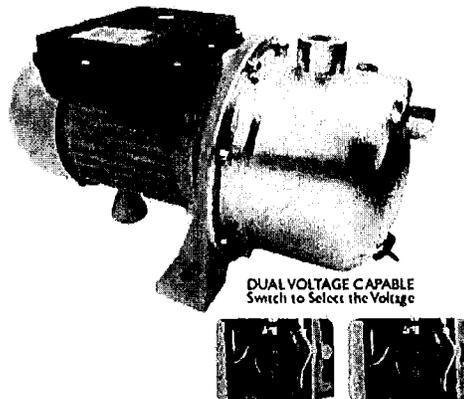
**BOMBA JET BROWN 1/2HP 127/240V BRWP500JSS**

*WORR*  
WORR

**50-097-010**

JET pumps are with an automatic ejector system, stainless steel pump body and excellent plastic for injector, with special reliable mechanical seals and aluminum motor body. These pumps are very light, reliable, safe and simple to use. 1" Inlet/outlet connections, 127/240V, maximum temperature of fluid up to 120°F. Available in 1/2 HP, 3/4 HP & 1 HP.

**Bomba de Agua "JET"**. Las bombas de agua JET tienen un sistema eyector automático, el cuerpo de la bomba de acero inoxidable y plástico excelente para inyector, con sellos mecánicos confiables especiales y el cuerpo del motor de aluminio. Estas bombas son muy livianas, confiables, seguras y fáciles de usar. Conexiones de entrada/salida de 1", operan a 127/240V, temperatura máxima del líquido hasta 120°F. Disponible en 1/2 HP, 3/4 HP & 1 HP.



B. Water Storage

4. Miscellaneous plumbing materials

- a. Buoy
- b. Level Sensor
- c. Copper & Fittings

W

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**FLOAT VALVE 3/4" LD-855A**

**VALVULA CIST. 3/4" C/BOYA PLAST. L.D**

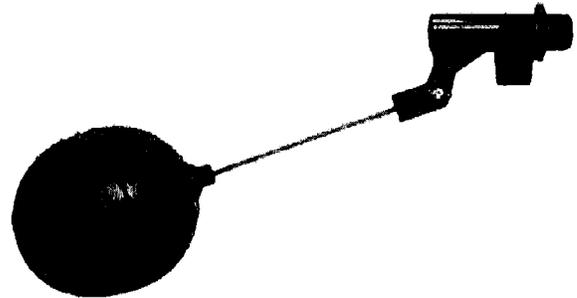
**50-018-037**

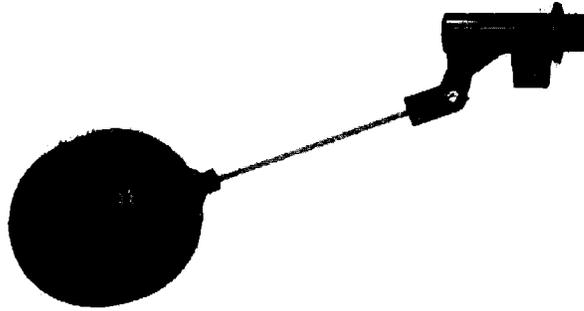
**FLOAT VALVE 3/4" LD-855A**

Plastic Float Valve 1/2", 3/4" & 1", LD-855A. Solid construction and thermoplastic body float valve with male standard short thread connection. Rust free stainless steel parts and replaceable seals and gasket design. Float ball included. 5-year warranty for factory defects

**VALVULA CIST. 3/4" C/BOYA PLAST. L.D**

Válvula de flotador de plástico de 1/2", 3/4" y 1", LD-855A. Válvula de flotador de construcción sólida y cuerpo termoplástico con conexión de rosca corta estándar macho. Piezas de acero inoxidable libres de óxido y diseño de juntas y sellos reemplazables. Bola flotante incluida. 5 años de garantía por defectos de fábrica.





Product Code: LD855

Working Pressure Materials From 1/2"DN15 up to 3"DN80  
150PSI@73°F

PN10BAR@22°CBody: UPVC, CPVC

Gasket: EPDM, FPM, NBR

O-Ring: EPDM, FPM, NBR

Metal: SUS 316 / 304

Float: HDPE Standards

Thread: NPT, BSP

A float valve is a mechanical feedback mechanism that regulates fluid level by using a float to drive an inlet valve which at higher fluid level will force the valve to close while a lower fluid level will let the valve open. The most common use of a float valve is to control the filling of water in the water tank.

Ideal for application of automatic tank filling required. Perfect for direct tank wall installation. Low cost alternative for costly stainless steel or other metal float valves. Solid construction and thermoplastic body, never rust! Rust free stainless steel parts. Replaceable seals and gasket design for long life application. Easy adjustable angle for liquid level control. Provides maximum efficiency in controlling liquid level.



<https://www.ldvalve.com/>



W

**Electric Float Switch for Water Pump with 10' Cable**  
**Flotador Eléctrico para Bomba de Agua con Cable de 10'**

WRR  
WRR

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50097200

**Electric Float Switch for Water Pump with 10' Cable**

The float switch or sensor is intended to automate water pump avoiding it to function when not needed and to provide protection of the pump, as this only turns on when there is water in the cistern or tank. The float switch is a plastic product hermetically sealed, its design is very practical, as well as their installation, because it requires no further complications for placement. It have 2 cables 16 AWG, 127V/220V, 60 Hz, 25Amp technology. 5-year warranty for factory defects



**Flotador Eléctrico para Bomba de Agua con Cable de 10'**

Flotador Eléctrico para Bomba de Agua con Cable de 10', FV-002. El sensor o interruptor flotante tiene como función automatizar la bomba de agua evitando que esta funcione cuando no sea necesario y provee una protección de la bomba, pues esta solo se enciende cuando hay agua en la cisterna o tanque. El flotador es un producto de plástico, sellado herméticamente, su diseño es muy práctico, al igual que su instalación, pues no requiere de mayores complicaciones para su colocación. Tecnología de 2 cables de 16 AWG, 127V/220V, 60Hz, 25Amp. 5 años de garantía por defectos de fábrica.

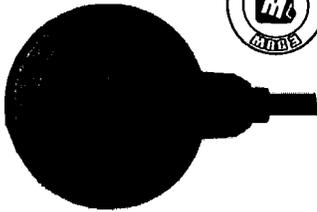
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## Flotadores de Nivel

### Reguladores de nivel de accionamiento electromecánico.

Los interruptores de flotador permiten la automatización de los equipos eléctricos (normalmente las bombas, también electroválvulas, alarmas, etc...) para el control de un nivel predeterminado. En el interior del dispositivo hay un micro interruptor que, dependiendo del nivel de líquido, abre o cierra el contacto que alimenta la bomba. Los modelos con cable 3x1 o 4G1 se pueden utilizar para el llenado o vaciado, dependiendo de los terminales conectados. Los modelos con cable 3G1 (con cable de tierra) están diseñados para una sola función.

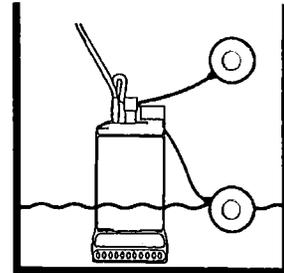
Small



**Aplicación:** Es el más difundido para el control de bombas de drenaje y el más utilizado por los fabricantes de bombas eléctricas que lo montan directamente como parte de sus productos.

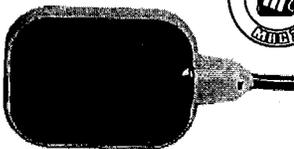
**Ventajas:** Su característica esencial es su reducido tamaño y alta confiabilidad.  
**Beneficios:** Tiene un alto poder de corte con micro 20A. Operación dual para el llenado y el vaciado.

Características Micro Interruptor	20(8)A 250 V~ 20(8)A 250 V~ 10(6)A 400 V~ (multitensione)
Homologación	ENEC/CE 10(8)A 250V~ 10(8)A 250 V~ 10(6)A 400 V~ (multitensione)
T. de Funcionamiento	0°C + + 50°C
T. de Almacenamiento	-10°C + +60°C
Grado de protección	IP 68
Ángulo de comunicación	±45°
Dimensiones	mm 82x111x48
Peso	gr. 113
Volumen	cm³ 179
Resistencia a presión	2 bar e 5 bar
Contenedor	Polipropileno atoxico (PP)
Colorante	Atoxico
Cable estándar	PVC 3X1 H07RN-F 3G1 H07RN-F 3X1
Notas	Especificar en la orden si será utilizado para llenado o vaciado



También en versión aprobado IECEX

Key

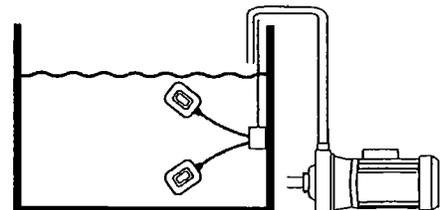


**Aplicación:** Es el interruptor de flotador más utilizado en el mundo para la automatización de las bombas en los tanques de almacenamiento.

**Ventajas:** Sus dimensiones lo convierten en el más versátil para todas las aplicaciones.

**Beneficios:** Es muy fiable y se puede producir de muchas variaciones de acuerdo con las necesidades de cada cliente y país. Operación dual para el llenado y el vaciado.

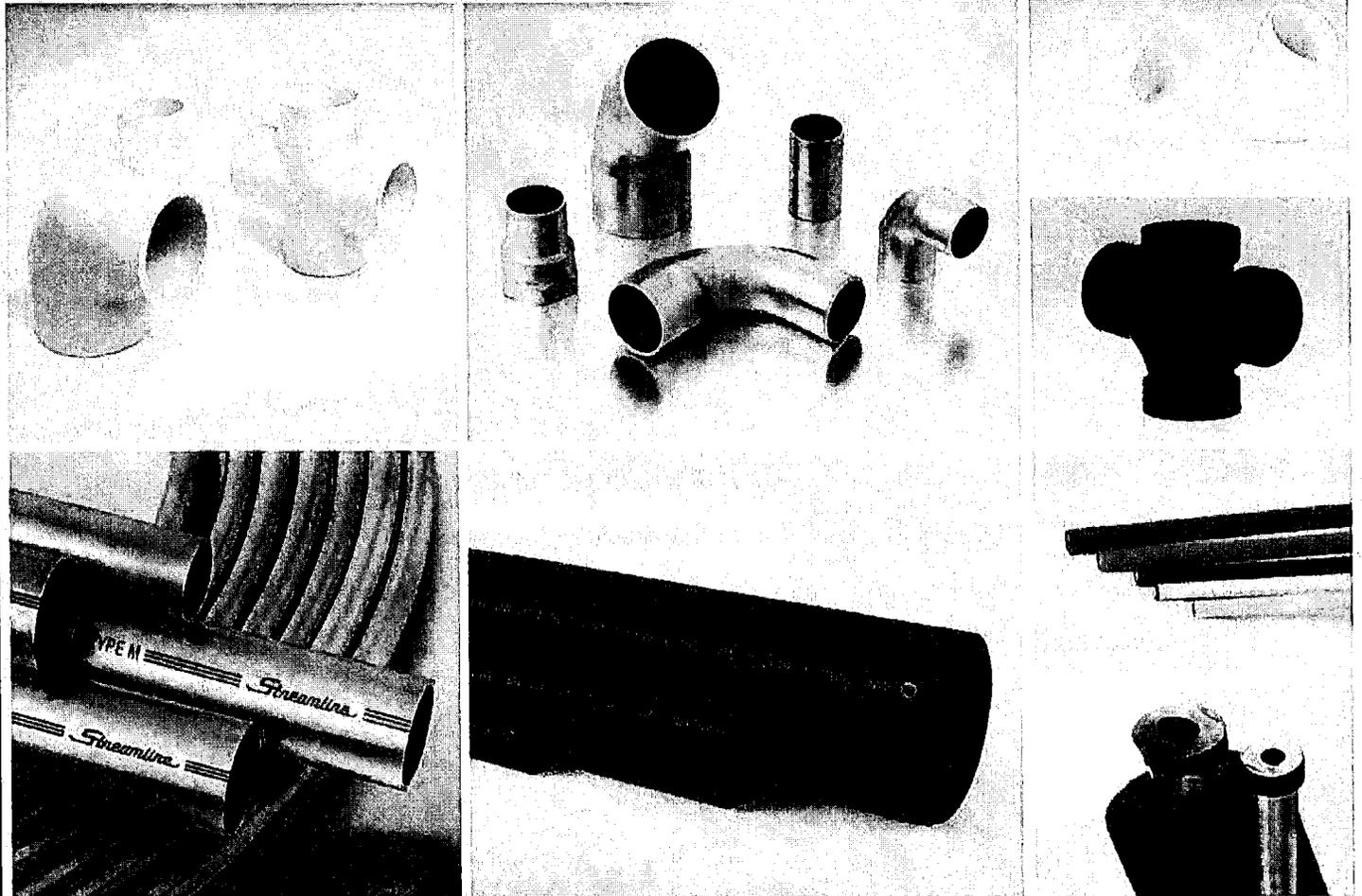
Características Micro Interruptor	16(4)A 250V ~, 20(8)A 250 V~ 20(8)A 250 V~ 10(6)A 400 V~ (multitensione)
Homologación	ENEC/CE 10(4)A 250V ~, 10(8)A 250V~ 10(8)A 250 V~ 10(6)A 400 V~ (multitensione)
T. de Funcionamiento	0°C + + 50°C
T. de Almacenamiento	-10°C + +60°C
Grado de protección	IP 68
Ángulo de comunicación	±45°
Dimensiones	mm 81x131x41,5
Peso	gr. 154
Volumen	cm³ 243
Resistencia a presión	1 bar
Contenedor	Polipropileno atoxico (PP)
Colorante	Atoxico
Cable estándar	PVC 3X1 H07RN-F 3G1 H07RN-F 3X1 H07RN-F 4G1
Notas	Especificar en la orden si será utilizado para llenado o vaciado



**Streamline<sup>®</sup>**

Tube • Fittings • Valves

THE INDUSTRY'S FINEST PRODUCTS.  
80 YEARS & COUNTING.

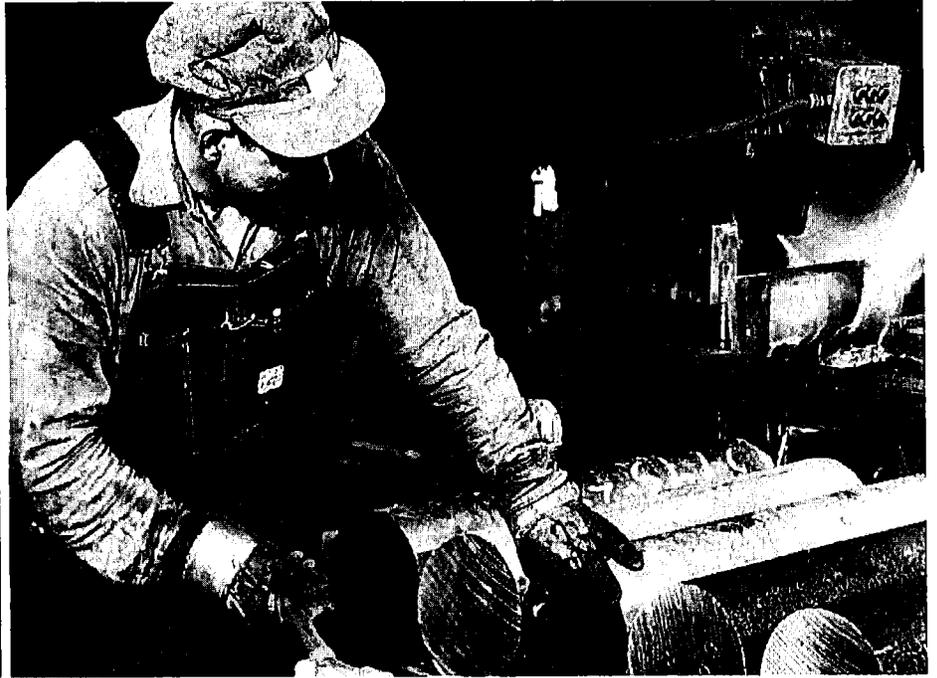


**PLUMBING**  
WHOLESALE CATALOG

A BRAND OF MUELLER INDUSTRIES



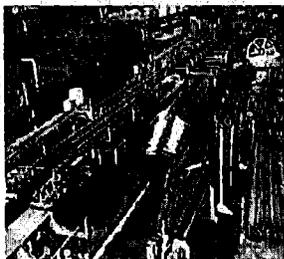
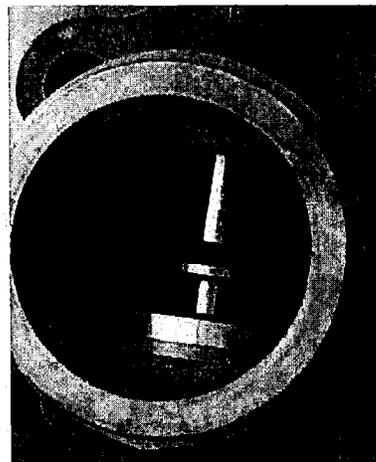
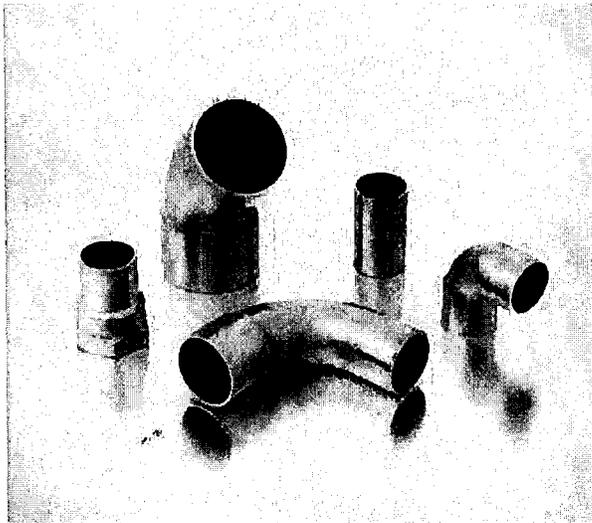
▶ **80 YEARS**  
OF THE INDUSTRY'S  
FINEST PRODUCTS.  
  
**AND COUNTING.**



▶ **Mueller Industries' Streamline® brand of tube, fittings, valves and related products have set the Plumbing, HVAC and Refrigeration Industry's standard of excellence for over 80 years. Known for quality, precision fit and reliable performance, we're proud to be the preferred and specified brand of professionals all around the world.**



# Streamline®

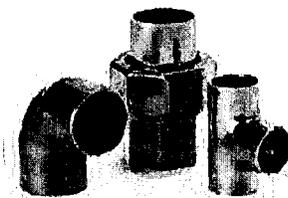


## Streamline® Past and Future.

When Mueller Industries introduced the world's first solder-type copper fittings under the Streamline brand in 1930, the plumbing industry changed forever.

Those then-revolutionary Streamline copper solder-joined fittings were strong, precise and reliable, which helped establish all-copper plumbing systems as the industry standard.

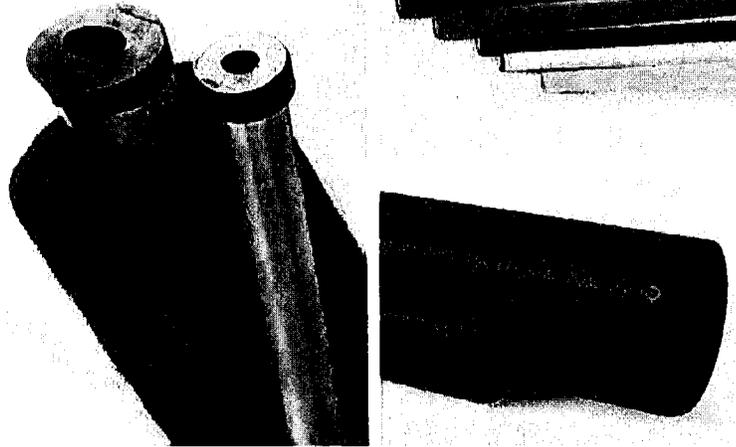
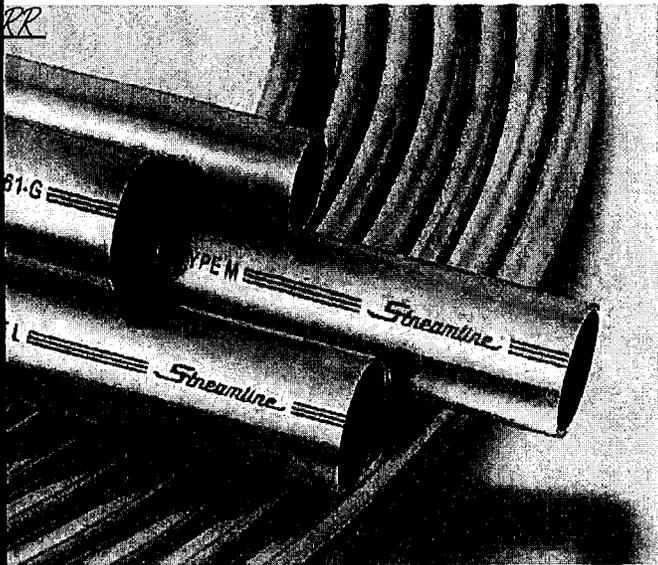
Today, Streamline stands for 80 years of excellence in Plumbing, HVAC and Refrigeration flow-control products. Manufactured in the U.S.A. in our many modern, state-of-the-art facilities, Streamline copper tube, fittings and line sets; plastic pipe and fittings; brass flare fittings; refrigeration valves and protection devices are known and respected all over the world for consistency, precision fit and unfailing performance.



**M**  
MUELLER  
INDUSTRIES

*Streamline*<sup>®</sup>

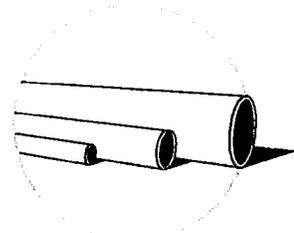
PREMIUM QUALITY TUBE & PIPE MANUFACTURED TO  
THE ABSOLUTE HIGHEST STANDARDS



# TUBE & PIPE



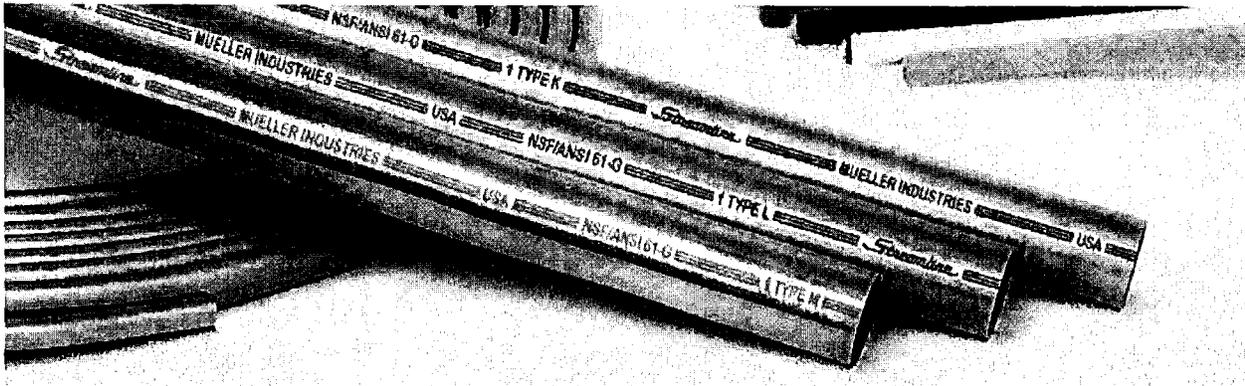
▶ A global leader in premium-quality tube and pipe products since the early 1900's, Streamline® copper tube, line sets and ABS DWV pipe are manufactured in the USA to the absolute highest quality standards. From our pioneering of nitrogen charged ACR copper tube to the precision manufacturing of our ABS DWV pipe, our products reflect many industry first innovations and leading technologies. Each tube and pipe product line offers a full selection of choices to meet the needs of our customers' plumbing, air-conditioning, refrigeration, medical gas and other specialty applications.



- Copper Tube
- Plastic Coated Copper Tube
- Level Wound Copper Tube
- Line Sets
- ABS DWV Pipe

*Streamline*®

# COPPER TUBE • PLUMBING



Streamline® Copper Tube sets the standard for quality, consistency and service in the plumbing industries. With a full line of copper tube products to support most all plumbing supply and DWV applications, Streamline® Copper Tube is available in all common types including Type K, Type L, Type M and DWV. Each piece of tube is incised marked and color coded for easy, long lasting identity. Manufactured in accordance with applicable standards, our ongoing commitment to quality continues to make Streamline® Copper Tube the preferred and specified brand of industry professionals.

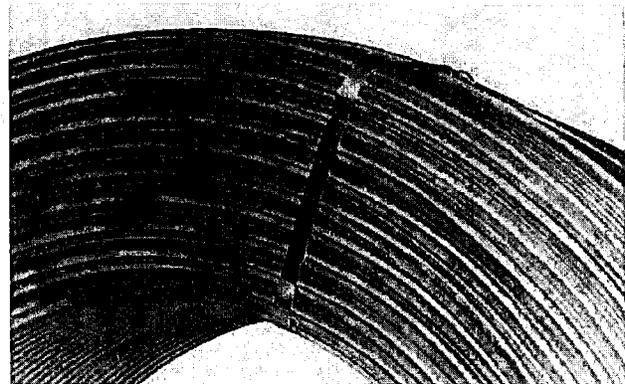
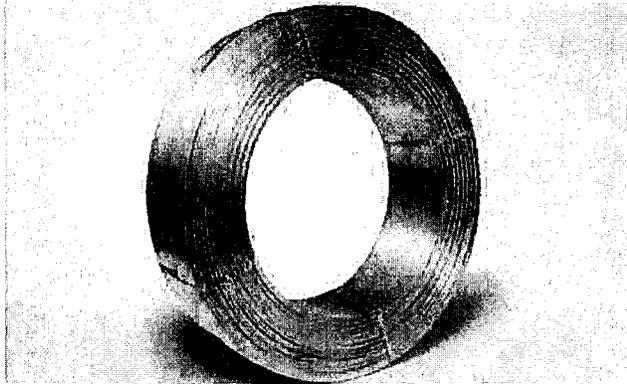


- Made to applicable ASTM standards B88, B306, B819
- Meets NSF 61G
- Made in the USA

## Copper Tube • Plumbing

Nom. Dia.	O.D. Dia.	TYPE K			TYPE L			TYPE M	DWV	MEDICAL GAS	
		Hard Lengths	Soft Coils	Soft Lengths	Hard Lengths	Soft Coils	Soft Lengths	Hard Lengths	Hard Lengths	Hard Lengths	Hard Lengths
1/4"	3/8"	10 ft., 20 ft.	60 ft., 100 ft.	10 ft., 20 ft.	10 ft., 20 ft.	60 ft., 100 ft.	10ft, 20ft	-	-	10 ft., 20 ft.	10 ft., 20 ft.
3/8"	1/2"	10 ft., 20 ft.	60 ft., 100 ft.	10 ft., 20 ft.	10 ft., 20 ft.	60 ft., 100 ft.	10ft, 20ft	10 ft., 20 ft.	-	10 ft., 20 ft.	10 ft., 20 ft.
1/2"	5/8"	10 ft., 20 ft.	60 ft., 100 ft.	10 ft., 20 ft.	10 ft., 20 ft.	60 ft., 100 ft.	10ft, 20ft	10 ft., 20 ft.	-	10 ft., 20 ft.	10 ft., 20 ft.
5/8"	3/4"	10 ft., 20 ft.	60 ft., 100 ft.	10 ft., 20 ft.	10 ft., 20 ft.	60 ft., 100 ft.	10ft, 20ft	10 ft., 20 ft.	-	10 ft., 20 ft.	10 ft., 20 ft.
3/4"	7/8"	10 ft., 20 ft.	60 ft., 100 ft.	10 ft., 20 ft.	10 ft., 20 ft.	60 ft., 100 ft.	10ft, 20ft	10 ft., 20 ft.	-	10 ft., 20 ft.	10 ft., 20 ft.
1"	1-1/8"	10 ft., 20 ft.	60 ft., 100 ft.	10 ft., 20 ft.	10 ft., 20 ft.	60 ft., 100 ft.	10ft, 20ft	10 ft., 20 ft.	-	10 ft., 20 ft.	10 ft., 20 ft.
1-1/4"	1-3/8"	10 ft., 20 ft.	60 ft., 100 ft.	10 ft., 20 ft.	10 ft., 20 ft.	60 ft., 100 ft.	10ft, 20ft	10 ft., 20 ft.			
1-1/2"	1-5/8"	10 ft., 20 ft.	60 ft., 100 ft.	10 ft., 20 ft.	10 ft., 20 ft.	60 ft., 100 ft.	10ft, 20ft	10 ft., 20 ft.			
2"	2-1/8"	10 ft., 20 ft.	40 ft., 60 ft.	10 ft., 20 ft.	10 ft., 20 ft.	40 ft., 60 ft.	10ft, 20ft	10 ft., 20 ft.			
2-1/2"	2-5/8"	10 ft., 20 ft.	-	10 ft., 20 ft.	10 ft., 20 ft.	-	10ft, 20ft	10 ft., 20 ft.	-	10 ft., 20 ft.	10 ft., 20 ft.
3"	3-1/8"	10 ft., 20 ft.	-	10 ft., 20 ft.	10 ft., 20 ft.	-	10ft, 20ft	10 ft., 20 ft.			
3-1/2"	3-5/8"	10 ft., 20 ft.	-	-	10 ft., 20 ft.	-	-	10 ft., 20 ft.	-	10 ft., 20 ft.	10 ft., 20 ft.
4"	4-1/8"	10 ft., 20 ft.	-	-	10 ft., 20 ft.	-	-	10 ft., 20 ft.			
5"	5-1/8"	10 ft., 20 ft.	-	-	10 ft., 20 ft.	-	-	10 ft., 20 ft.			
6"	6-1/8"	10 ft., 20 ft.	-	-	10 ft., 20 ft.	-	-	10 ft., 20 ft.	-	10 ft., 20 ft.	10 ft., 20 ft.
8"	8-1/8"	10 ft., 20 ft.	-	-	10 ft., 20 ft.	-	-	10 ft., 20 ft.	-	10 ft., 20 ft.	10 ft., 20 ft.

# COPPER TUBE • LEVEL WOUND



Streamline® Level Wound Copper Tube is a great solution for when large quantity coiled tubing is a benefit. Available in light annealed, soft annealed and hard temper, this tube comes in either bulk coil or spool rolled coil packaging. Bulk coils come independently stacked with cardboard disk separators and stretch wrapped onto a skid. Spool coil coils come stacked with hub mounted cardboard reels and also stretch wrapped onto a skid. Streamline® Level Wound Copper Tube is manufactured in various wall dimensions and diameters. Custom options and tempers can be quoted upon request.



- Seamless tube alloy made to C12200 DHP
- Copper material made to ASTM standard B743
- Custom O.D. wall and or tempers can be quoted as required
- Bulk packaging and spool packaging available

## Copper Tube • Level Wound

O.D. Dia.	Wall	Sizes (lbs.)	Coil Width	Coils per Skid	Approx. Feet / Coil
0.250	0.028	180	7"	6	2377
0.250	0.030	180	7"	6	2239
0.313	0.032	180	7"	6	1643
0.375	0.028	180	7"	6	1521
0.375	0.030	180	7"	6	1428
0.375	0.035	180	7"	6	1242
0.500	0.028	180	7"	6	1118
0.500	0.032	180	7"	6	987
0.500	0.035	180	7"	6	908
0.625	0.032	180	9"	5	779
0.625	0.035	180	9"	5	716
0.625	0.040	180	9"	5	632
0.750	0.035	180	9"	5	591
0.875	0.038	180	9"	5	465
0.875	0.045	180	9"	5	396
1.125	0.050	180	9"	5	275

\* Level Wound Copper Tube is available in Light Annealed, Soft Annealed and Hard Temper.

### Bulk Packaging Information

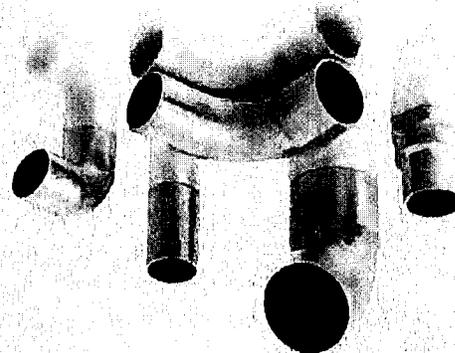
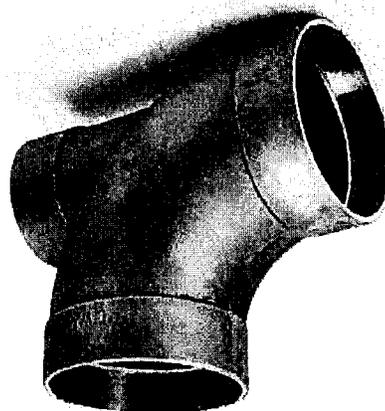
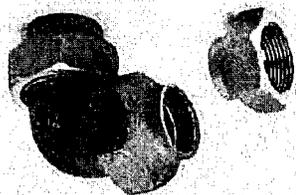
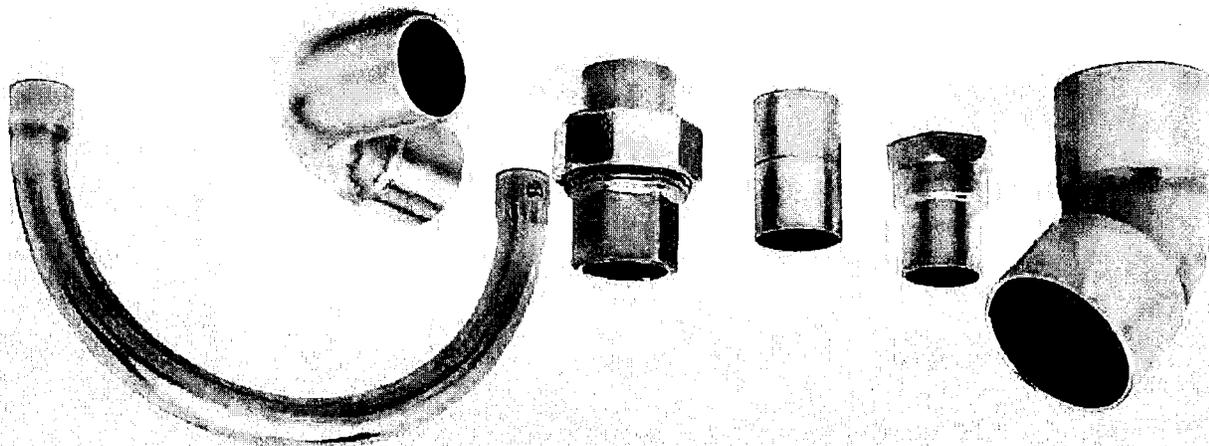
Skids (43" X 43") | Coil ID = 26"  
 Stacked in with cardboard disk as separators  
 Plastic stretch wrapped on to a skid  
 Coils per skid are dependent on coil width

### Spool Packaging Information Skids (43" X 43")

Spools Diameter 42" O.D. | Hub Hole 5.25" I.D.  
 Stacked with cardboard reels and hubs mounted  
 Plastic stretch wrapped on to a skid  
 Coils per skid are dependent on coil width

### Temper

050 = Light Annealed  
 060 = Soft Annealed  
 H58 = Hard

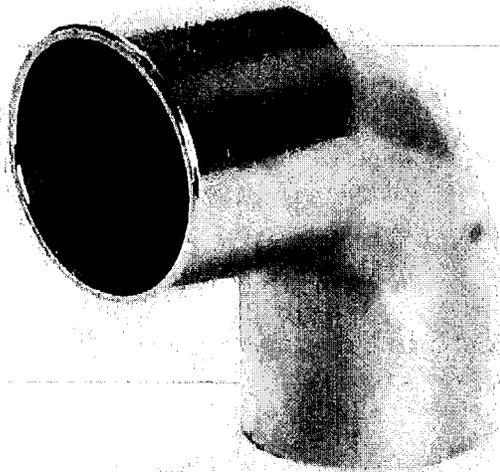


**Streamline®**

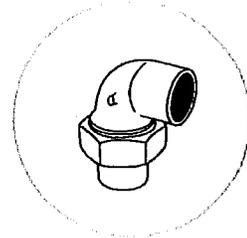
THE BEST FITTINGS IN THE JOINT™

12/82

# COPPER FITTINGS



▶ As originators of the solder-type copper fittings, our commitment to providing the highest quality fittings in the industry holds a special place. Today, our expansive line of Streamline® Copper Fittings are one of the industry's most complete offerings of fittings for copper piping systems from one source. Included are wrought and cast solder-joint pressure fittings, wrought and cast solder-joint DWV fittings and copper flare fittings. Our many years of engineering know-how and experience are reflected in the fine quality and workmanship of each copper fitting we manufacture.

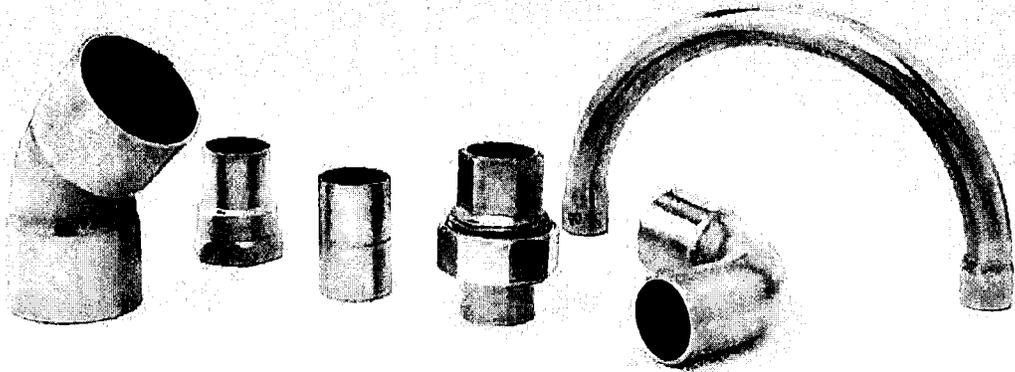


- Copper Pressure Fittings
- Copper DWV Fittings
- Copper Flare Fittings

***Streamline***®

WORR  
WORR

# COPPER SOLDER-JOINT PRESSURE FITTINGS

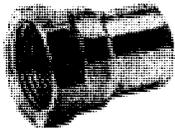


Streamline® Copper Solder-Joint Fittings for supply/pressurized systems have been the leading brand of copper fittings for over 80 years. Available in both wrought copper and cast bronze, our product selection has grown to become the most extensive in the industry. We are the acknowledged experts at engineering and manufacturing precision solder-joint copper fittings. Quality, consistency and reliability have made the Streamline® brand trusted and specified all around the world.



\*\* Applies to Wrot fittings only.

- For use in above-ground potable water supply systems
- Constructed of high-grade copper or bronze materials
- Made to applicable ASME standards B16.15, B16.18, B16.22, B16.24, B16.50, B1.20.1
- Wrot fittings meet NSF 61G



## Adapter • Female

C x FPT  
Wrot Style #: WC-402  
Cast Style #: C-102\*

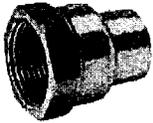


\*\* Applies to Wrot Fittings only

(CONTINUED FROM PREVIOUS COLUMN)

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01207	1/8"	0.0355	100	1500
W 01215	1/4"	0.0446	50	750
W 01225	3/8"	0.0676	50	750
WB01231	1/2"	0.0983	50	500
WB01246	3/4"	0.1389	25	250
WB01263	1"	0.2535	10	100
W 01271	1-1/4"	0.4548	10	100
W 01279	1-1/2"	0.5329	10	100
W 01287	2"	0.565	1	50
W 01296	2-1/2"	1.224	1	25
W 01297	3"	1.833	1	15
A 01926*	4"	3.82	1	10
A 02007*	5"	9	1	5
W 01204	1/8" x 1/2"	0.1012	100	300
W 01205	1/8" x 3/8"	0.0525	100	700
W 01206	1/8" x 1/4"	0.0432	100	900
W 01214	1/4" x 3/8"	0.0626	50	1000
W 01216	1/4" x 1/8"	0.0313	100	1500
W 01223	3/8" x 3/4"	0.158	50	300

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01224	3/8" x 1/2"	0.0959	50	500
W 01226	3/8" x 1/4"	0.0557	50	750
WB01230	1/2" x 3/4"	0.1594	25	250
W 01232	1/2" x 3/8"	0.0708	50	500
W 01233	1/2" x 1/4"	0.0585	50	500
W 01238	5/8" x 3/4"	0.1538	50	500
W 01239	5/8" x 1/2"	0.0892	50	500
W 01245	3/4" x 1"	0.275	25	250
W 01247	3/4" x 1/2"	0.109	25	250
A 04122*	3/4" x 3/8"	0.17	50	200
W 01261	1" x 1-1/4"	0.28	10	100
W 01264	1" x 3/4"	0.216	25	250
W 01265	1" x 1/2"	0.2474	20	200
W 01270	1-1/4" x 1-1/2"	0.5026	10	100
W 01272	1-1/4" x 1"	0.3297	10	100
W 01278	1-1/2" x 2"	0.7374	1	60
W 01280	1-1/2" x 1-1/4"	0.3944	10	100
W 01288	2" x 1-1/2"	0.738	5	50



### Adapter • Fitting

FTG x FPT  
Wrot Style #: WC-405  
Cast Style #: C-105\*



\*\* Applies to Wrot Fittings only.

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01525	3/8"	0.0546	50	750
W 01531	1/2"	0.114	50	450
W 01546	3/4"	0.1721	25	250
W 01563	1"	0.2444	25	250
W 01571	1-1/4"	0.4022	10	100
W 01579	1-1/2"	0.4582	10	100
W 01587	2"	0.6535	1	50
W 01596	2-1/2"	1.2023	1	25
A 01779*	3"	2.33	1	20
W 01514	1/4" x 3/8"	0.058	50	750
W 01524	3/8" x 1/2"	0.0985	50	350
W 01526	3/8" x 1/4"	0.0586	50	750
W 01532	1/2" x 3/8"	0.0688	50	750
A 01480*	1/2" x 1/4"	0.105	50	500
W 01547	3/4" x 1/2"	0.1109	50	500
W 01564	1" x 3/4"	0.1807	25	250



### Adapter • Special Drop

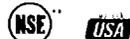
C x FPT  
Cast Style #: C-102S\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 03948*	1/2"	0.1590	50	250



### Adapter • Male

C x MPT  
Wrot Style #: WC-401  
Cast Style #: C-101\*



\*\* Applies to Wrot Fittings only.

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01107	1/8"	0.0158	50	1000
W 01115	1/4"	0.033	50	1200
W 01125	3/8"	0.0558	50	500
WB01131	1/2"	0.064	50	500
WB01146	3/4"	0.133	25	250
WB01163	1"	0.2365	10	100
W 01171	1-1/4"	0.4105	10	100
W 01179	1-1/2"	0.5145	10	100
W 01187	2"	0.573	5	50
W 01196	2-1/2"	1.257	1	20
W 01199	3"	1.704	1	20
W 01150	4"	3.711	1	16
A 01876*	4"	3.538	1	10
A 02005*	5"	8.6	1	5
A 02104*	6"	10.73	1	3
W 01105	1/8" x 3/8"	0.0604	50	750
W 01106	1/8" x 1/4"	0.0325	50	1200
W 01113	1/4" x 1/2"	0.0847	50	500
W 01114	1/4" x 3/8"	0.0571	50	1000

(CONTINUED NEXT COLUMN)

(CONTINUED FROM PREVIOUS COLUMN)

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01116	1/4" x 1/8"	0.0193	50	1000
W 01123	3/8" x 3/4"	0.1709	25	250
W 01124	3/8" x 1/2"	0.0921	50	500
W 01126	3/8" x 1/4"	0.053	50	750
W 01129	1/2" x 1"	0.2968	15	150
WB01130	1/2" x 3/4"	0.1725	25	250
W 01132	1/2" x 3/8"	0.0656	50	500
W 01133	1/2" x 1/4"	0.0554	25	600
W 01138	5/8" x 3/4"	0.141	25	250
W 01139	5/8" x 1/2"	0.1243	25	500
A 02547*	3/4" x 1-1/4"	0.375	10	100
W 01145	3/4" x 1"	0.2925	10	100
W 01147	3/4" x 1/2"	0.1201	25	250
W 01161	1" x 1-1/2"	0.4841	10	100
W 01162	1" x 1-1/4"	0.3856	10	100
W 01164	1" x 3/4"	0.1734	10	100
W 01165	1" x 1/2"	0.182	25	250
W 01170	1-1/4" x 1-1/2"	0.4834	10	100
W 01172	1-1/4" x 1"	0.2384	10	100
W 01173	1-1/4" x 3/4"	0.2137	10	100
W 01178	1-1/2" x 2"	0.776	1	50
W 01180	1-1/2" x 1-1/4"	0.3742	10	100
W 01181	1-1/2" x 1"	0.3838	10	100
W 01188	2" x 1-1/2"	0.6444	1	50
W 01189	2" x 1-1/4"	0.568	1	50
W 01197	2-1/2" x 2"	0.9794	1	20
W 01198	2-1/2" x 1-1/2"	0.9754	1	20



### Adapter • Male (Flush)

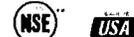
C x MPT  
Wrot Style #: 104-F  
Cast Style #: C-101F\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01136	1/2"	0.0274	5	1700
A 03637*	3/4"	0.0280	50	500



### Adapter • Fitting

FTG x MPT  
Wrot Style #: WC-404  
Cast Style #: C-104\*



\*\* Applies to Wrot Fittings only.

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01425	3/8"	0.0534	50	750
W 01431	1/2"	0.0885	50	500
W 01446	3/4"	0.1538	50	500
W 01463	1"	0.2308	25	250
W 01471	1-1/4"	0.4108	10	100
W 01479	1-1/2"	0.4914	10	100
W 01487	2"	0.7552	1	50
W 01496	2-1/2"	1.9502	1	20
A 01778*	3"	2.214	1	25
W 01432	1/2" x 3/8"	0.0626	50	750
A 01474*	3/4" x 1"	0.27	25	250
W 01447	3/4" x 1/2"	0.1304	25	250
W 01464	1" x 3/4"	0.1855	25	250

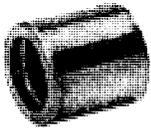
# COPPER FITTINGS | COPPER PRESSURE FITTINGS



**Air Chamber**  
FTG  
Wrot Style #: WA-515



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 06000	1/2" x 6"	0.2229	1	100
W 06001	1/2" x 12"	0.4203	1	50
W 06002	3/4" x 12"	0.4063	1	72



**Bushing • Flush**  
FTG x C  
Wrot Style #: WC-106



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01706	1/4" x 1/8"	0.0079	100	3400
W 01712	3/8" x 1/4"	0.0137	100	3400
W 01714	3/8" x 1/8"	0.022	100	2400
W 01715	1/2" x 3/8"	0.0197	100	1500
W 01717	1/2" x 1/4"	0.0446	100	1500
W 01720	5/8" x 1/2"	0.0314	50	750
W 01721	5/8" x 3/8"	0.0575	50	750
W 01722	5/8" x 1/4"	0.0765	50	750
W 01725	3/4" x 5/8"	0.0419	50	500
W 01726	3/4" x 1/2"	0.0738	50	500
W 01727	3/4" x 3/8"	0.1113	50	500
W 01737	1" x 3/4"	0.1249	50	500
W 01738	1" x 5/8"	0.1779	50	500
W 01739	1" x 1/2"	0.2193	25	250
W 01743	1-1/4" x 1"	0.1614	10	200
W 01745	1-1/4" x 3/4"	0.298	10	200
W 01750	1-1/2" x 1-1/4"	0.219	10	100
W 01751	1-1/2" x 1"	0.4073	10	100
W 01758	2" x 1-1/2"	0.6752	10	100
W 01759	2" x 1-1/4"	0.9419	5	50
W 01767	2-1/2" x 2"	0.9225	1	50



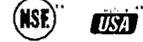
**Bushing • Flush**  
FTG x FPT  
Wrot Style #: WC-417  
(Brass)



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07813	1/2" x 1/4"	0.0218	50	1200
A 07812	1/2" x 1/8"	0.0363	100	1600
A 07814	3/4" x 3/8"	0.0804	50	600
A 07815	1" x 1/2"	0.1658	50	300
A 07816	1-1/4" x 3/4"	0.2488	10	160
A 07817	1-1/2" x 1"	0.3388	10	120
A 07819	2" x 1-1/2"	0.4825	10	60

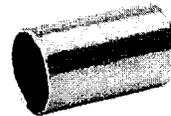


**Cap**  
C  
Wrot Style #: WC-415  
Cast Style #: C-115\*



\*\*Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07002	1/8"	0.0033	50	2000
W 07004	1/4"	0.0056	50	2000
W 07006	3/8"	0.0125	50	1000
W807007	1/2"	0.0188	50	1000
W 07008	5/8"	0.0319	50	1000
W807009	3/4"	0.043	25	1000
W807011	1"	0.0775	10	500
W 07012	1-1/4"	0.1058	25	250
W 07013	1-1/2"	0.175	25	250
W 07014	2"	0.3	1	100
W 07015	2-1/2"	0.475	1	50
W 07016	3"	0.725	1	50
W 07017	3-1/2"	1.15	1	25
W 07018	4"	1.5	1	20
A 02018*	5"	5.484	1	5
A 02115*	6"	9.67	1	5



**Coupling • No Stop**  
C x C  
Wrot Style #: WC-400NS



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01900	1/8"	0.0046	100	3400
W 01901	1/4"	0.008	50	1700
W 01902	3/8"	0.0148	50	1700
W 01903	1/2"	0.0253	100	1000
W 01904	5/8"	0.044	25	375
W 01905	3/4"	0.0628	50	500
W 01906	1"	0.1075	25	250
W 01907	1-1/4"	0.1483	25	250
W 01908	1-1/2"	0.248	10	100
W 01909	2"	0.399	1	75
W 01910	2-1/2"	0.6643	1	50
W 01911	3"	1.0296	1	25
W 01913	4"	2.1467	1	15



**Coupling • Rolled Stop**  
C x C  
Wrot Style #: WC-400



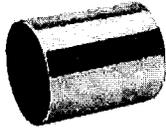
Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01003	1/8"	0.0046	100	3400
W 01009	1/4"	0.008	50	1700
W 01017	3/8"	0.0149	50	1700
W801022	1/2"	0.0253	50	1000
W 01028	5/8"	0.045	50	500
W801034	3/4"	0.0628	25	500
W801047	1"	0.1075	10	250

(CONTINUED NEXT COLUMN)

\*Cast Bronze

(CONTINUED FROM PREVIOUS COLUMN)

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01055	1-1/4"	0.1530	25	250
W 01063	1-1/2"	0.2070	10	100
W 01072	2"	0.3960	1	75
W 01082	2-1/2"	0.6630	1	50
W 01092	3"	1.0290	1	25
W 10100	3-1/2"	1.1786	1	20
W 10107	4"	2.1050	1	15



### Coupling • Staked Stop

C x C  
Wrot Style #: WC-400S



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 10141	1/8"	0.0046	100	3400
W 10143	1/4"	0.0080	50	1700
W 10144	3/8"	0.0150	50	1700
W 10145	1/2"	0.0253	100	1000
W 10157	5/8"	0.0431	25	500
W 10146	3/4"	0.0626	50	500
W 10147	1"	0.1075	25	250
W 10148	1-1/4"	0.1484	25	250
W 10149	1-1/2"	0.2170	10	100
W 10150	2"	0.4090	1	75
W 10151	2-1/2"	0.6640	1	50
W 10152	3"	1.0230	1	25
W 10153	3-1/2"	1.0340	1	20
W 10154	4"	2.1510	1	15
W 10155	5"	3.3373	1	8
W 10156	6"	4.6125	1	3
W 10130	8"	14.130	0	1



### Coupling • Reducing

C x C  
Wrot Style #: WC-400R



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01011	1/4" x 1/8"	0.0072	50	1700
W 01019	3/8" x 1/4"	0.0150	50	1700
W 01021	3/8" x 1/8"	0.0161	50	1200
W 01023	1/2" x 3/8"	0.0291	100	1000
W 01025	1/2" x 1/4"	0.0292	100	1000
W 01027	1/2" x 1/8"	0.0293	100	1000
W 01029	5/8" x 1/2"	0.0454	100	600
W 01030	5/8" x 3/8"	0.0373	100	600
W 01031	5/8" x 1/4"	0.0416	100	600
W 01035	3/4" x 5/8"	0.0614	100	1000
WB01036	3/4" x 1/2"	0.0788	25	500
W 01037	3/4" x 3/8"	0.0576	50	500
W 01038	3/4" x 1/4"	0.0568	50	500
W 01049	1" x 3/4"	0.1332	25	250
W 01050	1" x 5/8"	0.1127	25	250
W 01051	1" x 1/2"	0.1089	25	250
W 01052	1" x 3/8"	0.1092	25	250
W 01056	1-1/4" x 1"	0.1954	10	100

(CONTINUED NEXT COLUMN)

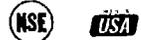
(CONTINUED FROM PREVIOUS COLUMN)

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01058	1-1/4" x 3/4"	0.1703	10	100
W 01060	1-1/4" x 1/2"	0.1660	10	100
W 01064	1-1/2" x 1-1/4"	0.2310	10	100
W 01065	1-1/2" x 1"	0.2310	10	100
W 01067	1-1/2" x 3/4"	0.2385	10	100
W 01069	1-1/2" x 1/2"	0.2240	10	100
W 01073	2" x 1-1/2"	0.4280	1	100
W 01074	2" x 1-1/4"	0.4250	1	100
W 01075	2" x 1"	0.4580	1	100
W 01077	2" x 3/4"	0.4014	1	100
W 01079	2" x 1/2"	0.4060	1	75
W 01083	2-1/2" x 2"	0.6490	1	50
W 01084	2-1/2" x 1-1/2"	0.7463	1	50
W 01085	2-1/2" x 1-1/4"	0.6983	1	50
W 01086	2-1/2" x 1"	0.7079	1	50
W 01093	3" x 2-1/2"	1.0647	1	25
W 01094	3" x 2"	1.0953	1	25
W 01095	3" x 1-1/2"	1.0103	1	25
W 10101	3-1/2" x 3"	1.2194	1	25
W 10108	4" x 3-1/2"	1.8692	1	20
W 10109	4" x 3"	0.7604	1	20
W 10110	4" x 2-1/2"	1.8789	1	15
W 10111	4" x 2"	1.9666	1	20
W 10116	5" x 4"	3.3100	1	1
W 10123	6" x 4"	4.8200	1	1
W 10124	6" x 3"	4.8500	1	1



### Coupling • Cross Over

C x C  
Wrot Style #: WC-412



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 02535	1/2"	0.1188	5	100
A 02583	3/4"	0.2559	5	50



### Coupling • Drain

C x C  
Cast Style #: CD-100\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11547*	1/2"	0.0770	10	200
A 11548*	3/4"	0.1370	25	250
A 11549*	1"	0.2190	10	100

\*Cast Bronze

COPPER FITTINGS • SOLDER-JOINED COPPER FITTINGS • PRESSURE

# COPPER FITTINGS | COPPER PRESSURE FITTINGS



## Coupling • Eccentric

C x C  
Cast Style #: CE-100\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 04340*	3/4" x 1/2"	0.1090	50	250
A 04341*	1" x 3/4"	0.1750	25	250
A 04342*	1-1/4" x 1"	0.2500	10	100
A 04343*	1-1/4" x 3/4"	0.2420	10	100



## 45° Elbow

FTG x FTG  
Wrot Style #: WE-507



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 03621	3/8"	0.0212	50	1700
W 03626	1/2"	0.0366	50	750
W 03634	3/4"	0.0958	25	250
W 03644	1"	0.1775	10	100



## Coupling • High Ear

C  
Cast Style #: C-100HE\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 03067*	1/2"	0.0620	100	1000
A 03068*	3/4"	0.0900	25	500
A 03071*	1"	0.1310	25	250

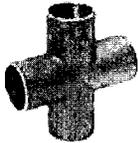


## 45° Elbow • Street

FTG x C  
Wrot Style #: WE-505



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 03312	1/4"	0.0106	100	3400
W 03321	3/8"	0.0268	100	1500
WB03326	1/2"	0.0348	50	500
W 03330	5/8"	0.0570	50	500
WB03334	3/4"	0.0912	25	250
W 03344	1"	0.1520	25	250
W 03350	1-1/4"	0.2440	10	100
W 03355	1-1/2"	0.3270	10	100
W 03359	2"	0.6050	5	50
W 03363	2-1/2"	1.0485	2	20
W 03368	3"	1.5163	2	10
W 03373	4"	3.1146	1	5



## Cross

C x C x C x C  
Cast Style #: T-312\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 02532*	1/2"	0.1400	25	250
A 02579*	3/4"	0.2980	10	100
A 02612*	1"	0.5400	5	100
A 02649*	1-1/4"	0.7420	5	50
A 02672*	1-1/2"	1.0470	1	50
A 02707*	2"	2.0000	1	25
A 02734*	2-1/2"	2.9100	1	15



## 90° Elbow • Short Radius

C x C  
Wrot Style #: WE-500  
Cast Style #: E-200\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 02003	1/8"	0.0078	50	1700
W 02009	1/4"	0.0173	50	1700
W 01617	3/8"	0.0279	50	750
WB01622	1/2"	0.0410	50	500
W 02028	5/8"	0.0840	50	500
WB01634	3/4"	0.0943	25	250
WB01647	1"	0.1820	10	100
W 02084	1-1/4"	0.3030	10	100
W 02085	1-1/2"	0.4230	10	100
W 02086	2"	0.7600	10	50
W 02087	2-1/2"	1.1920	5	25
W 02088	3"	1.8820	5	25
W 02089	3-1/2"	2.7699	2	10
W 02090	4"	3.9976	2	10
W 02096	5"	8.5860	1	1
W 02097	6"	13.7262	1	1
W 02099	8"	27.0000	1	1
W 02011	1/4" x 1/8"	0.0165	50	750
W 02019	3/8" x 1/4"	0.0267	50	750



## 45° Elbow

C x C  
Wrot Style #: WE-504



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 03005	1/8"	0.0066	50	1700
W 03012	1/4"	0.0125	50	1700
W 03021	3/8"	0.0257	25	850
W 03026	1/2"	0.0360	50	500
W 03030	5/8"	0.0590	50	500
WB03034	3/4"	0.0900	25	250
WB03044	1"	0.1560	10	200
W 03050	1-1/4"	0.2500	10	100
W 03055	1-1/2"	0.3570	10	100
W 03059	2"	0.6020	10	50
W 03063	2-1/2"	0.9950	5	25
W 03067	3"	1.5320	2	20
W 03070	3-1/2"	2.8137	2	10
W 03073	4"	3.1418	1	5
W 03074	5"	6.5640	1	1
W 03075	6"	10.6360	1	1

\*Cast Bronze

(CONTINUED NEXT COLUMN)

# Streamline®

## COPPER PRESSURE FITTINGS

(CONTINUED FROM PREVIOUS COLUMN)

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 02023	1/2" x 3/8"	0.0451	50	500
W 02025	1/2" x 1/4"	0.0456	50	500
W 02029	5/8" x 1/2"	0.0610	50	500
W 02030	5/8" x 3/8"	0.0667	50	500
W 02035	3/4" x 5/8"	0.1064	50	500
W 02036	3/4" x 1/2"	0.1050	50	500
W 02037	3/4" x 3/8"	0.1056	50	500
W 02049	1" x 3/4"	0.1710	25	250
W 02050	1" x 5/8"	0.1640	25	250
W 02051	1" x 1/2"	0.1799	25	250
W 02052	1" x 3/8"	0.1990	25	150
W 02056	1-1/4" x 1"	0.3163	20	200
A 02638*	1-1/4" x 3/4"	0.3380	10	100
A 03826*	1-1/4" x 1/2"	0.2800	10	100
W 02077	1-1/2" x 1-1/4"	0.3300	5	100
A 02663*	1-1/2" x 1"	0.5510	10	100
A 03905*	1-1/2" x 3/4"	0.4250	10	100
W 02078	2" x 1-1/2"	0.6000	5	50
A 02691*	2" x 1-1/4"	0.9130	5	50
A 02724*	2" x 1"	0.7800	5	50
A 02725*	2-1/2" x 2"	2.1620	1	10
A 02777*	3" x 2-1/2"	2.7620	1	20
A 02778*	3" x 2"	2.6800	1	10
A 01932*	4" x 3"	5.1800	1	5



### 90° Elbow • Long Radius

C x C  
Wrot Style #: WE-500L



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 02715	1/8"	0.0101	50	1700
W 02716	1/4"	0.0240	50	1700
W 02717	3/8"	0.0420	50	500
W 02722	1/2"	0.0590	50	500
W 02728	5/8"	0.0930	50	500
W 02734	3/4"	0.1293	25	250
W 02747	1"	0.2690	10	100
W 02055	1-1/4"	0.4210	10	100
W 02063	1-1/2"	0.6040	5	50
W 02072	2"	1.2280	5	25
W 02082	2-1/2"	2.0540	5	25
W 02092	3"	3.1250	2	10
W 02093	3-1/2"	5.5310	1	5
W 02095	4"	7.9780	0	1
W 02711	1/4" x 1/8"	0.0110	50	3000
W 02719	3/8" x 1/4"	0.0260	50	1000
W 02723	1/2" x 3/8"	0.0400	50	500
W 02725	1/2" x 1/4"	0.0300	50	1000
W 02735	3/4" x 5/8"	0.1200	25	250
W 02736	3/4" x 1/2"	0.0900	50	400
W 02749	1" x 3/4"	0.1700	10	200
W 02756	1-1/4" x 1"	0.3100	10	100
W 02064	1-1/2" x 1-1/4"	0.4351	5	50
W 02065	1-1/2" x 1"	0.5166	5	50
W 02067	1-1/2" x 3/4"	0.5127	5	50
W 02073	2" x 1-1/2"	0.9844	2	20
W 02074	2" x 1-1/4"	0.9437	2	20
W 02075	2" x 1"	0.9654	2	20
W 02083	2-1/2" x 2"	1.5277	2	20



### 90° Elbow Short Radius • Street

FTG x C  
Wrot Style #: WE-503



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 02305	1/8"	0.0082	50	1700
W 02312	1/4"	0.0174	50	1700
W 02321	3/8"	0.0300	50	750
WB01652	1/2"	0.0400	50	500
W 02330	5/8"	0.0900	25	250
WB01654	3/4"	0.0954	25	250
WB02344	1"	0.2180	10	100
W 02384	1-1/4"	0.2940	25	125
W 02385	1-1/2"	0.4410	10	100
W 02386	2"	0.7692	10	50
W 02387	2-1/2"	1.2310	5	25
W 02388	3"	1.9440	2	20
W 02389	3-1/2"	2.7809	1	10
W 02390	4"	4.0338	2	10



### 90° Elbow Long Radius • Street

FTG x C  
Wrot Style #: WE-503L



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 02809	1/4"	0.0236	50	1700
W 02817	3/8"	0.0401	50	500
W 02822	1/2"	0.0590	50	500
W 02828	5/8"	0.0943	25	250
W 02834	3/4"	0.1283	25	250
W 02847	1"	0.2585	10	100
W 02350	1-1/4"	0.4225	10	100
W 02355	1-1/2"	0.6020	5	50
W 02359	2"	1.2327	5	25
W 02363	2-1/2"	2.0800	5	25
W 02368	3"	3.1200	2	10
W 02393	3-1/2"	5.5179	1	5
W 02395	4"	8.0678	0	1



### 90° Elbow • Short Radius

FTG x FTG  
Wrot Style #: WE-506



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 02812	1/4"	0.0153	50	1700
W 02621	3/8"	0.0340	50	750
W 02626	1/2"	0.0493	50	500
W 02634	3/4"	0.1093	25	250
W 02644	1"	0.2178	10	100
W 02884	1-1/4"	0.3064	10	100
W 02685	1-1/2"	0.4251	5	50
W 02686	2"	0.7860	1	10
W 02687	2-1/2"	1.2530	1	10
W 02688	3"	2.0831	1	10
W 02689	3-1/2"	2.6250	1	10
W 02690	4"	3.8750	1	5

\*Cast Bronze

# COPPER FITTINGS | COPPER PRESSURE FITTINGS



## 90° Elbow • Long Radius

FTG x FTG  
Wrot Style #: WE-506L



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 02650	1-1/4"	0.4364	5	50
W 02655	1-1/2"	0.6282	5	50
W 02659	2"	1.2321	1	10



## 90° Elbow • Flanged Sink

C x FPT  
Cast Style #: E-215\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 03706*	1/2"	0.1990	25	250



## 90° Elbow • Drop Ear

C x C  
Cast Style #: E-210\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 02508*	1/2"	0.1170	50	500
A 02556*	3/4"	0.2280	10	200



## 90° Elbow

C x FPT  
Cast Style #: E-202\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 01397*	3/8"	0.0900	50	500
A 01507*	1/2"	0.2200	25	150
A 01532*	3/4"	0.1890	25	150
A 01559*	1"	0.4380	10	100
A 01594*	1-1/4"	0.7070	5	50
A 01632*	1-1/2"	0.9120	5	50
A 01680*	2"	1.4580	1	25



## 90° Elbow • High Ear

C x C  
Cast Style #: E-210HE\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 03040*	1/2"	0.1260	25	250
A 03070*	3/4"	0.2130	10	100



## 90° Elbow • Reducing

C x FPT  
Cast Style #: E-202\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 01379*	3/8" x 1/2"	0.1300	50	500
A 02512*	1/2" x 3/4"	0.1830	25	250
A 01520*	1/2" x 3/8"	0.0850	25	500
A 02559*	3/4" x 1"	0.3580	10	100
A 02560*	3/4" x 1/2"	0.1980	25	250
A 02609*	1" x 3/4"	0.3300	10	100



## 90° Elbow • Union

C x C  
Cast Style #: E-207\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11431*	3/8"	0.1670	25	250
A 11432*	1/2"	0.2430	25	250
A 11433*	3/4"	0.3940	10	100
A 11434*	1"	0.6360	5	50
A 11435*	1-1/4"	1.0680	5	50



## 90° Elbow • Drop Ear

C x FPT  
Cast Style #: E-211\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 01367*	3/8"	0.1200	50	500
A 01508*	1/2"	0.1510	25	250
A 02581*	3/4"	0.2400	25	100
A 02849*	1"	0.4850	10	100
A 01361*	3/8" x 1/2"	0.1800	50	500
A 02513*	1/2" x 3/8"	0.1650	50	250
A 02850*	3/4" x 1/2"	0.2400	25	250



## 90° Elbow • w/Drain

C x C  
Cast Style #: E-200D\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11555*	1/2"	0.1000	50	500
A 11556*	3/4"	0.1970	25	250
A 11557*	1"	0.3070	10	100

\*Cast Bronze

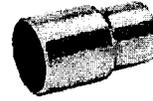
# Streamline®

## COPPER PRESSURE FITTINGS



**90° Elbow • High Ear**  
C x FPT  
Cast Style #: E-211HE\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 03038*	1/2"	0.1970	25	250
A 03048*	3/4"	0.2950	25	150



**90° Fitting Reducer**  
FTG x C  
Wrot Style #: WC-403



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 01306	1/4" x 1/8"	0.0143	50	1700
W 01312	3/8" x 1/4"	0.0152	50	1700
W 01314	3/8" x 1/8"	0.0127	50	1700
W 01315	1/2" x 3/8"	0.0272	50	750
W 01317	1/2" x 1/4"	0.0246	50	1700
W 01320	5/8" x 1/2"	0.0419	100	1000
W 01321	5/8" x 3/8"	0.0401	100	900
W 01322	5/8" x 1/4"	0.0356	100	900
W 01325	3/4" x 5/8"	0.0574	50	500
W 01326	3/4" x 1/2"	0.0641	50	500
W 01327	3/4" x 3/8"	0.0564	50	500
W 01328	3/4" x 1/4"	0.0490	50	1000
W 01337	1" x 3/4"	0.1131	25	250
W 01338	1" x 5/8"	0.1028	25	250
W 01339	1" x 1/2"	0.1002	25	250
W 01340	1" x 3/8"	0.0986	20	200
W 01343	1-1/4" x 1"	0.1744	10	100
W 01345	1-1/4" x 3/4"	0.1670	10	100
W 01347	1-1/4" x 1/2"	0.1563	10	100
W 01350	1-1/2" x 1-1/4"	0.2330	10	100
W 01351	1-1/2" x 1"	0.2370	10	100
W 01353	1-1/2" x 3/4"	0.2284	10	100
W 01355	1-1/2" x 1/2"	0.2190	10	100
W 01358	2" x 1-1/2"	0.4360	1	100
W 01359	2" x 1-1/4"	0.4320	1	100
W 01360	2" x 1"	0.4460	1	100
W 01362	2" x 3/4"	0.4268	1	100
W 01364	2" x 1/2"	0.4155	1	100
W 01367	2-1/2" x 2"	0.6180	1	50
W 01368	2-1/2" x 1-1/2"	0.5714	1	50
W 01369	2-1/2" x 1-1/4"	0.6214	1	50
W 01370	2-1/2" x 1"	0.6300	1	50
W 01376	3" x 2-1/2"	0.9997	1	25
W 01377	3" x 2"	0.8942	1	25
W 01378	3" x 1-1/2"	0.9159	1	50
W 01379	3" x 1-1/4"	1.0146	1	50
W 01381	3-1/2" x 3"	1.2756	1	20
W 01382	3-1/2" x 2-1/2"	1.3721	1	20
W 01383	3-1/2" x 2"	1.4670	1	20
W 01386	4" x 3-1/2"	1.7416	1	20
W 01387	4" x 3"	1.7657	1	15
W 01388	4" x 2-1/2"	1.8293	1	15
W 01389	4" x 2"	1.8577	1	15
W 01390	5" x 4"	3.2400	1	1
W 01391	5" x 3"	2.7600	1	1
W 01393	5" x 2"	2.6600	1	1
W 01394	6" x 5"	4.8000	1	1
W 01395	6" x 4"	4.3200	1	1
W 01396	6" x 3"	4.4900	1	1



**90° Elbow • w/Union**  
C x FPT  
Cast Style #: E-209\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11452*	1/2"	0.3090	10	100
A 11453*	3/4"	0.4860	10	100
A 11454*	1"	0.7890	5	50



**90° Elbow • w/Union**  
C x MPT  
Cast Style #: E-208\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11441*	3/8"	0.2060	10	200
A 11442*	1/2"	0.2990	10	100
A 11443*	3/4"	0.4870	10	100
A 11444*	1"	0.7250	5	50
A 11445*	1-1/4"	1.1580	5	50



**90° Elbow**  
C x MPT  
Cast Style #: E-201\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 01396*	3/8"	0.0800	50	500
A 01506*	1/2"	0.1140	50	250
A 01531*	3/4"	0.2270	25	125
A 01558*	1"	0.3900	10	100
A 01593*	1-1/4"	0.5840	10	50
A 01631*	1-1/2"	0.7690	5	50
A 01679*	2"	1.3800	1	25
A 02509*	1/2" x 3/4"	0.2010	25	250
A 02510*	1/2" x 3/8"	0.1000	25	500
A 02557*	3/4" x 1"	0.3300	10	100
A 02558*	3/4" x 1/2"	0.1800	10	200

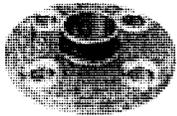
\*Cast Bronze

# COPPER FITTINGS | COPPER PRESSURE FITTINGS



**Flange (Companion) • Class 125**  
C x Flange  
Cast Style #: F-940\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 02881*	1/2"	0.4870	1	50
A 02882*	3/4"	0.7110	1	50
A 02883*	1"	0.9890	1	12
A 02884*	1-1/4"	1.1420	1	12
A 02885*	1-1/2"	1.6410	1	10
A 02886*	2"	2.7420	1	6
A 02887*	2-1/2"	3.7940	1	6
A 02888*	3"	4.9500	1	6
A 02889*	4"	6.8980	1	2
A 02890*	5"	9.0390	1	2
A 02891*	6"	13.1800	1	2
A 04152*	8"	25.9000	1	1



**Flange (Companion) • Class 150**  
C x Flange  
Cast Style #: F-900\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 04114*	3/4"	1.1470	1	40
A 02933*	1"	1.5930	1	12
A 03806*	1-1/4"	2.0370	1	12
A 03907*	1-1/2"	2.4330	1	12
A 02980*	2"	3.6700	1	8
A 02746*	2-1/2"	5.8290	1	6
A 02802*	3"	7.4470	1	6
A 01940*	4"	10.3500	1	2
A 02052*	5"	15.6880	1	2
A 02149*	6"	17.9140	1	2



**Plug • Fitting**  
FTG  
Wrot Style #: WC-416  
(Brass)



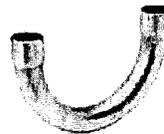
Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 01402	1/8"	0.0073	50	500
A 01392	3/8"	0.0200	50	2000
A 01504	1/2"	0.0305	50	1200
A 01529	3/4"	0.0700	50	600
A 01556	1"	0.1208	25	300
A 01590	1-1/4"	0.1950	180	180
A 01628	1-1/2"	0.2822	10	120



**P-Trap • Pressure**  
C x C  
Wrot Style #: WE-554P



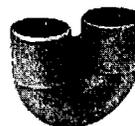
Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 60999	1/2"	0.3794	10	50
W 61008	5/8"	0.5100	10	50
W 61000	3/4"	0.6260	5	25
W 61001	1"	0.8720	3	15
W 61002	1-1/4"	1.1639	4	20
W 61003	1-1/2"	2.2755	1	4
W 61009	2"	3.8732	1	3



**Return Bend**  
C x C  
Wrot Style #: WE-512



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 06025	1/4" x 4-1/2"	0.0958	25	150
W 06020	1/4" x 1-1/2"	0.0164	25	850
W 06048	3/8" x 6"	0.2078	100	100
W 06045	3/8" x 4"	0.1424	200	200
W 06041	3/8" x 3"	0.1133	25	250
W 06036	3/8" x 2"	0.0600	50	300
W 06035	3/8" x 1-29/32"	0.0752	50	300
W 06032	3/8" x 1-1/2"	0.0623	50	500
W 06069	1/2" x 6"	0.2990	5	30
W 06062	1/2" x 3-3/8"	0.1800	10	100
W 06060	1/2" x 3"	0.1632	25	150
W 06058	1/2" x 2-1/2"	0.1436	25	250
W 06056	1/2" x 2-1/4"	0.1272	25	250
W 06053	1/2" x 1-7/8"	0.1100	25	250
W 06051	1/2" x 1-9/16"	0.0966	25	250
W 06084	5/8" x 4"	0.2462	120	120
W 06081	5/8" x 3-3/8"	0.2352	10	90
W 06077	5/8" x 2-1/2"	0.1717	10	100
W 06074	5/8" x 2-1/8"	0.1640	10	100
W 06073	5/8" x 2"	0.1515	10	100
W 06099	3/4" x 12"	0.8765	15	15
W 06095	3/4" x 3-3/8"	0.2899	10	100
W 06092	3/4" x 2-1/2"	0.2301	10	100
W 60111	1" x 3-1/4"	0.4890	5	50
W 60110	1" x 3"	0.4700	5	50
W 60121	1-1/4" x 3-3/4"	0.6467	5	50
W 60131	1-1/2" x 4-1/2"	0.9955	1	25
W 60140	2" x 5-1/2"	1.9200	1	15



**Return Bend • Closed**  
C x C  
Cast Style #: E-212\*

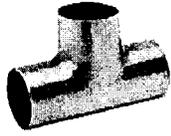
Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 04106*	3/4" x 1-5/16"	0.2910	10	100

\*Cast Bronze

All diameters are nominal.

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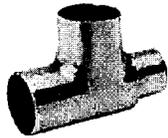
## COPPER PRESSURE FITTINGS



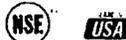
**Tee**  
C x C x C  
Wrot Style #: WT-600



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 40306	1/8"	0.0095	100	2400
W 04000	1/4"	0.0220	50	1700
W 04001	3/8"	0.0429	50	500
WB04006	1/2"	0.0655	50	500
W 04017	5/8"	0.1161	25	250
WB04031	3/4"	0.1550	25	200
WB04048	1"	0.2932	10	100
W 04068	1-1/4"	0.4220	5	50
W 04084	1-1/2"	0.5974	5	50
W 40102	2"	1.1410	5	25
W 40123	2 1/2"	1.7240	2	20
W 40152	3"	2.7700	2	10
W 40190	3-1/2"	5.6586	1	5
W 40200	4"	5.9870	1	5
W 40400	5"	12.3840	1	1
W 40500	6"	20.8500	0	1
W 40525	8"	36.8100	0	1



**Tee • Reducing**  
C x C x C  
Wrot Style #: WT-600  
Cast Style #: T-300\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 40368	1/8" x 1/8" x 1/4"	0.0273	50	750
W 40416	1/4" x 1/4" x 1/2"	0.0843	50	500
W 04005	1/4" x 1/4" x 3/8"	0.0378	50	500
W 40324	1/4" x 1/4" x 1/8"	0.0194	50	1700
W 40330	1/4" x 1/8" x 1/4"	0.0227	50	500
W 40332	1/4" x 1/8" x 1/8"	0.0223	50	1700
W 04015	3/8" x 3/8" x 1/2"	0.0944	50	500
W 04002	3/8" x 3/8" x 1/4"	0.0371	50	500
W 40350	3/8" x 3/8" x 1/8"	0.0422	50	500
W 04003	3/8" x 1/4" x 3/8"	0.0477	50	500
W 04004	3/8" x 1/4" x 1/4"	0.0426	50	500
W 40358	3/8" x 1/4" x 1/8"	0.0413	50	750
W 40363	3/8" x 1/8" x 3/8"	0.0522	50	750
W 40364	3/8" x 1/8" x 1/4"	0.0419	50	750
W 40366	3/8" x 1/8" x 1/8"	0.0462	50	450
W 04067	1/2" x 1/2" x 1"	0.3545	10	100
W 04047	1/2" x 1/2" x 3/4"	0.1060	25	250
W 04029	1/2" x 1/2" x 5/8"	0.0982	25	250
W 04007	1/2" x 1/2" x 3/8"	0.0779	50	500
W 04008	1/2" x 1/2" x 1/4"	0.0618	50	500
W 04014	1/2" x 1/2" x 1/8"	0.0833	50	500
W 04009	1/2" x 3/8" x 1/2"	0.0863	50	500
W 04010	1/2" x 3/8" x 3/8"	0.0787	50	500
W 04011	1/2" x 3/8" x 1/4"	0.0848	50	500
W 04012	1/2" x 1/4" x 1/2"	0.0894	50	500
W 40367	1/2" x 1/4" x 3/8"	0.0819	50	500
W 04013	1/2" x 1/4" x 1/4"	0.0882	50	500
W 04046	5/8" x 5/8" x 3/4"	0.1473	25	250
W 04018	5/8" x 5/8" x 1/2"	0.1014	25	250

(CONTINUED NEXT COLUMN)

(CONTINUED FROM PREVIOUS COLUMN)

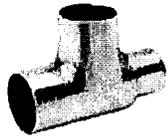
Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 04019	5/8" x 5/8" x 3/8"	0.1003	25	250
W 04020	5/8" x 5/8" x 1/4"	0.1036	25	250
W 04021	5/8" x 1/2" x 5/8"	0.1271	25	225
W 04022	5/8" x 1/2" x 1/2"	0.1085	25	250
W 04023	5/8" x 1/2" x 3/8"	0.1071	25	225
W 04025	5/8" x 3/8" x 5/8"	0.1501	25	250
W 04026	5/8" x 3/8" x 1/2"	0.1440	25	225
W 04027	5/8" x 3/8" x 3/8"	0.1069	25	250
W 04065	3/4" x 3/4" x 1"	0.2200	10	100
W 04032	3/4" x 3/4" x 5/8"	0.1678	25	250
WB04033	3/4" x 3/4" x 1/2"	0.1220	25	250
W 04034	3/4" x 3/4" x 3/8"	0.1114	25	250
W 04035	3/4" x 3/4" x 1/4"	0.1080	25	250
W 04036	3/4" x 5/8" x 3/4"	0.1870	25	250
W 04037	3/4" x 5/8" x 5/8"	0.1659	25	250
WB04041	3/4" x 1/2" x 3/4"	0.1550	25	250
W 04042	3/4" x 1/2" x 5/8"	0.1707	25	150
WB04043	3/4" x 1/2" x 1/2"	0.1300	25	250
W 04044	3/4" x 1/2" x 3/8"	0.1210	25	250
W 04045	3/4" x 1/2" x 1/4"	0.1503	25	225
W 40230	3/4" x 3/8" x 3/4"	0.1900	25	250
W 40231	3/4" x 3/8" x 1/2"	0.1650	25	250
W 40232	3/4" x 3/8" x 3/8"	0.1210	25	250
W 40101	1" x 1" x 1-1/2"	0.4707	5	50
W 04082	1" x 1" x 1-1/4"	0.3140	5	50
WB04049	1" x 1" x 3/4"	0.2415	10	100
W 04050	1" x 1" x 5/8"	0.2706	10	100
WB04051	1" x 1" x 1/2"	0.2055	10	100
W 04052	1" x 1" x 3/8"	0.1877	10	100
W 04055	1" x 3/4" x 1"	0.2970	10	100
W 04056	1" x 3/4" x 3/4"	0.2532	10	100
W 04057	1" x 3/4" x 5/8"	0.4317	10	90
W 04058	1" x 3/4" x 1/2"	0.2324	10	100
W 04059	1" x 3/4" x 3/8"	0.2090	10	100
W 40233	1" x 5/8" x 1"	0.3255	10	100
W 40234	1" x 5/8" x 3/4"	0.3010	10	90
W 40235	1" x 5/8" x 5/8"	0.3091	10	100
W 40236	1" x 5/8" x 1/2"	0.3455	10	90
W 04061	1" x 1/2" x 1"	0.2982	10	100
W 04062	1" x 1/2" x 3/4"	0.2760	10	100
W 04063	1" x 1/2" x 1/2"	0.2146	10	100
W 40122	1-1/4" x 1-1/4" x 2"	0.8940	2	20
W 40100	1-1/4" x 1-1/4" x 1-1/2"	0.4873	5	50
W 04069	1-1/4" x 1-1/4" x 1"	0.4063	5	50
W 04070	1-1/4" x 1-1/4" x 3/4"	0.3540	5	50
W 04072	1-1/4" x 1-1/4" x 3/8"	0.2863	5	50
W 04073	1-1/4" x 1" x 1-1/4"	0.4779	5	50
W 04074	1-1/4" x 1" x 1"	0.4580	5	50
W 04075	1-1/4" x 1" x 3/4"	0.3805	5	50
W 04076	1-1/4" x 1" x 1/2"	0.3560	5	50
W 04078	1-1/4" x 3/4" x 1-1/4"	0.4540	5	50
W 04079	1-1/4" x 3/4" x 1"	0.4553	5	50
W 04080	1-1/4" x 3/4" x 3/4"	0.3687	5	50
W 04081	1-1/4" x 3/4" x 1/2"	0.3380	5	50
W 04083	1-1/4" x 1/2" x 1-1/4"	0.5739	5	50
A 01610*	1-1/4" x 1/2" x 1"	0.4830	5	50
W 40121	1-1/2" x 1-1/2" x 2"	1.2090	2	20
W 04085	1-1/2" x 1-1/2" x 1-1/4"	0.5670	5	50
W 04086	1-1/2" x 1-1/2" x 1"	0.5200	5	50
W 04087	1-1/2" x 1-1/2" x 3/4"	0.4717	5	50
W 04088	1-1/2" x 1-1/2" x 1/2"	0.4210	5	50
W 04089	1-1/2" x 1-1/2" x 3/8"	0.4140	5	50
W 04090	1-1/2" x 1-1/4" x 1-1/2"	0.6790	5	50

(CONTINUED NEXT PAGE)

\*Cast Bronze

All diameters are nominal.

# COPPER FITTINGS | COPPER PRESSURE FITTINGS



## Tee • Reducing (CONTINUED)

C x C x C  
Wrot Style #: WT-600  
Cast Style #: T-300\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 04091	1-1/2" x 1-1/4" x 1-1/4"	0.6880	5	50
W 04092	1-1/2" x 1-1/4" x 1"	0.5698	5	50
W 04093	1-1/2" x 1-1/4" x 3/4"	0.5660	5	50
W 04094	1-1/2" x 1-1/4" x 1/2"	0.4520	5	50
W 04095	1-1/2" x 1" x 1-1/2"	0.6760	5	50
W 04096	1-1/2" x 1" x 1-1/4"	0.6482	5	50
W 04097	1-1/2" x 1" x 1"	0.6114	5	50
W 04098	1-1/2" x 1" x 3/4"	0.5570	5	50
W 40237	1-1/2" x 1" x 1/2"	0.4540	5	30
W 04099	1-1/2" x 3/4" x 1-1/2"	0.6661	5	50
W 40239	1-1/2" x 3/4" x 1-1/4"	0.7522	5	50
W 40240	1-1/2" x 3/4" x 1"	0.5232	5	50
W 40238	1-1/2" x 3/4" x 3/4"	0.5540	5	50
W 40243	1-1/2" x 3/4" x 1/2"	0.4660	5	50
W 40244	1-1/2" x 3/4" x 1-1/2"	0.6630	5	50
W 40153	2" x 2" x 3"	2.5537	1	10
W 40144	2" x 2" x 2-1/2"	1.4586	1	10
W 40103	2" x 2" x 1-1/2"	0.9930	5	50
W 40104	2" x 2" x 1-1/4"	0.8510	5	50
W 40105	2" x 2" x 1"	0.8810	5	50
W 40106	2" x 2" x 3/4"	0.8317	5	50
W 40107	2" x 2" x 1/2"	0.6677	5	50
W 40109	2" x 1-1/2" x 2"	1.3140	2	20
W 40110	2" x 1-1/2" x 1-1/2"	1.1470	2	20
W 40111	2" x 1-1/2" x 1-1/4"	0.8647	2	20
W 40112	2" x 1-1/2" x 1"	1.0590	2	20
W 40113	2" x 1-1/2" x 3/4"	0.7535	2	20
W 40114	2" x 1-1/2" x 1/2"	0.7690	5	50
W 40115	2" x 1-1/4" x 2"	1.2956	2	20
W 40116	2" x 1-1/4" x 1-1/2"	1.1375	2	20
W 40117	2" x 1-1/4" x 1-1/4"	1.0900	2	20
W 40118	2" x 1-1/4" x 1"	0.9460	2	20
W 40119	2" x 1-1/4" x 3/4"	0.7606	5	50
W 40120	2" x 1-1/4" x 1/2"	0.7820	5	20
W 40245	2" x 1" x 2"	1.6369	5	25
W 40247	2" x 1" x 1"	1.0570	5	50
W 40248	2" x 3/4" x 2"	1.7076	5	25
W 40249	2" x 1/2" x 2"	1.6561	5	25
A 01812*	2-1/2" x 2-1/2" x 3"	2.9810	1	15
W 40124	2-1/2" x 2-1/2" x 2"	1.5930	2	20
W 40125	2-1/2" x 2-1/2" x 1-1/2"	1.4930	2	20
W 40126	2-1/2" x 2-1/2" x 1-1/4"	1.8741	2	20
W 40127	2-1/2" x 2-1/2" x 1"	1.8320	2	20
W 40128	2-1/2" x 2-1/2" x 3/4"	1.8270	1	10
W 40129	2-1/2" x 2-1/2" x 1/2"	2.0475	1	10
W 40130	2-1/2" x 2" x 2-1/2"	2.3007	4	20
W 40131	2-1/2" x 2" x 2"	1.8369	2	20
W 40132	2-1/2" x 2" x 1-1/2"	2.0884	4	20
W 40133	2-1/2" x 2" x 1-1/4"	2.1160	4	20
W 40134	2-1/2" x 2" x 1"	2.1000	4	20
W 40135	2-1/2" x 2" x 3/4"	2.0591	4	20
W 40136	2-1/2" x 2" x 1/2"	2.1980	4	20
W 40137	2-1/2" x 1-1/2" x 2-1/2"	2.3185	4	20
W 40138	2-1/2" x 1-1/2" x 2"	1.8438	4	20
W 40139	2-1/2" x 1-1/2" x 1-1/2"	2.1127	4	20
W 40140	2-1/2" x 1-1/2" x 1-1/4"	2.1682	4	20
W 40141	2-1/2" x 1-1/2" x 1"	1.8333	4	20
W 40142	2-1/2" x 1-1/2" x 3/4"	2.3573	4	20
W 40143	2-1/2" x 1-1/2" x 1/2"	2.3573	4	20

(CONTINUED FROM PREVIOUS COLUMN)

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 40220	2-1/2" x 1-1/4" x 2-1/2"	2.3457	4	20
W 40250	2-1/2" x 1-1/4" x 2"	1.8214	4	20
W 40251	2-1/2" x 1-1/4" x 1-1/2"	2.4695	4	20
W 40252	2-1/2" x 1-1/4" x 1-1/4"	1.9815	4	20
W 40253	2-1/2" x 1-1/4" x 1"	2.4695	4	20
W 40254	2-1/2" x 1-1/4" x 3/4"	2.1793	4	20
W 40255	2-1/2" x 1-1/4" x 1/2"	2.4695	4	20
W 40221	2-1/2" x 1" x 2-1/2"	2.3949	4	20
W 40256	2-1/2" x 1" x 2"	1.9737	4	20
W 40257	2-1/2" x 1" x 1-1/2"	2.1539	4	20
W 40258	2-1/2" x 1" x 1-1/4"	2.0444	4	20
W 40259	2-1/2" x 1" x 1"	2.2655	4	20
W 40222	2-1/2" x 3/4" x 2-1/2"	2.4105	4	20
A 01902*	3" x 3" x 4"	6.9600	1	5
W 40151	3" x 3" x 2-1/2"	2.4451	2	10
W 40150	3" x 3" x 2"	2.2991	2	10
W 40149	3" x 3" x 1-1/2"	2.1760	2	10
W 40148	3" x 3" x 1-1/4"	2.3822	2	10
W 40147	3" x 3" x 1"	1.9647	2	20
W 40146	3" x 3" x 3/4"	1.4850	2	20
W 40145	3" x 3" x 1/2"	1.3780	2	20
W 40159	3" x 2-1/2" x 3"	2.9624	2	10
W 40158	3" x 2-1/2" x 2-1/2"	4.5160	2	10
W 40157	3" x 2-1/2" x 2"	2.6830	2	10
W 40156	3" x 2-1/2" x 1-1/2"	2.6252	2	10
W 40155	3" x 2-1/2" x 1-1/4"	2.6179	2	10
W 40154	3" x 2-1/2" x 1"	2.0165	2	20
W 40167	3" x 2" x 3"	3.0684	2	10
W 40165	3" x 2" x 2-1/2"	4.6424	2	10
W 40164	3" x 2" x 2"	2.7490	2	10
W 40163	3" x 2" x 1-1/2"	2.5732	2	10
W 40162	3" x 2" x 1-1/4"	2.6110	2	10
W 40161	3" x 2" x 1"	2.0430	2	20
W 40174	3" x 1-1/2" x 3"	2.9748	2	10
W 40181	3" x 1-1/4" x 3"	3.1416	2	10
W 40178	3" x 1" x 3"	3.0152	2	10
W 40179	3" x 3/4" x 3"	3.0287	2	10
W 40198	4" x 4" x 3"	4.9370	1	5
W 40197	4" x 4" x 2-1/2"	5.1562	1	5
W 40196	4" x 4" x 2"	4.5180	1	10
W 40195	4" x 4" x 1-1/2"	4.1000	1	10
W 40194	4" x 4" x 1-1/4"	4.5531	1	10
W 40193	4" x 4" x 1"	3.0540	1	10
W 40192	4" x 4" x 3/4"	2.8900	1	10
W 40191	4" x 4" x 1/2"	2.8880	1	10
W 40208	4" x 3" x 4"	8.6632	1	5
W 40206	4" x 3" x 3"	5.1180	1	5
W 40205	4" x 3" x 2-1/2"	5.6143	1	5
W 40204	4" x 3" x 2"	4.7578	1	5
W 40212	4" x 2-1/2" x 4"	7.7912	1	5
W 40216	4" x 2" x 4"	8.9477	1	5
W 40215	4" x 1-1/2" x 4"	8.5082	1	5
W 40214	4" x 1-1/4" x 4"	8.5658	1	5
W 40213	4" x 1" x 4"	9.3333	1	5
W 40401	5" x 5" x 4"	6.9500	1	1
W 40402	5" x 5" x 3"	6.2500	1	1
W 40404	5" x 5" x 2"	5.0500	1	1
W 40520	6" x 4" x 4"	12.5200	1	1
W 40502	6" x 6" x 4"	11.0000	1	1
W 40503	6" x 6" x 3"	10.9998	1	1
W 40504	6" x 6" x 2-1/2"	11.1046	1	1
W 40505	6" x 6" x 2"	9.5356	1	1
W 40526	8" x 8" x 4"	22.2640	1	1

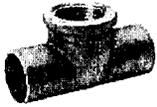
(CONTINUED NEXT COLUMN)

\*Cast Bronze

All diameters are nominal.

# Streamline®

## COPPER PRESSURE FITTINGS



**Tee**  
C x C x FPT  
Cast Style #: T-302\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 01399*	3/8"	0.1050	50	480
A 01512*	1/2"	0.1250	25	250
A 01538*	3/4"	0.3250	10	100
A 01569*	1"	0.5420	5	50
A 01607*	1-1/4"	0.7560	5	50
A 01644*	1-1/2"	1.0800	1	25
A 01698*	2"	1.7400	1	25
A 02517*	1/2" x 1/2" x 3/4"	0.2180	25	250
A 01521*	1/2" x 1/2" x 3/8"	0.1470	25	250
A 01539*	3/4" x 3/4" x 1/2"	0.2170	25	250
A 02578*	3/4" x 3/4" x 3/8"	0.2300	25	250
A 02907*	3/4 x 1/2 x 3/4"	0.2800	25	100
A 01572*	1" x 1" x 3/4"	0.4220	10	100
A 01570*	1" x 1" x 1/2"	0.3470	10	100
A 02655*	1-1/4" x 1-1/4" x 1"	0.6600	5	50
A 02654*	1-1/4" x 1-1/4" x 3/4"	0.5510	10	100
A 01613*	1-1/4" x 1-1/4" x 1/2"	0.3960	10	100
A 02688*	1-1/2" x 1-1/2" x 1"	0.7920	5	50
A 02673*	1-1/2" x 1-1/2" x 3/4"	0.6480	5	50
A 01645*	1-1/2" x 1-1/2" x 1/2"	0.6200	5	50
A 02703*	2" x 2" x 1"	1.2280	1	25
A 02706*	2" x 2" x 3/4"	1.1000	1	25
A 01699*	2" x 2" x 1/2"	0.9720	1	25



**Tee • Baseboard**  
C x FPT x C  
Cast Style #: T-301\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07750*	1/2" x 1/8" x 1/2"	0.1040	50	500
A 07757*	3/4" x 1/8" x 1"	0.2900	10	100
A 07751*	3/4" x 1/8" x 3/4"	0.1960	25	250
A 07754*	1" x 1/8" x 1"	0.3110	10	100
A 07775*	1-1/4" x 1/8" x 1-1/4"	0.5140	10	80



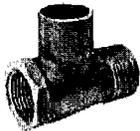
**Tee • Drop**  
C x C x C  
Cast Style #: T-310\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 02515*	1/2"	0.1500	25	250



**Tee • Drop**  
C x C x FPT  
Cast Style #: T-311\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 01513*	1/2"	0.2400	25	250
A 01549*	3/4"	0.3770	10	100



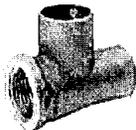
**Tee**  
FPT x MPT x C  
Cast Style #: T-305\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 03655*	3/4"	0.3400	10	100
A 03656*	3/4" x 3/4" x 1/2"	0.3280	10	100



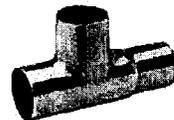
**Tee**  
FPT x FPT x C  
Cast Style #: T-304\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 01502*	1/2"	0.2200	25	150
A 04117*	3/4"	0.3700	10	100
A 03711*	3/4" x 3/4" x 1/2"	0.3100	10	200
A 04109*	3/4" x 1/2" x 3/4"	0.3100	10	100
A 09692*	3/4" x 1/2" x 1/2"	0.2570	10	200



**Tee**  
C x FPT x C  
Cast Style #: T-303\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 02516*	1/2"	0.1900	25	250
A 01548*	3/4"	0.3100	10	100
A 01577*	1"	0.5200	10	50
A 01621*	1-1/4"	0.7000	5	50
A 01646*	1-1/2"	1.0000	1	25
A 01712*	2"	1.7200	1	25
A 02151*	1/2" x 3/4" x 1/2"	0.2700	25	125
A 02587*	3/4" x 1/2" x 3/4"	0.2550	25	250
A 02624*	1" x 3/4" x 1"	0.4600	10	100
A 04053*	1" x 1/2" x 1"	0.4120	10	100



**Tee**  
C x FTG x C  
Wrot Style #: WT-600F



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 04106	1/2"	0.0998	50	300
W 04131	3/4"	0.1940	25	150

\*Cast Bronze

COPPER FITTINGS - SOLDER-JOINT COPPER FITTINGS - PRESSURE

WRR  
WORR

# COPPER FITTINGS | COPPER PRESSURE FITTINGS



## Tee • Supply & Return

C x C x C  
Cast Style #: T-300RB\*

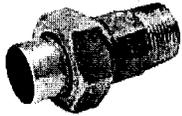
Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 03623*	1/2"	0.1670	25	250



## 45° Wye

C x C x C  
Cast Style #: T-317\*

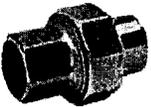
Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 03726*	1/2"	0.1500	10	100
A 04119*	3/4"	0.3020	10	100
A 04216*	1"	0.5500	5	50



## Union

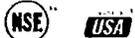
C x MPT  
Cast Style #: C-108\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11209*	3/8"	0.1970	10	100
A 11210*	1/2"	0.2770	25	125
A 11211*	3/4"	0.4270	10	100
A 11212*	1"	0.6780	10	100
A 11213*	1-1/4"	0.9540	5	50
A 11214*	1-1/2"	1.3470	1	50
A 11215*	2"	2.1710	1	25
A 11240*	2-1/2"	4.1250	1	10



## Union

C x C  
Wrot Style #: WC-407  
Cast Style #: C-107\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 08001	1/4"	0.1160	10	200
W 08002	3/8"	0.1141	50	250
W 08003	1/2"	0.1583	25	250
W 08004	3/4"	0.3672	25	150
W 08005	1"	0.5162	10	100
A 11205*	1-1/4"	0.7640	1	25
A 11206*	1-1/2"	1.0420	1	25
A 11207*	2"	1.7700	1	25
A 11216*	2-1/2"	3.2500	1	20
A 11217*	3"	4.7500	1	10

\*Cast Bronze



## Union

C x FPT  
Cast Style #: C-109\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11421*	3/8"	0.1900	10	200
A 11422*	1/2"	0.2560	25	125
A 11423*	3/4"	0.3710	25	150
A 11424*	1"	0.6090	10	100
A 11425*	1-1/4"	0.9820	5	50
A 11426*	1-1/2"	1.2120	1	50
A 11427*	2"	1.8950	1	25



## 25 Ft. Roll Copper Tube Strap Perforated

C  
Wrot Style #: WS-1101



Each Wt.	Item No.	Inner Qty.	Master Carton
A 01211	1.6290	1	10



## Copper Tube Strap • Two-Hole

C  
Wrot Style #: WS-1100



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 01203	1/8"	0.0050	100	4000
A 01278	1/4"	0.0063	100	5600
A 01366	3/8"	0.0071	100	3400
A 02529	1/2"	0.0083	100	1500
A 01467	5/8"	0.0102	100	2000
A 02574	3/4"	0.0125	50	750
A 02614	1"	0.0233	50	750
A 02650	1-1/4"	0.0423	50	500
A 02675	1-1/2"	0.0512	50	500
A 02708	2"	0.0607	50	500



## Hanger High Ear

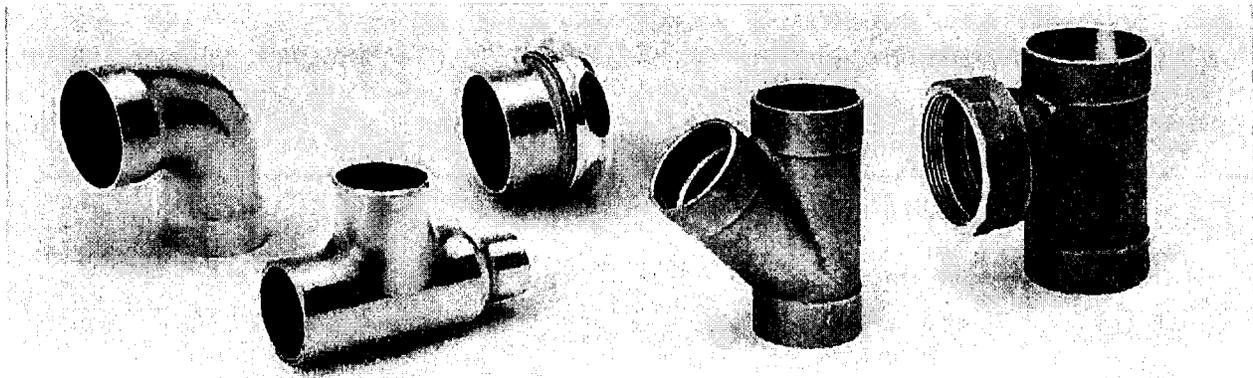
C  
Wrot Style #: W-124



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 03167	1/2"	0.0294	100	1000
A 03168	3/4"	0.0375	50	500
A 03171	1"	0.0425	25	250

All diameters are nominal.

# COPPER SOLDER-JOINT DWV FITTINGS



Streamline® Copper Solder-Joint Fittings for DWV plumbing applications are available in both wrot copper and cast bronze materials. Designed for use in non-pressurized sanitary systems, these fittings commonly feature shorter solder cup designs and more sweeping turns. They are available in a wide range of diameters, styles and connections to meet most all sanitary system applications.



- For use in non-pressurized drain, waste and vent sanitary systems
- Constructed of high-grade copper or bronze materials
- Made to applicable ASME standards B16.23, B16.29
- Wrot fittings meet NSF 61G

\*\* Applies to Wrot fittings only



## Adapter • Soil Pipe

C x Spigot  
Wrot Style #: DW-733  
Cast Style #: D-733\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07122	2"	0.4267	5	100
W 07133	3"	1.1150	5	40
A 07220*	4"	2.2290	1	15
A 07018*	1-1/4" x 2"	0.9320	1	50
W 07112	1-1/2" x 2"	0.6070	5	50
A 07322*	2" x 4"	2.3060	1	10
A 07169*	3" x 4"	2.7750	1	20



## Adapter • Trap

FTG x SJ  
Wrot Style #: DW-724F  
Cast Style #: D-724F\*



\*\* Applies to Wrot Fittings only

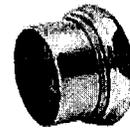
Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11563*	1-1/4"	0.2540	10	100
A 11564	1-1/2"	0.2800	1	10
A 11566	1-1/2" x 1-1/4"	0.2580	10	100



## Adapter • Soil Pipe

C x No Hub  
Cast Style #: D-736N\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07486*	2"	0.3960	1	50
A 07488*	3"	0.7500	1	50
A 07485*	1-1/2" x 2"	0.4270	1	50



## Adapter • Trap

C x SJ  
Wrot Style #: DW-724



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11355	1-1/4"	0.2200	1	25
A 11356	1-1/2"	0.3280	1	10
A 11383	1-1/2" x 1-1/4"	0.3958	1	10

# COPPER FITTINGS | COPPER DWV FITTINGS



**Adapter • Trap**  
FPT x SJ  
Wrot Style #: DW-757



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11409	1-1/4"	0.3400	10	100
A 11410	1-1/2"	0.4000	10	100
A 11411	1-1/2" x 1-1/4"	0.4000	10	100



**Adapter • Slip Joint**  
C x SJ THD  
Cast Style #: D-729\*

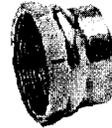
Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07050*	1-1/4"	0.0500	50	500
W 07051*	1-1/2"	0.0540	50	500
W 07052*	2"	0.0640	25	250



**Adapter • Trap**  
MPT x SJ  
Wrot Style #: DW-756



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11405	1-1/4"	0.4200	10	100
A 11406	1-1/2"	0.5200	1	10
A 11407	1/2" x 1-1/4"	0.5300	10	100



**Adapter • Female**  
C x FPT  
Wrot Style #: DW-753  
Cast Style #: D-753\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07221	1-1/2"	0.2530	10	100
W 07222	2"	0.4080	10	100
A 07403*	3"	1.4500	1	25
A 07340*	4"	2.3100	1	20



**Adapter • Trap**  
C x O.D. Tube  
Cast Style #: D-738\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07251*	1-1/4"	0.2100	25	250
A 07252*	1-1/2"	0.2390	10	100
A 07253*	1-1/2" x 1-1/4"	0.1950	10	100



**Adapter • Male**  
C x MPT  
Wrot Style #: DW-732  
Cast Style #: D-732\*



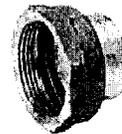
\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07012	1-1/4"	0.3527	25	250
A 07054	1-1/2"	0.4354	10	100
A 07094	2"	0.5150	10	100
A 07234*	3"	1.2940	1	25
A 07339*	4"	2.5880	1	20
W 07235	1-1/4" x 1-1/2"	0.3710	10	100
A 07233*	1-1/2" x 1-1/4"	0.3090	10	100



**Adapter • Trap**  
C x MPT  
Cast Style #: D-732F\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07230*	1-1/4"	0.2200	25	150
A 07231*	1-1/2"	0.2540	25	150
A 07232*	2"	0.3290	10	100
A 07264*	3"	0.7700	1	50
A 07263*	1-1/4" x 1-1/2"	0.4380	10	100



**Adapter • Fitting**  
FTG x FPT  
Wrot Style #: DW-754  
Cast Style #: D-754\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07240	1-1/4"	0.1900	10	100
A 07436*	1-1/2"	0.3910	10	100
A 07481*	2"	0.5530	10	100
A 07482*	3"	1.4390	1	25



**Adapter • Trap (Flush)**  
C x MPT  
Cast Style #: D-732C\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07645*	1-1/2"	0.1880	25	150
A 07646*	2"	0.2540	10	100

\*Cast Bronze



### Bushing • Extended

FTG x C  
Wrot Style #: DW-742



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07350	1-1/2" x 1-1/4"	0.1127	25	250
W 07358	2" x 1-1/2"	0.2193	1	100
W 07359	2" x 1-1/4"	0.1782	1	100
W 07377	3" x 2"	0.4742	1	50
W 07378	3" x 1-1/2"	0.4448	1	50
W 07379	3" x 1-1/4"	0.5029	1	50
W 07387	4" x 3"	0.8873	1	25
W 07389	4" x 2"	1.0289	1	25

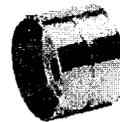


### Flange • Closet

C x Closet  
Wrot Style #: DW-734



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07834	3" x 4"	0.8260	5	50
W 07844	4" x 4"	0.6666	5	40



### Coupling

C x C  
Wrot Style #: DW-741



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07055	1-1/4"	0.0854	25	150
W 07063	1-1/2"	0.1143	25	250
W 07072	2"	0.1306	1	100
W 07092	3"	0.4677	1	50
W 70107	4"	1.0337	1	25
W 07073	2" x 1-1/2"	0.1676	1	100
W 07074	2" x 1-1/4"	0.1770	1	100
W 07094	3" x 2"	0.5228	1	50
W 07095	3" x 1-1/2"	0.5184	1	50
W 07096	3" x 1-1/4"	0.6958	1	50
W 70109	4" x 3"	0.9252	1	25
W 70106	4" x 2"	1.3793	1	25

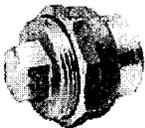


### Bushing • Flush

FTG x C  
Wrot Style #: DW-742F



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07334	2" x 1-1/2"	0.3700	10	100



### Cleanout • w/Plug

FTG x C.O.  
Cast Style #: D-730\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11350*	1-1/4"	0.4900	10	100
A 11351*	1-1/2"	0.6010	1	100
A 11352*	2"	0.8710	1	50
A 11353*	3"	2.3680	1	25
A 11354*	4"	3.9900	1	10



### Coupling • Repair

C x C  
Wrot Style #: DW-741NS



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07907	1-1/4"	0.0720	25	225
W 07908	1-1/2"	0.1146	25	250
W 07909	2"	0.1896	1	75
W 07911	3"	0.3427	1	50



### Cleanout • Flush w/Plug

FTG x C.O.  
Cast Style #: D-730F\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11551*	1-1/4"	0.2000	10	100
A 11552*	1-1/2"	0.2900	15	150
A 11553*	2"	0.4160	10	100
A.11554*	3"	0.9560	5	50



### 1-1/4° Elbow

C x C  
Cast Style #: D-704\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07063*	1-1/2"	0.2180	10	100
A 07103*	2"	0.4020	5	50

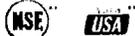
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# COPPER FITTINGS | COPPER DWV FITTINGS



## 22-1/2° Elbow

C x C  
Wrot Style #: DW-703  
Cast Style #: D-703\*



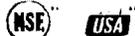
\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07011*	1-1/4"	0.1930	25	200
W 07060	1-1/2"	0.2650	10	100
A 07098	2"	0.4610	1	50
A 07157	3"	0.9860	1	25



## 45° Elbow

C x C  
Wrot Style #: DW-204  
Cast Style #: D-702\*



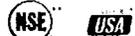
\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07420	1-1/4"	0.1367	25	250
W 07421	1-1/2"	0.2030	25	125
W 07422	2"	0.3340	1	50
W 07423	3"	0.8421	1	25
A 07304*	4"	2.4700	1	10



## 45° Elbow • Street

FTG x C  
Wrot Style #: DW-205  
Cast Style #: D-702\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07430	1-1/4"	0.1675	25	250
W 07431	1-1/2"	0.1954	25	125
W 07432	2"	0.3240	0	50
W 07433	3"	0.8148	1	25
A 07124*	4"	2.8120	1	10



## 60° Elbow

C x C  
Wrot Style #: DW-701



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07064	1-1/2"	0.3520	25	125
W 07066	3"	0.9500	2	20



## 90° Elbow

C x C  
Wrot Style #: DW-200  
Cast Style #: D-700\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07400	1-1/4"	0.2548	25	125
W 07401	1-1/2"	0.2384	20	100
W 07403	2"	0.7052	1	50
W 07404	3"	1.6575	1	15
A 07215*	4"	3.7570	1	10
A 07056*	1-1/2" x 1-1/4"	0.4300	10	100
A 07210*	2" x 1-1/2"	0.6400	1	50



## 90° Elbow • Long Radius

C x C  
Wrot Style #: DW-700LT



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07209	1-1/2"	0.4120	5	100
A 07202	2"	0.6200	1	5



## 90° Elbow • Extra Long Radius

C x C  
Wrot Style #: DW-700XLT



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07451	1-1/2"	0.5534	10	50
W 07452	2"	1.1106	5	25
W 07453	3"	2.2801	2	10
W 07454	4"	5.0976	1	5



## 90° Elbow

C x MPT  
Cast Style #: D-722\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07326*	1-1/2"	0.6630	1	50



## 90° Elbow

C x FPT  
Cast Style #: D-705\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07059*	1-1/4"	0.7150	10	100
A 07097*	2"	1.1500	1	25

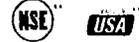


**90° Elbow • w/Low Heel Inlet**  
C x C x C  
Cast Style #: D-737\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07330*	3" x 3" x 2"	2.4250	1	10



**Tee • Reducing**  
C x C x C  
Wrot Style #: DW-707  
Cast Style #: D-707\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07510	1-1/2" x 1-1/2" x 1-1/4"	0.5089	10	100
W 07512	1-1/2" x 1-1/4" x 1-1/4"	0.5196	10	100
W 07521	2" x 2" x 1-1/2"	0.7530	5	50
W 07520	2" x 2" x 1-1/4"	0.6839	5	30
W 07524	2" x 1-1/2" x 1-1/2"	0.8741	5	50
W 07532	3" x 3" x 2"	1.6878	5	25
W 07531	3" x 3" x 1-1/2"	1.4542	5	25
W 07530	3" x 3" x 1-1/4"	0.8095	5	25
A 07308*	4" x 4" x 3"	3.4880	1	10
A 07309*	4" x 4" x 2"	2.7350	1	15



**90° Elbow • Street**  
FTG x C  
Wrot Style #: DW-203  
Cast Style #: D-700\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07410	1-1/4"	0.2631	25	125
W 07411	1-1/2"	0.3834	20	100
W 07412	2"	0.7000	1	50
W 07413	3"	1.7025	1	15
A 07119*	4"	3.8350	1	10



**Tee**  
C x C x FPT  
Cast Style #: D-708\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07046*	1-1/2"	0.8780	1	50
A 07100*	2"	1.5700	1	25
A 07101*	2" x 2" x 1-1/2"	1.1670	1	25



**90° Elbow • Double**  
C x C x C  
Cast Style #: D-706\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07443*	1-1/2"	0.7270	1	50
A 07444*	2"	1.3080	1	25
A 07446*	2" x 1-1/2" x 1-1/2"	0.9670	1	50



**Tee • Double (Cross)**  
C x C x C x C  
Cast Style #: D-718\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07065*	1-1/2"	0.7750	1	50
A 07105*	2"	1.3100	1	25
A 07086*	1-1/2" x 1-1/2" x 1-1/4" x 1-1/4"	0.6800	1	50
A 07106*	2" x 2" x 1-1/2" x 1-1/2"	0.9780	1	25
A 07171*	3" x 3" x 2" x 2"	2.3550	1	15
A 07320*	3" x 3" x 1-1/2" x 1-1/2"	1.5130	1	25

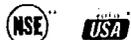


**Plug • Male**  
MPT  
Cast Style #: D-745\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07679*	3/4"	0.0760	100	1000
A 07437	1-1/2"	0.2200	25	250
A 07222*	2"	0.3300	10	100



**Tee**  
C x C x C  
Wrot Style #: DW-707  
Cast Style #: D-707\*



\*\* Applies to Wrot Fittings only

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07500	1-1/4"	0.3683	20	100
W 07511	1-1/2"	0.5180	20	100
W 07522	2"	0.8510	5	25
W 07533	3"	2.0971	1	10
A 07208*	4"	4.9210	1	5



**Tee • Test w/Plug**  
C x C x C.O  
Cast Style #: D-714\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11360*	1-1/2"	1.0000	1	50
A 11366*	2"	1.3540	1	25
A 11367*	3"	3.7770	1	10

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## Test Cap

C  
Wrot Style #: DW-798T



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 07634	1/2"	0.0025	500	3000
W 07635	3/4"	0.0041	100	600
W 07636	1"	0.0059	100	600
W 07637	1-1/4"	0.0080	100	600
W 07638	1-1/2"	0.0107	100	600
W 07639	2"	0.0165	50	300
W 07640	3"	0.0428	50	300



## Drum Trap • Swivel

C x C x C.O.  
Cast Style #: D-778\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 11395*	3" x 6" x 1-1/2"	2.8960	1	10



## 45° Wye

C x C x C  
Cast Style #: D-719\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07005*	1-1/4"	0.6300	1	50
A 07037*	1-1/2"	0.8710	1	50
A 07077*	2"	1.2400	1	25
A 07150*	3"	2.7670	1	20
A 07200*	4"	5.5470	1	5
A 07078*	2" x 2" x 1-1/2"	1.1460	1	50
A 07079*	2" x 2" x 1-1/4"	1.0110	1	50
A 07249*	2" x 1-1/2" x 2"	1.1550	1	40
A 07318*	2" x 1-1/2" x 1-1/2"	0.8500	1	50
A 07152*	3" x 3" x 2"	2.0350	1	25
A 07153*	3" x 3" x 1-1/2"	1.6860	1	25
A 07315*	4" x 4" x 3"	3.9590	1	10
A 07203*	4" x 4" x 2"	2.9040	1	10



## T-Y • Long Turn

C x C x C  
Cast Style #: D-715\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07082*	1-1/4"	0.9260	1	50
A 07041*	1-1/2"	0.8700	1	10
A 07083*	2"	1.8350	1	10
A 07158*	3"	3.6860	1	10
A 07273*	4"	9.0000	1	4
A 07084*	2" x 2" x 1-1/2"	1.0200	1	25
A 07159*	3" x 3" x 2"	2.7810	1	10



## T-Y • Long Turn (Double)

C x C x C x C  
Cast Style #: D-717\*

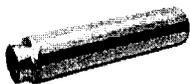
Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07061*	1-1/2"	1.2500	1	25
A 07089*	2"	2.8310	1	10
A 07090*	2" x 2" x 1-1/2" x 1-1/2"	1.9630	1	25



## P-Trap • w/Cleanout

C x SJ  
Cast Style #: D-763\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 15660*	1-1/2"	1.7980	1	20
A 15661*	2"	2.6550	1	25



## Vent Ineraser

C x Tube  
Wrot Style #: DW-752



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
W 70112	3" x 4" x 18"	4.3694	1	6
W 70111	3" x 4" x 24"	5.9046	1	5



## 45° Wye • Double

C x C x C x C  
Cast Style #: D-720\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 07039*	1-1/2"	1.1150	1	50
A 07080*	2"	2.0000	1	20
A 07379*	3"	3.9500	1	10
A 07081*	2" x 2" x 1-1/2" x 1-1/2"	1.2620	1	25



**P-Trap**  
C x SJ  
Cast Style #: D-762\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 15654*	1-1/2"	1.5000	1	25



**Return Bend • w/Cleanout**  
C x C  
Cast Style #: D-783\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 15692*	1-1/4"	0.8130	1	50
A 15695*	1-1/2"	0.9780	1	50
A 15698*	2"	1.3980	1	25



**P-Trap • w/Cleanout**  
C x C  
Cast Style #: D-761\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 15656*	1-1/4"	1.2130	1	50
A 15657*	1-1/2"	1.5310	1	50
A 15658*	2"	2.2610	1	25



**P-Trap**  
C x C  
Cast Style #: D-760\*

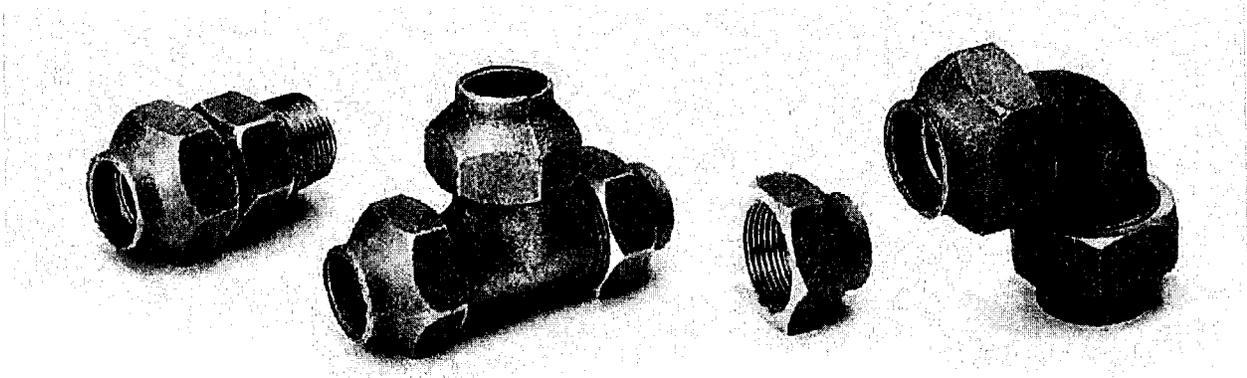
Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 15651*	1-1/2"	1.4530	1	50
A 15652*	2"	2.1130	1	25



**P-Trap • w/Union Joint**  
C x SJ  
Cast Style #: D-740\*

Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 15636*	1-1/2"	1.8550	1	25

# COPPER FLARE FITTINGS



Streamline® Copper Flare Fittings are for use with above-ground flexible copper tube in common potable water supply systems. These fittings make for easy and flame-free installations and require common tools for assembly. Available in five diameters from 1/2" to 2", these flare fittings come in an assortment of styles to meet common job needs.



- For use in above-ground potable water supply systems
- Made to ASME standard B16.26
- Constructed of high-grade copper or bronze materials
- Meets NSF 61G



**90° Elbow • w/Flare Nuts**  
FL x FL  
Cast Style #: WW-816\*



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 12275*	1/2"	0.5400	10	100
A 12276*	3/4"	0.7710	5	50
A 12277*	1"	1.6000	5	50



**Adapter • Two Piece**  
FL x MPT  
Cast Style #: WW-813\*



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 12252*	1/2"	0.2900	25	250
A 12352*	3/4"	0.5830	10	50
A 12452*	1"	0.8820	5	50
A 12652*	1-1/2"	1.8900	1	25
A 12752*	2"	2.9450	1	10



**Adapter • Two Piece**  
FL x FPT  
Cast Style #: WW-814\*



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 12251*	1/2"	0.3550	25	250
A 12351*	3/4"	0.4760	5	50
A 12451*	1"	1.0340	5	50
A 12651*	1-1/2"	1.9900	1	25
A 12751*	2"	3.2240	1	25



**Coupling • Three Piece**  
FL x FL  
Cast Style #: WW-812\*



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 12250*	1/2"	0.4360	10	100
A 12350*	3/4"	0.6780	10	50
A 12450*	1"	1.2600	5	25
A 12550*	1-1/4"	1.9990	5	30
A 12650*	1-1/2"	2.9800	1	10
A 12750*	2"	4.5910	1	10

\*Cast Bronze



**Flare Nut**

FL  
Cast Style #: WW-815\*



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 01024*	3/4"	0.2060	50	500
A 01025*	1"	0.3100	1	25



**Tee**

FL x FL x FL  
Cast Style #: WW-817\*



Item No.	Diameter	Each Wt.	Inner Qty.	Master Carton
A 12285*	1/2"	0.6750	5	50
A 12286*	3/4"	1.0890	5	25
A 12287*	1"	2.0770	1	10

\*Cast Bronze

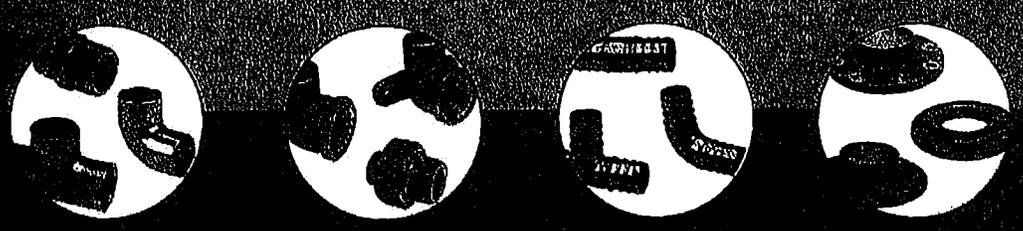
All diameters are nominal.

CATALOG

C-CF-0207

# NIBCO<sup>®</sup>

AHEAD OF THE FLOW



Copper Fittings

# Specifications

All of the advantages found in copper as a metal have been capitalized to the utmost in the manufacture of NIBCO Fittings. Because of the accuracy of construction and design, copper plumbing is more efficient and less expensive.

NIBCO manufactures nine general types of fittings: Wrot Pressure; Cast Pressure; Wrot Drainage; Cast Drainage; Flanges; Flared Tube; Threaded Bronze; Insert Fittings for PEX; Barbed Insert Fittings for Polybutylene. Each has its particular place and use and each offers its own advantages when used for the proper service requirement.

**WORK WORRY** **ALLOY AND FINISH** — NIBCO Fittings are made from highest quality raw materials available — Cast Fittings are made from Copper Alloy C84400 which consists of 81% Copper, 7% Lead, 3% Tin, and 9% Zinc per ASTM Specification B584. Wrot Copper Fittings are made from commercially pure copper mill products per ASTM Specifications B75 Alloy C12200.

NIBCO fittings are produced to meet requirements of applicable standards wherever practicable.

NIBCO brand wrot and cast fittings are manufactured in the U.S.A. and Mexico. The manufacturing plants at Stuarts Draft, VA, Nacogdoches, TX and Reynosa, Mexico are registered to ISO 9002 quality standards.

Following is suggested phrasing to be incorporated in your specifications or bills of material for Copper Tube Fittings.

**WROT SOLDER JOINT FITTINGS** — "Wrot Solder Joint Fittings shall be produced to one of the following specifications:

1. Material and workmanship shall be in accordance with ASME/ANSI B16.22; Wrought Copper and Copper Alloy Solder Joint Pressure Fittings."
2. The dimensional, material and workmanship shall meet the requirements of MSS SP-104; Wrought Copper Solder Joint Pressure Fittings."
3. The dimensional, material and workmanship of 5"-12" copper fittings shall meet the requirements of MSS SP-109 "Welded Fabricated Copper Solder Joint Pressure Fittings."
4. Certified to ANSI/NSF 61.

dimensions of Federal Specifications WW-F-406 or ASME Std. B16.24.

CLASS 125 — Material, workmanship and dimensions of flanges shall be in accordance with MSS SP-106.

**CAST BRONZE THREADED FITTINGS** — "Cast Bronze Threaded Fittings shall be in accordance with ANSI/ASME B16.15."

**POLYBUTYLENE COPPER INSERT TYPE VALVES AND FITTINGS** — "Wrot Copper Insert Fittings shall be manufactured per the following specifications: MSS SP-103 or ASTM F1380."

NIBCO Copper Tube Fittings are all produced to above Standards. To simplify, write your specifications to read: "Copper Tube Fittings to be in accordance with specifications as outlined in NIBCO Catalog c-cf-0602."

**WROT COPPER MEDICAL MEDICAL GAS SYSTEM COMPONENTS** — Wrot copper fittings that are to be installed in medical gas applications shall be prepared in accordance with NFPA 99, Health Care Facilities Gas and Vacuum Systems and the Compressed Gas Association, Pamphlet G4.1. Packaging shall be adequately protective and include labeling that identifies the preparer and states that the product has been cleaned and bagged for oxygen or med gas service.

For technical information and dimensions refer to the engineering section contained in this catalog.

**CAST COPPER ALLOY SOLDER JOINT FITTINGS** — "Cast Copper Alloy Solder Joint Fittings shall be in accordance with ANSI Std. B16.18."

**WROT DRAINAGE FITTINGS** — "Wrot Drainage Fittings shall be in accordance with ASME/ANSI Std. B16.29."

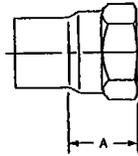
**CAST COPPER ALLOY SOLDER JOINT DRAINAGE FITTINGS** — "Cast Copper Alloy Solder Joint Drainage Fittings shall be in accordance with ASME Std. B16.29."

**CAST COPPER ALLOY FLARED TUBE FITTINGS** — "Cast Copper Alloy Flared Tube Fittings shall be in accordance with ANSI Std. B16.26."

**CAST COPPER ALLOY FLANGES AND FLANGED FITTINGS**

CLASS 125 — "Cast Copper Alloy Flanges and Flanged Fittings shall meet the requirements of MSS SP-106 and/or the workmanship and

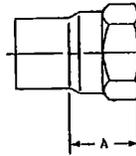
## ADAPTERS



**603**  
Adapter C x F – Wrot

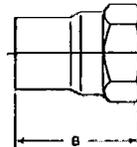
WORR  
WORR

NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES
1/8	0.03	13/32
1/8 x 1/4	0.03	1/2
1/4	0.03	5/8
1/4 x 3/8	0.05	21/32
3/8	0.04	11/16
3/8 x 1/2	0.09	29/32
3/8 x 1/4	0.03	9/16
1/2	0.09	27/32
1/2 x 3/4	0.14	1
1/2 x 3/8	0.04	17/32
1/2 x 1/4	0.05	1/2
5/8 x 3/4	0.12	29/32
5/8 x 1/2	0.11	3/4
3/4	0.15	29/32
3/4 x 1	0.21	1 1/8
3/4 x 1/2	0.10	5/8
1	0.24	31/32
1 x 1 1/4	0.28	1 7/32
1 x 3/4	0.19	25/32
1 x 1/2	0.24	5/8
1 1/4	0.33	1 3/32
1 1/4 x 1 1/2	0.40	1 1/4
1 1/4 x 1	0.27	31/32
1 1/2	0.44	1 1/8
1 1/2 x 2	0.50	1 1/32
2	0.63	1 3/32
2 x 1 1/2	0.74	1 3/16
2 1/2	1.13	–
3	1.94	–



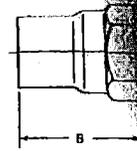
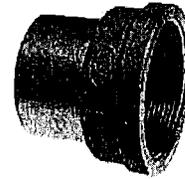
**703**  
Adapter C x F – Cast

NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES
1/4 x 1/2	0.13	27/32
1/2 x 1	0.30	1
3/4 x 1 1/4	0.55	1 1/8
3/4 x 3/8	0.17	3/4
1 x 1 1/2	0.68	1 3/32
1 1/4 x 1	0.27	31/32
1 1/4 x 3/4	0.29	3/4
1 1/2 x 2	0.78	1 1/32
1 1/2 x 1	0.37	25/32
1 1/2 x 1 1/4	0.47	1 1/4
2 x 1 1/4	0.76	27/32
2 1/2	1.62	1 3/8
3	2.34	1 1/2
4	4.05	1 9/16



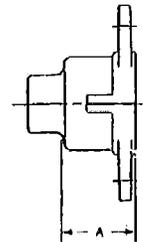
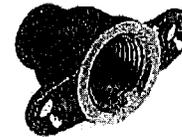
**603-2**  
Fitting Adapter Ftg x F – Wrot

NOM. SIZE	APPROX. NET WT./LBS.	DIM. B INCHES
1/4	0.03	13/32
3/8	0.06	13/16
1/2	0.09	17/16
1/2 x 3/8	0.05	1 1/4
3/4	0.13	1 11/16
1	0.27	2 1/32
1 1/4	0.31	2 1/8
1 1/2	0.43	2 5/16
2	0.61	2 17/32



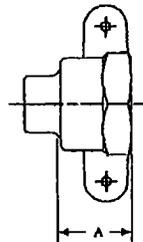
**703-2**  
Fitting Adapter Ftg x F – Cast

NOM. SIZE	APPROX. NET WT./LBS.	DIM. B INCHES
1/2 x 1/4	0.11	17/32
3/4 x 1/2	0.12	1 9/16
1 x 3/4	0.38	1 31/32
1 x 1/2	0.15	1 7/16
2 1/2	1.65	2 15/16
3	2.47	3 1/4



**703-5 Special**  
Drop Adapter C x F – Cast

NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES
1/2	0.16	3/4
3/4	0.24	21/32

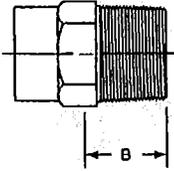


**703-5B**  
Drop Adapter C x F – Cast

NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES
1/2	0.15	3/4

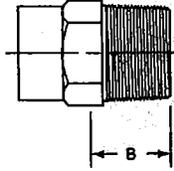
Consult price sheet for Made to Order items and for minimum order quantities.

**ADAPTERS** *continued*



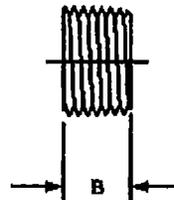
**604**  
Adapter C x M – Wrot

NOM. SIZE	APPROX. NET WT./LBS.	DIM. B INCHES
1/8 x 1/4	0.03	7/16
1/4	0.03	23/32
3/8	0.04	15/32
3/8 x 3/4	0.15	15/16
3/8 x 1/2	0.09	1
1/2	0.07	5/8
1/2 x 1	0.25	1 1/2
1/2 x 3/4	0.15	13/16
1/2 x 3/8	0.05	19/32
1/2 x 1/4	0.07	5/8
5/8 x 3/4	0.16	1 1/8
5/8 x 1/2	0.08	3/4
3/4	0.14	13/16
3/4 x 1	0.26	1 1/16
3/4 x 1/2	0.10	27/32
1	0.21	31/32
1 x 1 1/2	0.54	29/32
1 x 1 1/4	0.38	1 1/2
1 x 3/4	0.18	29/32
1 x 1/2	0.18	31/32
1 1/4	0.35	15/16
1 1/4 x 1 1/2	0.51	1 19/32
1 1/4 x 1	0.27	15/32
1 1/2	0.44	31/32
1 1/2 x 2	0.81	1 1/8
1 1/2 x 1 1/4	0.38	13/16
1 1/2 x 1	0.37	13/32
2	0.81	13/32
2 x 1 1/2	0.64	1 1/8
2 1/2	1.48	1 21/32
3	1.69	—



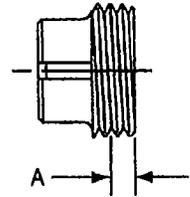
**704**  
Adapter C x M – Cast

NOM. SIZE	APPROX. NET WT./LBS.	DIM. B INCHES
3/4 x 1 1/2	0.60	1 17/32
3/4 x 1 1/4	0.38	1 7/32
3/4 x 3/8	0.19	13/16
1 x 2	1.15	—
1 x 1 1/2	0.64	29/32
1 1/4 x 2	0.88	1 9/32
1 1/4 x 3/4	0.30	31/32
1 1/2 x 2	0.77	1 1/8
2 x 2 1/2	1.57	1 15/32
2 x 1 1/2	0.71	1 1/8
2 x 1 1/4	1.08	—
2 1/2	1.48	1 21/32
2 1/2 x 2	1.83	1 11/16
3	1.96	1 1/2
4	3.66	1 11/16
5	8.60	2 5/8
6	10.73	2



**704-F**  
Flush Adapter C x M – Cast

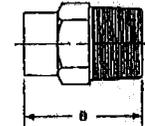
NOM. SIZE	APPROX. NET WT./LBS.	DIM. B INCHES
1/2	0.03	9/16
3/4	0.03	19/32



**704-H**  
Hose Adapter C x Hose – Cast

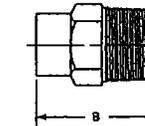
NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES
1/2	0.09	9/32

NOTE: Fits 1/2", 3/4" and 1" Garden Hose.



**604-2**  
Fitting Adapter Ftg x M – Wrot

NOM. SIZE	APPROX. NET WT./LBS.	DIM. B INCHES
1/8	0.02	1 1/8
3/8	0.04	1 1/4
1/2	0.09	1 15/32
1/2 x 3/4	0.16	1 13/16
1/2 x 3/8	0.04	1 11/32
3/4	0.17	1 15/16
1	0.25	2 1/4

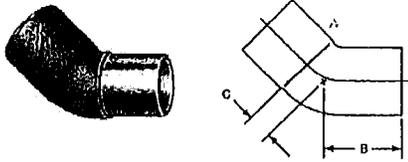


**704-2**  
Fitting Adapter Ftg x M – Cast

NOM. SIZE	APPROX. NET WT./LBS.	DIM. B INCHES
3/4 x 1	0.27	1 31/32
3/4 x 1/2	0.12	1 23/32
1 x 3/4	0.24	1 15/16
1 1/4	0.43	2 27/32
1 1/2	0.54	2 13/32
2	0.89	2 3/4
2 1/2	1.55	3 3/8
3	2.21	3 23/32

Consult price sheet for Made to Order items and for minimum order quantities.

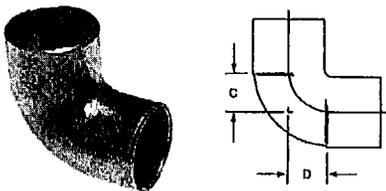
## ELBOWS *continued*



706-2  
45° Fitting Elbow Ftg x C – Cast

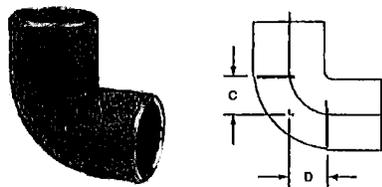
NOM. SIZE	APPROX. NET WT./LBS.	DIM. B INCHES	DIM. C INCHES
4	4.31	3 <sup>11</sup> / <sub>32</sub>	1 <sup>5</sup> / <sub>16</sub>

WORR



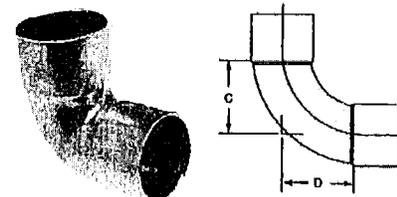
607  
90° Elbow – Close Rough  
C x C – Wrot

NOM. SIZE	APPROX. NET WT./LBS.	DIM. C INCHES	DIM. D INCHES
1/8	0.01	1 <sup>3</sup> / <sub>32</sub>	1 <sup>3</sup> / <sub>32</sub>
1/4	0.02	9 <sup>3</sup> / <sub>32</sub>	9 <sup>3</sup> / <sub>32</sub>
3/8	0.03	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
1/2	0.04	3 <sup>3</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>8</sub>
1/2 x 3/8	0.04	9 <sup>3</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>32</sub>
3/4	0.10	1 <sup>7</sup> / <sub>32</sub>	1 <sup>7</sup> / <sub>32</sub>
3/4 x 5/8	0.12	2 <sup>9</sup> / <sub>32</sub>	7 <sup>7</sup> / <sub>8</sub>
3/4 x 1/2	0.10	1 <sup>7</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>4</sub>
1	0.21	2 <sup>3</sup> / <sub>32</sub>	2 <sup>3</sup> / <sub>32</sub>
1 x 3/4	0.16	2 <sup>3</sup> / <sub>32</sub>	5 <sup>7</sup> / <sub>8</sub>
1 1/4	0.31	1 <sup>1</sup> / <sub>32</sub>	1 <sup>1</sup> / <sub>32</sub>
1 1/4 x 1	0.31	1 <sup>5</sup> / <sub>8</sub>	1 <sup>15</sup> / <sub>32</sub>
1 1/2	0.46	1 <sup>7</sup> / <sub>32</sub>	1 <sup>7</sup> / <sub>32</sub>
1 1/2 x 1 1/4	0.35	1 <sup>5</sup> / <sub>32</sub>	1 <sup>3</sup> / <sub>32</sub>
2	0.84	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
2 x 1 1/2	0.58	1 <sup>7</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>4</sub>
2 1/2	1.41	1 <sup>27</sup> / <sub>32</sub>	1 <sup>27</sup> / <sub>32</sub>
3	2.07	2 <sup>3</sup> / <sub>32</sub>	2 <sup>3</sup> / <sub>32</sub>
3 1/2	2.94	2 <sup>3</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>8</sub>
4	4.23	2 <sup>25</sup> / <sub>32</sub>	2 <sup>25</sup> / <sub>32</sub>
5	7.74	2 <sup>7</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>
6	10.95	3 <sup>7</sup> / <sub>16</sub>	3 <sup>7</sup> / <sub>16</sub>
8	29.50	4 <sup>23</sup> / <sub>32</sub>	4 <sup>23</sup> / <sub>32</sub>



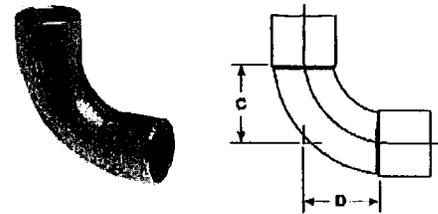
707  
90° Elbow – Close Rough  
C x C – Cast

NOM. SIZE	APPROX. NET WT./LBS.	DIM. C INCHES	DIM. D INCHES
1 1/4 x 1	0.42	1 <sup>5</sup> / <sub>8</sub>	1 <sup>15</sup> / <sub>32</sub>
1 1/4 x 3/4	0.34	9 <sup>3</sup> / <sub>16</sub>	1 <sup>3</sup> / <sub>16</sub>
1 1/4 x 1/2	0.28	1 <sup>5</sup> / <sub>32</sub>	2 <sup>7</sup> / <sub>32</sub>
1 1/2 x 1	0.54	1 <sup>11</sup> / <sub>16</sub>	1
1 1/2 x 3/4	0.42	1 <sup>9</sup> / <sub>32</sub>	3 <sup>1</sup> / <sub>32</sub>
1 1/2 x 1/2	0.40	5 <sup>7</sup> / <sub>8</sub>	2 <sup>9</sup> / <sub>32</sub>
2 x 1 1/4	0.86	7 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>
2 x 1	0.78	3 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>
2 x 3/4	0.69	5 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>
2 1/2 x 2	2.16	1 <sup>3</sup> / <sub>16</sub>	1 <sup>9</sup> / <sub>32</sub>
3 x 2 1/2	2.26	1 <sup>11</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>2</sub>
3 x 2	2.68	1 <sup>3</sup> / <sub>8</sub>	1 <sup>9</sup> / <sub>16</sub>
4 x 3	5.18	1 <sup>29</sup> / <sub>32</sub>	2 <sup>15</sup> / <sub>32</sub>



607-1  
90° Elbow –  
Intermediate Radius C x C  
– Wrot

NOM. SIZE	APPROX. NET WT./LBS.	DIM. C INCHES	DIM. D INCHES
1/2	0.06	1 <sup>9</sup> / <sub>32</sub>	1 <sup>9</sup> / <sub>32</sub>
5/8	0.09	7 <sup>7</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub>
3/4	0.14	1 <sup>3</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>16</sub>
1	0.24	1 <sup>1</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>16</sub>

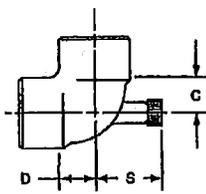


607-LT  
90° Elbow – Long Radius  
C x C – Wrot

NOM. SIZE	APPROX. NET WT./LBS.	DIM. C INCHES	DIM. D INCHES
3/16 O.D.	0.01	1 <sup>3</sup> / <sub>32</sub>	1 <sup>3</sup> / <sub>32</sub>
1/8	0.01	1 <sup>3</sup> / <sub>32</sub>	1 <sup>3</sup> / <sub>32</sub>
5/16 O.D.	0.02	9 <sup>3</sup> / <sub>16</sub>	9 <sup>3</sup> / <sub>16</sub>
1/4	0.02	1 <sup>7</sup> / <sub>32</sub>	1 <sup>7</sup> / <sub>32</sub>
1/4 x 1/8	0.01	1 <sup>9</sup> / <sub>32</sub>	1 <sup>1</sup> / <sub>2</sub>
3/8	0.04	2 <sup>3</sup> / <sub>32</sub>	2 <sup>3</sup> / <sub>32</sub>
1/2	0.08	7 <sup>7</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub>
1/2 x 3/8	0.06	1 <sup>3</sup> / <sub>16</sub>	1 <sup>3</sup> / <sub>16</sub>
1/2 x 1/4	0.03	2 <sup>5</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>32</sub>
5/8	0.10	1 <sup>3</sup> / <sub>32</sub>	1 <sup>3</sup> / <sub>32</sub>
5/8 x 1/2	0.09	1 <sup>1</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>16</sub>
3/4	0.16	1 <sup>1</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>8</sub>
3/4 x 5/8	0.13	1 <sup>1</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>32</sub>
3/4 x 1/2	0.10	1 <sup>1</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>16</sub>
7/8	0.28	1 <sup>19</sup> / <sub>32</sub>	1 <sup>19</sup> / <sub>32</sub>
1	0.28	1 <sup>7</sup> / <sub>16</sub>	1 <sup>7</sup> / <sub>16</sub>
1 x 3/4	0.20	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>8</sub>
1 x 5/8	0.15	1 <sup>13</sup> / <sub>32</sub>	1 <sup>3</sup> / <sub>32</sub>
1 1/4	0.42	1 <sup>7</sup> / <sub>8</sub>	1 <sup>7</sup> / <sub>8</sub>
1 1/4 x 1	0.33	1 <sup>25</sup> / <sub>32</sub>	1 <sup>1</sup> / <sub>2</sub>
1 1/2	0.66	2 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>4</sub>
2	1.23	2 <sup>15</sup> / <sub>16</sub>	2 <sup>15</sup> / <sub>16</sub>
2 1/2	1.96	3 <sup>11</sup> / <sub>16</sub>	3 <sup>11</sup> / <sub>16</sub>
3	2.93	4 <sup>1</sup> / <sub>32</sub>	4 <sup>1</sup> / <sub>32</sub>
4	5.95	5 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>4</sub>

Consult price sheet for Made to Order items and for minimum order quantities.

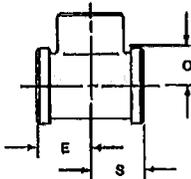
## TEES continued



705-D  
Vent Elbow C x C - Cast

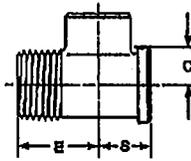
WORR

NOM. SIZE	APPROX. NET WT. LBS.	DIMENSIONS INCHES		
		C	D	S
1/2	0.10	7/16	7/16	25/32
3/4	0.20	9/16	9/16	28/32
1	0.31	23/32	23/32	1 1/32



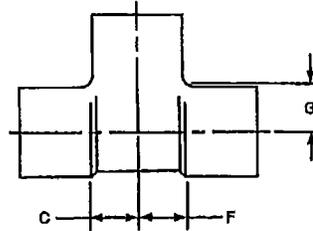
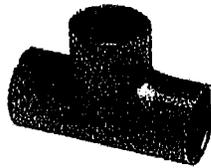
710-3  
Tee F x F x C - Cast

NOM. SIZE	APPROX. NET WT. LBS.	DIMENSIONS INCHES		
		C	E	S
1/2	0.20	9/16	7/8	7/8
3/4	0.37	1 1/16	1	1
3/4 x 3/4 x 1/2	0.31	1 1/16	31/32	31/32
3/4 x 1/2 x 3/4	0.29	1 1/16	1	15/16
3/4 x 1/2 x 1/2	0.27	1 1/16	31/32	7/8



710-3-4  
Tee M x F x C - Cast

NOM. SIZE	APPROX. NET WT. LBS.	DIMENSIONS INCHES		
		C	E	S
3/4	0.34	1 1/16	1 11/32	1
3/4 x 3/4 x 1/2	0.33	1 1/16	1 7/32	31/32



611  
Tee C x C x C - Wrot

NOM. SIZE	APPROX. NET WT. LBS.	DIMENSIONS INCHES		
		C	F	G
3/16 o.d.	0.01	7/32	7/32	7/32
1/8	0.02	1/4	1/4	7/32
1/8 x 1/8 x 1/4	0.02	13/32	13/32	1/4
1/8 x 1/8 x 3/16 o.d.	0.01	1/4	1/4	5/16
1/8 x 3/16 o.d. x 1/8	0.01	1/4	11/32	7/32
5/16 o.d.	0.02	3/8	3/8	5/16
5/16 o.d. x 5/16 o.d. x 1/4	0.02	3/8	3/8	1/4
5/16 o.d. x 5/16 o.d. x 1/8	0.02	3/8	3/8	13/32
5/16 o.d. x 1/8 x 5/16 o.d.	0.02	3/8	13/32	5/16
5/16 o.d. x 1/8 x 1/8	0.02	3/8	13/32	13/32
1/4	0.02	5/16	5/16	1/4
1/4 x 1/4 x 1/2	0.06	19/32	19/32	3/8
1/4 x 1/4 x 3/8	0.04	17/32	17/32	11/32
1/4 x 1/4 x 5/16 o.d.	0.02	5/16	5/16	5/16
1/4 x 1/4 x 1/8	0.02	5/16	5/16	13/32
1/4 x 1/4 x 3/16 o.d.	0.02	5/16	5/16	7/16
1/4 x 5/16 o.d. x 1/4	0.02	5/16	3/8	1/4
1/4 x 1/8 x 1/4	0.02	5/16	13/32	1/4
1/4 x 1/8 x 1/8	0.02	5/16	13/32	3/8
3/8	0.04	11/32	11/32	11/32
3/8 x 3/8 x 1/2	0.07	17/32	17/32	3/8
3/8 x 3/8 x 1/4	0.04	11/32	11/32	15/32
3/8 x 3/8 x 5/16 o.d.	0.04	11/32	11/32	11/32
3/8 x 3/8 x 1/8	0.04	11/32	11/32	11/32
3/8 x 1/4 x 3/8	0.04	11/32	17/32	11/32
3/8 x 1/4 x 1/4	0.04	11/32	17/32	15/32
3/8 x 1/4 x 1/8	0.04	11/32	17/32	9/16
3/8 x 1/8 x 3/8	0.04	11/32	19/32	11/32
3/8 x 1/8 x 1/8	0.04	11/32	19/32	19/32
1/2	0.06	11/32	11/32	11/32
1/2 x 1/2 x 1	0.29	1	1	21/32
1/2 x 1/2 x 3/4	0.12	17/32	17/32	11/32
1/2 x 1/2 x 5/8	0.11	5/8	5/8	7/16
1/2 x 1/2 x 3/8	0.07	5/16	5/16	13/32
1/2 x 1/2 x 1/4	0.06	5/16	5/16	9/16
1/2 x 3/8 x 1/2	0.07	7/16	17/32	3/8
1/2 x 3/8 x 3/8	0.06	5/16	17/32	13/32
1/2 x 3/8 x 1/4	0.06	5/16	17/32	17/32
1/2 x 1/4 x 3/8	0.06	5/16	5/8	9/16

NOTE: Tee sizes are read Run x Run x Outlet.

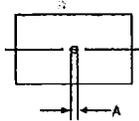
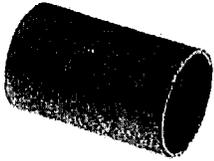
NOM. SIZE	APPROX. NET WT. LBS.	DIMENSIONS INCHES		
		C	F	G
5/8	0.12	7/16	7/16	7/16
5/8 x 5/8 x 3/4	0.15	23/32	23/32	1/2
5/8 x 5/8 x 1/2	0.11	7/16	7/16	13/32
5/8 x 5/8 x 3/8	0.09	7/16	7/16	5/8
5/8 x 5/8 x 1/4	0.09	7/16	7/16	3/4
5/8 x 1/2 x 5/8	0.10	7/16	5/8	7/16
5/8 x 1/2 x 1/2	0.09	7/16	19/32	13/32
5/8 x 3/8 x 5/8	0.10	7/16	3/4	7/16
5/8 x 3/8 x 3/8	0.09	7/16	3/4	5/8
3/4	0.15	1/2	1/2	1/2
3/4 x 3/4 x 1	0.22	23/32	23/32	1/2
3/4 x 3/4 x 5/8	0.16	17/32	17/32	11/16
3/4 x 3/4 x 1/2	0.12	7/16	7/16	17/32
3/4 x 3/4 x 3/8	0.12	7/16	7/16	21/32
3/4 x 3/4 x 1/4	0.12	13/32	13/32	23/32
3/4 x 3/4 x 1/8	0.12	7/16	7/16	13/16
3/4 x 5/8 x 3/4	0.15	17/32	11/16	1/2
3/4 x 5/8 x 5/8	0.15	17/32	23/32	11/16
3/4 x 1/2 x 3/4	0.15	17/32	25/32	1/2
3/4 x 1/2 x 1/2	0.12	13/32	19/32	1/2
3/4 x 1/2 x 3/8	0.12	7/16	21/32	21/32
3/4 x 3/8 x 3/4	0.15	17/32	17/32	1/2
3/4 x 3/8 x 1/2	0.12	7/16	23/32	17/32
3/4 x 3/8 x 3/8	0.12	7/16	23/32	21/32
7/8	0.31	23/32	23/32	23/32
1	0.30	1 1/16	1 1/16	21/32
1 x 1 x 1 1/2	0.60	1 11/32	1 11/32	31/32
1 x 1 x 1 1/4	0.42	1	1	29/32
1 x 1 x 3/4	0.27	9/16	9/16	21/32
1 x 1 x 5/8	0.26	9/16	9/16	7/8
1 x 1 x 1/2	0.23	15/32	15/32	23/32
1 x 1 x 3/8	0.23	15/32	15/32	29/32
1 x 1 x 1/4	0.23	15/32	15/32	1
1 x 3/4 x 1	0.29	1 1/16	7/8	21/32
1 x 3/4 x 3/4	0.26	9/16	23/32	3/4
1 x 3/4 x 1/2	0.22	15/32	21/32	23/32

Continues...

Consult price sheet for Made to Order items and for minimum order quantities.

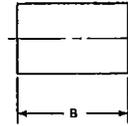
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## COUPLINGS *continued*



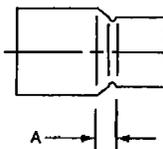
**600-DS**  
Coupling with Dimpled Tube Stop  
C x C – Wrot

NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES
3/16 O.D.	0.01	3/32
1/8	0.01	1/16
5/16 O.D.	0.01	3/32
1/4	0.01	1/16
3/8	0.01	3/32
1/2	0.03	3/32
5/8	0.04	3/32
3/4	0.06	3/32
7/8	0.09	3/32
1	0.11	3/32
1 1/4	0.16	1/8
1 1/2	0.23	1/8
2	0.41	1/8
2 1/2	0.65	1/8
3	0.93	1/8
3 1/2	1.45	5/32
4	1.93	7/32
5	3.53	7/32
6	5.63	7/32
8	14.12	15/32



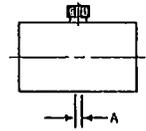
**601**  
Coupling without Stop  
C x C – Wrot

NOM. SIZE	APPROX. NET WT./LBS.	DIM. B INCHES
1/4	0.01	11/16
3/8	0.01	27/32
1/2	0.03	1
5/8	0.04	1 11/32
3/4	0.06	1 19/32
1	0.11	1 29/32
1 1/4	0.16	2 1/16
1 1/2	0.23	2 5/16
2	0.41	2 13/16
2 1/2	0.64	2 15/16
3	0.86	3 5/16
3 1/2	1.40	3 13/16
4	1.84	4 5/16
5	3.50	5 5/16
6	5.60	6 3/16
8	13.68	8 3/32



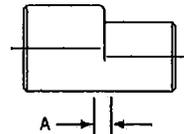
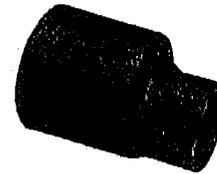
**701**  
Reducing Coupling C x C – Cast

NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES
3 x 1 1/4	1.35	23/32
3 x 1	1.64	27/32



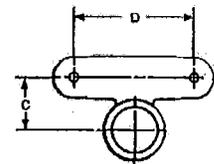
**701-D**  
Drain Coupling C x C – Cast

NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES
1/2	0.08	1/4
3/4	0.14	1/4
1	0.22	1/4



**702**  
Eccentric Coupling C x C – Cast

NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES
3/4 x 1/2	0.10	17/32
1 x 3/4	0.18	1/4
1 1/4 x 1	0.25	1/4
1 1/4 x 3/4	0.24	9/32



**724-5-A**  
Hy-Set Hanger Coupling  
C – Cast

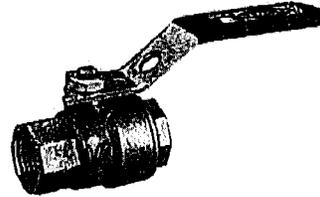
NOM. SIZE	APPROX. NET WT./LBS.	DIM. C INCHES	DIM. D INCHES
1/2	0.05	1 5/8	23/32
3/4	0.09	1 5/8	27/32
1	0.13	1 5/8	1

Consult price sheet for Made to Order items and for minimum order quantities.

# Bronze Ball Valves

Two-Piece Body • Standard Port • Blowout-Proof Stem • TFE Seats

**400 PSI/28 Bar Non-Shock Cold Working Pressure**



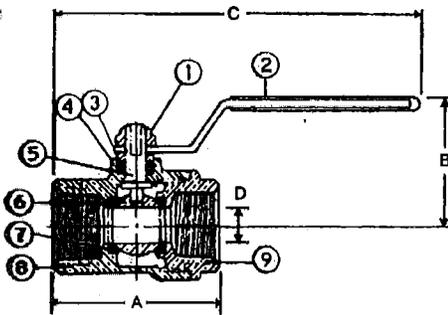
**T-580**  
Threaded



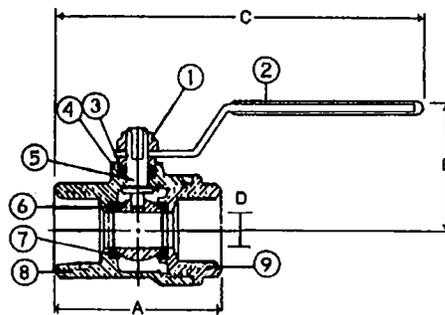
**S-580**  
Solder

### MATERIAL LIST

PART	SPECIFICATION
1. Handle Nut	Zinc Plated Steel
2. Handle	Zinc Plated Steel Clear Chromate Plastisol Coated
3. Packing Gland	Brass ASTM B 16 Alloy C36000
4. Packing	TFE
5. Stem	Silicon Bronze ASTM B 371 Alloy C69400 or ASTM B 16 Alloy C36000
6. Ball	Brass ASTM B 124 Alloy C37700 or ASTM B 16 Alloy C36000
7. Seat Rings	TFE
8. Body	Bronze ASTM B 584 Alloy C84400 or Brass ASTM B 124 Alloy C37700
9. Body End Piece	Bronze ASTM B 584 Alloy C84400 or Brass ASTM B 124 Alloy C37700



**T-580**  
NPT x NPT



**S-580**  
C x C

### DIMENSIONS—WEIGHTS—QUANTITIES

Size	Dimensions										T-580		S-580		
	A		B		C		D Port		T-580		S-580				
In. mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.	Lbs.	Kg.	
1/2	15	2.00	51	1.94	49	1.56	40	4.88	124	4.84	123	.38	10	.50	.23
3/4	20	2.28	58	2.63	67	1.72	44	5.00	127	5.19	132	.50	13	.70	.32
1	25	2.88	73	3.21	82	2.06	52	6.06	154	6.28	160	.75	19	1.20	.54
1 1/4	32	3.41	87	3.81	97	2.31	59	6.34	161	6.56	167	1.00	25	1.80	.82
1 1/2	40	3.75	95	4.25	108	2.81	71	8.56	217	8.81	224	1.25	32	2.90	1.32
2	50	4.44	113	5.21	132	3.06	78	8.88	226	9.25	235	1.50	38	4.30	1.95

**NOTE:** S-580 valves to be soft soldered into lines using solder with the melting point not exceeding 470° F. Higher temperature solders will damage the seat material.



## CHECK VALVE EUROPA #100 1"

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**50-022-038**

### **CHECK VALVE EUROPA #100 1"**

Check Valve #100, Europa. Threaded check valve brass construction body with stainless steel plate and spring. Minimum and maximum working temperatures: -20°C - 100°C with 250 PSI CWP.



*WORR*  
WORR



## Spring Check Valve 1/2" Lead Free, Euro 2000.

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*WORR*  
WORR

**50-022-018**

**Spring Check Valve 1/2" Lead Free, Euro 2000.**  
Spring Check Valve 1/2" Lead Free, Euro 2000.  
Female threaded spring check valve, brass construction body with brass insert, NBR seal and stainless steel spring. Minimum and maximum working temperatures: -20°C - 100°C with 230 PSI cold water pressure.





MUELLER STREAMLINE CO.  
150 Schilling Blvd., Suite 201  
Collierville, TN 38017  
P 901.751.7709

## STANDARD COPPER TUBE

Mueller Copper Tube products are manufactured in the USA. All tubing produced in Fulton, MS, and Cedar City, UT is seamless and of UNS C12200 grade of copper. It is manufactured to meet the chemical, mechanical, cleanness, and eddy current testing requirements of the applicable ASTM specifications set forth below.

Although Mueller Copper Tube strives to meet all requirements specified in the ASTM specifications, Standard Tube may not fully meet ASTM dimensional requirements. Standard Tube will be provided unless Certified Tube is clearly defined on the Purchase Order. When specified at order placement, Mueller Copper Tube can supply Certified Tube to meet all requirements of the current applicable ASTM specification, at an additional cost.

- Streamline Copper Water Tube (Types K,L,M) is produced in accordance with, ASTM B88 and ANSI/ NSF 61\*\*
- Streamline Copper Refrigeration Service Coils are produced in accordance with ASTM B280
- Streamline Nitrogenized ACR Hard Drawn Copper Tube is produced in accordance with ASTM B280
- Streamline Copper Drainage Tube (DWV) is produced in accordance with ASTM B306
- Oxygen & Medical Service Tube - To ASTM B819 (Types K & L) Hard Drawn Straight Lengths Only in accordance to CGA Cleanness Specification; CGA G4.1 (Compressed Gas Association); & NFPA 99 (Health Care Facilities).

\*\* NSF 61 Restriction Statement Copper Tube (Alloy C12200) is certified by Truesdail to NSF/ANSI 61 / 372 for public water supplies meeting or in the process of meeting the U.S. EPA Lead and Copper Rule (56FR 26460, June 7, 1991). Water supplies with pH less than 6.5 may require corrosion control to limit copper solubility in drinking water."

Last revision: May 15, 2020

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**MANUFACTURER – LETTER(S) AUTHORIZED REPRESENTATIVE(S)**

A. PHOTOVOLTAIC SYSTEMS

B. WATER STORAGE SYSTEMS

A. Photovoltaic System

1. Caribbean Energy Distributors
2. Glenn International
3. Sol-Ark
4. Warren del Caribe
5. WARU
6. Wholesale Electric
7. World Technology Corporation
8. World Tech Supply

W

WARR  
WARR

# CARIBBEAN ENERGY

P.O. Box 29155 San Juan. P.R. 00929-0155  
Ph. (787) 750-5566 E. info@cedpr.com

W  
7 de marzo de 2022

WORR  
WORR  
Jonnathan Rivera  
Project Manager  
Venegas Construction Corp.

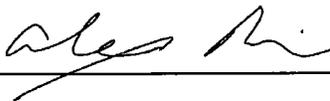
**RE: CDBG-DR-IFB-2022-03**

Saludos,

Por este medio deseo notificar que Caribbean Energy Distributor Corp. es líder autorizado para la comercialización, distribución y venta de las marcas Fortress Power LLC., Schneider Electric Solar Inverters USA, Inc., Sol Ark, IronRidge, MidNite Solar Inc. y TIGO Energy Inc.; entre otras. Cartas de suplidores se incluyen en paquete cotizado.

Siendo distribuidor oficial de las marcas antes mencionadas y de los equipos cotizados; autorizamos a Venegas Construction Corp. para ofrecer y suplir nuestros productos en la licitación CDBG-DR-IFB-2022-03.

Cordialmente,



Ing. Alex G. Rivera Rolón

Vice President & Managing Partner



**GLENN INTERNATIONAL**  
electrical • lighting • telecom  
SINCE 1947

14 de marzo de 2022

W  
  
WRR  
WRR

Sr. Emilio R. Venegas  
Venegas Construction  
472 Tito Castro Ave.  
Ponce, PR 00716

**Re: CDBG-DR-IFB-2022-03 PV Systems & Water Storage Systems**

Estimado señor Venegas:

Confirmamos que **Glenn International, Inc.** es representante autorizado para la venta y distribución de las marcas de equipos para sistemas de energía solar Ironridge, Fortress, Schneider Electric, Outback, Generac, Simpliphi, Canadian Solar, Sunpower, JA Solar, Sol-Ark, Homegrid y SMA, las cuales le ofrecemos para los trabajos de instalación de sistemas de energía solar a llevarse a cabo en el proyecto de referencia.

Siendo **Glenn International, Inc.** representante autorizado para la venta y distribución de las marcas antes mencionadas, por este medio autorizamos a **Venegas Construction**, contratista general, a ofrecer, suplir, e instalar nuestros productos en la propuesta para la subasta, y posteriormente en la ejecución de los trabajos del proyecto de referencia.

Atentamente,

Ricardo M. Díaz  
Chief Financial Officer  
Glenn International, Inc.



*WJ*  
Sol-Ark, LLC  
5833 Curtis Drive, Suite 200  
Parker, Texas 75002

WORR  
WORR  
To Whom It May Concern:

This letter serves to affirm that VENEGAS CONSTRUCTION and TERRA ALTA CONSULTING are authorized distributors of Sol-Ark products. VENEGAS CONSTRUCTION and TERRA ALTA CONSULTING are authorized to purchase, stock and resell all products from Sol-Ark.

Andy Goldstein

A handwritten signature in black ink, appearing to read 'Andy Goldstein', written in a cursive style.

VP Corporate Strategy  
[www.sol-ark.com](http://www.sol-ark.com)



**WARREN-ECM**  
**A Sonepar Company**

March 14, 2022

Ing. Emilio R. Venegas  
Venegas Construction

Dear Mr. Venegas

I hereby inform you that Warren-ECM is an authorized distributor of the brands: Canadian Solar, Unirac, Enphase, Sonnen, Generac, SMA, Fortress, Sol-Ark & Outback, as confirmed by the letters from the manufacturers included in this document.

We hereby authorize **Venegas** to offer, supply and install our products in tender C CDBG-DR-IFB-2022-03.

Cordially,

*Ismael Díaz*  
Ismael Díaz Malavé

Business Developer – Renewable Energy

Carr# 1 KM 29.4 Bo. Rio Cañas

Caguas, PR, 00725

**Warren • Electrical, Training and Industrial Solutions**

P.O. Box 4985 PMB 280 Caguas, PR 007269 • Phone (787) 757-8600 • Fax ( 787 ) 757-8612



WARUENERGY

March 8, 2022

From: WARU ENERGY, LLC

To: Venegas Construction Corporation  
(contact: Jonathan Rivera)

Re. Authorized contractor certification

Through this communication WARU Energy, LLC wishes to certify that Venegas Construction Corporation is an authorized contractor that subcontracts us to supply and/or install our products which includes inverters, battery modules, solar panels, rapid shut down system, racking system, and all the necessary electrical/non-electrical materials that are necessary to perform a Photovoltaic system with backup storage installation with all the required specifications to be certified and approve by the appropriate government agencies.

Cordially,

Sr. Raúl E. Reyes  
Presidente  
WARU Energy, LLC  
Tel. (787) 391-7195

WARU ENERGY, LLC  
Industrial Víctor M Fernández  
315 calle 3  
San Juan, PR 00926

Tel. (787) 680-0008  
[www.waruenergy.com](http://www.waruenergy.com)  
[office@waruenergy.com](mailto:office@waruenergy.com)



WARUENERGY

WDRR  
WDRR



**Wholesale Electric Caribe, Inc.**  
 #22 Calle America Esquina Roosevelt  
 San Juan, PR 00917

8 de marzo de 2022  
 Sr. Jonnathan Rivera  
 Venegas Construction, Corp.

**Re: CDBG-DR-IFB-2022-03 PV Systems & Water Storage Systems**

Estimado Sr. Rivera,

Sirva la presente para comunicar que **Wholesale Electric Caribe, Inc.** es representante (suplidor) autorizado para la venta y distribución de las marcas presentadas a continuación\*, los cuales son componentes para sistemas fotovoltaicos, materiales eléctricos y las que proponemos para la ejecución del proyecto en referencia.

\*Listado de marcas

Sistemas Fotovoltaicos	Materiales Eléctricos	
<b>Placas solares:</b> <ul style="list-style-type: none"> <li>• Longi</li> <li>• Seraphim</li> <li>• Yingli</li> <li>• Risen</li> </ul> <b>Inversores:</b> <ul style="list-style-type: none"> <li>• Schneider</li> <li>• Sol-Ark</li> <li>• SMA</li> </ul> <b>Baterías:</b> <ul style="list-style-type: none"> <li>• Iron Edison</li> <li>• Discover</li> <li>• Fortress</li> </ul> <b>Sistema de Anclaje:</b> <ul style="list-style-type: none"> <li>• Unirac</li> <li>• GripRac</li> </ul>	<b>Tubería PVC:</b> <ul style="list-style-type: none"> <li>• Prime Conduit</li> </ul> <b>Curvas &amp; Accesorios (PVC):</b> <ul style="list-style-type: none"> <li>• ABB (T&amp;B) Carlon</li> </ul> <b>Pega PVC:</b> <ul style="list-style-type: none"> <li>• Lanco</li> </ul> <b>Cables:</b> <ul style="list-style-type: none"> <li>• Viakon</li> </ul> <b>Terminales:</b> <ul style="list-style-type: none"> <li>• Burndy</li> </ul> <b>Amarraderas:</b> <ul style="list-style-type: none"> <li>• ABB (T&amp;B) Catamount</li> </ul>	<b>Tornillería:</b> <ul style="list-style-type: none"> <li>• Metro Fasteners &amp; Industrial Supplies</li> </ul> <b>Centros de Carga (Panelas) con sus Interruptores e Interruptores de Transferencia :</b> <ul style="list-style-type: none"> <li>• Eaton</li> <li>• ABB (GE) Industrial Solutions</li> </ul> <b>Bombillas:</b> <ul style="list-style-type: none"> <li>• Sylvania</li> <li>• Satco</li> </ul> <b>Interruptores de remplazo:</b> <ul style="list-style-type: none"> <li>• Zinsco</li> <li>• Challenger</li> <li>• Federal Pacific</li> </ul>

Siendo **Wholesale Electric Caribe, Inc.** representante autorizado para la venta y distribución de las marcas antes mencionadas, por este medio autorizamos a **Venegas Construction, Corp.**, contratista general, a ofrecer, suplir e instalar nuestros productos en la propuesta para la subasta, y posteriormente en la ejecución del proyecto de referencia.

Cordialmente,

DocuSigned by:  
*Carlos De Jesus*  
 E8FF53C1A77A489

Carlos de Jesús - Gerente de Proyectos  
 Wholesale Electric Caribe, Inc.



**World Technology Corporation**

65 S. Pierson Rd, Maplewood, New Jersey 07040  
Tel: 646 775-4976

March 10, 2022

To Whom It May Concern,

World Technology Corporation is a global solar equipment solutions provider with a proven track record supplying solar projects to over 45 countries with bankable, high quality and cost-effective solar equipment. Energy investors, installers, contractors, developers, and EPCs work with World Technology to create the lowest cost to generate the highest financial return on their projects.

Our exclusive contractual relationships with manufacturer clients enable us to provide products at the lowest available price. Since 1991, we have supplied solar equipment to companies in the USA, Europe, Pacific Rim, and Latin America. Customers gain the benefit of World Technology Corp's global volume pricing and get World Technology's international customer support, quality assurance and warranty support, warehousing and logistics services.

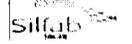
World Technology Corporation is supporting Venegas Construction Corporation on tender #CDBG-DR-IFB-2022-03. Venegas Construction Corporation is one of our most valuable partners with whom we have worked with for several years supplying all required equipment for solar projects in Puerto Rico. Venegas Construction is a very professional company with a strong record in supplying large technology projects in the island.

World Technology Corporation is the Registered Distributor for the following solar products in Puerto Rico:  
IronRidge - solar mounting  
Darfon Solar - hybrid solar inverters  
Sol-Ark - hybrid solar inverters  
Fortress Power - lithium batteries  
Philadelphia Solar - solar power modules

We look forward to supporting Venegas Construction Corporation in executing this important project in Puerto Rico.

Thanks again.

Sincerely,  
Pete Tierney  
Managing Director World Technology Corporation



San Juan, Puerto Rico. 14 de marzo de 2022.

A quien pueda interesar.

En relación al Proyecto: CDBG-DR-IFB-2022-03

Queremos dejarle saber a los interesados, que en **World Technology Supply**, como distribuidores Master para el continente americano, con headquarter en la ciudad de Miami y presencia local en Puerto Rico. Confirmamos que la empresa **Venegas Construction Corp**, es representante autorizado para la venta y distribución de los equipos de sistemas de energía renovable de varias de las marcas que representamos.

Por medio de la siguiente carta queremos dejar constancia que de acuerdo a nuestros estándares, **Venegas Construction Corp**, representada por el Ing. **Emilio Venegas**, cuenta con nuestro apoyo para ofrecer, suplir, e instalar nuestros productos en la propuesta para la subasta, y posteriormente en la ejecución de los trabajos del proyecto de referencia. Las tecnologías que en conjunto representamos son:

- **Hoymiles**, microinversores con garantía de 25 años.
- **Unirac**, como solución de anclaje para sistemas de placas solares con garantía de 25 años.
- Placas Solares **JA Solar** con 25 años de garantía.
- Sistema de batería **SunBeat** con 10 años de garantía.

Sin mas, me despido atentamente,

Rafael E. Davila Vergara  
Strategic Account Director  
World Technology Supply Corp.

B. Water Storage System:

1. HQJ
2. RJ Nido
3. Roto Solutions
4. Water Works

W

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WRR

**B. Water Storage System:**

1. HQJ
2. RJ Nido
3. Roto Solutions
4. Water Works

WJ

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WDRR



14 de marzo de 2022

VENEGAS

Re: CDBG-DR IBF-2022-01 PV Systems & Water Storage Systems

Estimado,

Deseamos notificarle que HQJ Plumbing Supplies es representante autorizado para la venta y distribución de los materiales de plomería y sistemas de cisternas de agua potable cotizados de las siguientes marcas, Everflow, Cambridge Lee, Mueller, Wayne Water Pumps, American Water Heater, La Cisterna, Ecotanke y Hydronix Water Technology, las cuales le ofrecemos para los trabajos de sistemas de cisternas de agua potable a llevarse a cabo en el proyecto de referencia. Siendo HQJ Plumbing Supplies representante autorizado para la venta y distribución de las marcas antes mencionadas, por este medio autorizamos a VENEGAS , contratista general, a ofrecer, suplir, e instalar nuestros productos en la propuesta para la subasta, y posteriormente en la ejecución de los trabajos del proyecto de referencia.

Atentamente

A handwritten signature in black ink, appearing to read 'Jonathan Gonzalez', is written over a light blue horizontal line.

Jonathan Gonzalez

Gerente General

HQJ Plumbing Supplies

plomerlahqj.com



11 de marzo de 2022

W  
Ing. Jonnathan Rivera  
Venegas Construction

WRR  
WRR  
Re: **CDBG-DR-IFB-2022-03 PV Systems & Water Storage Systems**

Estimado Ing. Rivera,

Deseamos notificarle que **Rafael J. Nido, Inc.** es representante autorizado para la venta y distribución de los materiales de plomería y sistemas de cisternas de agua potable cotizados de las siguientes marcas, **Pro-Tank, Tuff-Tank, Tanker, Brown, Pressure Wave, Tubería Cobre Mueller Streamline y Nibco**, las cuales le ofrecemos para los trabajos de sistemas de cisternas de agua potable a llevarse a cabo en el proyecto de referencia.

Siendo **Rafael J. Nido, Inc.** representante autorizado para la venta y distribución de las marcas antes mencionadas, por este medio autorizamos a **Venegas Construction**, contratista general, a ofrecer, suplir, e instalar nuestros productos en la propuesta para la subasta, y posteriormente en la ejecución de los trabajos del proyecto de referencia.

Cordialmente

  
María De León  
Sales Manager  
Rafael J. Nido Inc.

100, Road 866, Candelaria Arenas, Toa Baja, PR 00949  
PO Box 11978, San Juan PR 00922-1978  
787-251-1000 [www.nidogroup.net](http://www.nidogroup.net)



March 11, 2022

Puerto Rico Housing Department  
San Juan, PR

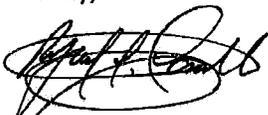
Re: Bid Num. CDBG-DR-IFB-2021-03

To whom it may concern:

This letter serves as confirmation to the Puerto Rico Housing Department that Venegas Construction Corp. is duly authorized representative of Rotosolutions, PR LLC to promote, sell and install its water tanks manufactured in our facilities in Ponce, PR. Also, it is hereby acknowledged that Venegas Construction Corp shall have the authority to offer our tanks for sale to the project of reference.

If any questions may arise regarding this letter do not hesitate to contact us at your convenience,

Sincerely,

  
Rafael Vassallo Collazo  
Vice-President  
Rotosolutions PR LLC  
[vassallof@rotopr.com](mailto:vassallof@rotopr.com)  
Phone: 787-840-0363



P.O. Box 800356 Coto Laurel, P.R. 00780  
787-840-0363



# Water Works Suppliers

**Water Works Suppliers Corporation**  
PO Box 366203, San Juan, PR 00936-6203  
Tel (787) 787-3959 Fax (787) 787-9697

W  
  
WRR  
WRR  
March 14, 2022

**TO WHOM IT MAY CONCERN:**

**REF: *BID PV SYSTEMS, WATER CISTERNS ACQUISITION AND  
INSTALLATION SERVICES CDBG-DR-IFB-2022-03***

We, Water Works Suppliers Corp., are manufacturers and wholesalers of the products to be supplied for the above mentioned auction.

Roto Solutions PR, LLC, Streamline Mueller and E-Pumps Solutions hereby inform you that Venegas Construction Corp. is authorized by our company to supply and install such materials.

If you have any questions regarding this document, please contact me at (787) 479-3030 or [fparache@waterworkspr.net](mailto:fparache@waterworkspr.net)

Cordially yours,

  
Juan F. Parache  
Sales Executive



GOVERNMENT OF PUERTO RICO  
DEPARTMENT OF HOUSING

## SCOPE OF WORK

### Invitation for Bid

### Increase Capacity

### PV Systems, Water Storage System Acquisition, and Installation Services

### Community Development Block Grant – Disaster Recovery

### Puerto Rico Department of Housing

### CDBG-DR-IFB-2022-03

#### 1. Introduction

The Puerto Rico Department of Housing solicits the bids for the purchase of PV Systems and Water Storage System and Installation Services for the Community Energy and Water Resilience Installation Program (**CEWRI**) funded by the Community Development Block Grant – Disaster Recovery (**CDBG-DR**) Program. This document defines the work and requirements the Selected Bidder(s) must perform under a contract with PRDOH across a broad range of the CDBG-DR and Community Development Block Grant – Mitigation (**CDBG-MIT**) funded programs. The process is designed to promote fair and open competition while seeking a cost-competitive solution.

A detailed description of CDBG-DR Programs is included in the Action Plan approved by the U.S. Housing and Urban Development (**HUD**). A complete copy of the CDBG-DR Action Plan is available at [www.cdbg-dr.pr.gov/action-plan](http://www.cdbg-dr.pr.gov/action-plan). A complete copy of the CDBG-MIT Action Plan is available at <https://cdbg-dr.pr.gov/en/download/cdbg-mit-action-plan-effective-on-april-19th-2021/>.

#### Program Overview

The CEWRI Program provides homeowners energy and water efficiency improvements to promote resilience during emergencies with the installation of Photovoltaic System (**PV Systems**) with battery back-up for critical loads and Water Storage System (**WSS**). The CEWRI program also assists homeowners that have been recipients of Rehabilitation, Reconstruction, or New Construction under the Repair, Reconstruction, or Relocation Program (**R3 Program**).

The purchase and installation of PV Systems and WSS are specifically for the homes that have been repaired or reconstructed under the R3 Program. We are defining homes as those involving the construction, alteration, or repair of single-family houses or apartment buildings of no more than four stories in height. Homes that do not fall under this category are not included in this scope of work.

The PRDOH seeks, at its discretion and in the best interest of the program implementation, to award multiple contracts with a two (2) year term of services and an option to extend up to one (1) year. The acquisition of equipment and the required installation services will be made on an as-needed basis and issued on a work order.

No guarantee of the acquisition of any specific quantity or total dollar amount is made. The PRDOH reserves the right to increase or decrease amounts proposed on all goods/services. The PRDOH reserves the right to add or delete goods/services. Proposed

WDRR  
WDRR

quantities represent a reasonable estimate under this contract for bidding purposes. This IFB should be considered an "all or non-basis". However, Bidders are encouraged to provide a bid for all goods and services listed in this Scope of Work. Bidders must provide bids for equipment and installation of Photovoltaic System PV System and Water Storage System.

The selected Bidder will be directly responsible for ensuring the accuracy, timeliness, and completion of all tasks assigned under this contract. Therefore, we encourage a careful analysis of the requirements of this document. The scope of work represents the present need and circumstances at the time the IFB is released. The selected Bidder must guarantee the prices of all the goods/services for the contract term. The PRDOH reserves the right to modify or delete the tasks/goods listed and, if appropriate, add additional tasks/goods before and during the term of the contract.

## 2. PRDOH's Reservation of Rights

The PRDOH reserves the right, without limitations, to:

- (i) Reject any or all bids, to waive any informality in the IFB process, or to terminate the IFB process at any time, if deemed by to be in its best interests.
- (ii) Reject and not consider any bid that does not meet the requirements of this IFB, including but not necessarily limited to incomplete bids and/or bids offering alternate or non-requested services.
- (iii) Cancel this solicitation and reissue the IFB or another version of it, if it deems that doing so is in the best interest of the Public Interest.
- (iv) PRDOH shall have no obligation to compensate any bidder for any costs incurred in responding to this IFB.
- (v) To reduce or increase estimated or actual quantities in whatever amount necessary without prejudice or liability to, if:
  - a. Funding is not available,
  - b. Legal restrictions are placed upon the expenditure of monies for this category.
  - c. PRDOH's requirements in good faith change after award of the contract.
- (vi) Make an award to more than one bidder based on ratings.
- (vii) To require additional information from all bidders to determine level of responsibility.
- (viii) To contact any individuals, entities, or organizations that have had a business relationship with the proposer regardless of their inclusion in the reference section of the proposal submittal.
- (ix) In the event any resulting contract is prematurely terminated due to nonperformance and/or withdrawal by the Contractor, PRDOH reserves the right to:
  - a. seek monetary restitution (to include but not limited to withholding of monies owed) from the Contractor to cover costs for interim services and/or cover the difference of a higher cost (difference between terminated Contractor's rate and new company's rate) beginning the date of Contractor's termination through the contract expiration date.

- (x) Amend the contract(s) of the Selected Bidder(s) to, among others, extend its original duration, as further explained in the IFB, or to extend the scale of its scope to include work under subsequent CDBG-DR and CDBG-MIT action plans as related to the services requested herein, or to reduce the scale of its scope to decrease work as a consequence of underperformance or inexcusable delays related to the services requested herein.
- (xi) To contract with one or more qualified bidders as result of the selection of qualified Proposers or the cancellation of this IFB.

### 3. Requirements

#### 3.1. General Requirements:

- The Bidder selected to provide services regarding Photovoltaic System (**PV System**) must have a minimum of 5 years of experience within the renewable energy sector.
- The Bidder selected to provide services regarding Water Storage System (**WSS**) must have a minimum of 2 years of experience in the installation of WSS.
- The Bidders offering services under this IFB must satisfy both conditions above. All equipment to be supplied and installed by the selected Bidder shall be new, no reconditioned, refurbished, or otherwise used parts or components will be accepted.
- All technical support or any warranty servicing from the manufacturers shall be generated and managed by the selected Bidder once contracted by the PRDOH.
- The selected Bidder shall not provide equipment that is close to the end of life or may become unsupported by the manufacturer during the required warranty period. If any equipment becomes unsupported by the manufacturer, the Bidder will be obligated to replace the equipment with an equivalent that meets the applicable warranty period, with similar or better specifications of the original, without incurring any additional financial obligation from PRDOH.
- All prices submitted by the Bidder shall include all expenses including incidentals, taxes, delivery fees, installation fees, profits, overhead, and any other administrative fees that apply to this acquisition. The PRDOH will not cover any additional costs. Only the unit price submitted for the equipment and installation services will be taken into consideration.
- The PRDOH will not be responsible for reimbursement or expense related to per-diem, tolls, parts or labors for equipment under warranty service.

#### 3.2. Code Compliance:

- Installation and equipment shall comply with applicable building, mechanical, fire, seismic, structural, and electrical codes, included in the Joint Regulation for the Evaluation and Grant of Permits Related to Developments, Land Use, and Business Operations (**Joint Regulation**), as amended. Bidders must abide

by the "Joint Regulation", as amended, "Regulation No. 7796", "Regulation No. 8080," and any other State regulation that regulates the installations within this Program.

- Bidder must install solar system equipment in compliance with Puerto Rico Residential Code 2018 (**PRRC**), National Electric Code (**NEC**), Puerto Rico Electrical Power Authority (**PREPA**) and Permit Management Office (**OGPe**, for its Spanish acronym) Regulations.

### **3.3. Contractor Responsibilities:**

#### **3.3.1. Contractor Levels**

Bidders are required to demonstrate financial resources and meet a Line of Credit or Cash availability requirement as outlined in the Invitation for Bid under Section 6.1.8. Based on the information provided and financial capacity demonstrated, the bidders will be categorized Level 1 Contractor or Level 2 Contractor.

#### **Level 1 Contractor:**

- Level 1 Contractors must demonstrate and meet the financial capacity requirement as outlined in Section 6.1.8.3, entitled "Line of Credit or Cash Availability";
- Will be frequently evaluated and held responsible for the performance of their team and organization, including designers, consultants, suppliers, manufacturers, and subcontractors;
- Will provide periodical status reports to PRDOH and its representatives; and
- Will attend or conduct meeting with the PRDOH and its representatives.

#### **Level 2 Contractor:**

- Level 2 Contractors must demonstrate and meet the financial capacity requirement as outlined in Section 6.1.8.3, entitled "Line of Credit or Cash Availability";
- Will be frequently evaluated and held responsible for the performance of their team and organization, including designers, consultants, suppliers, manufacturers, and subcontractors;
- Will provide periodical status reports to PRDOH and its representatives; and
- Will attend or conduct meeting with the PRDOH and its representatives.

### **3.4. General Responsibilities:**

It is the responsibility of the selected Bidder to deliver quality services in compliance with the project requirements. Also, it is the responsibility of the selected Bidder to:

- Hold the correct permits and licenses necessary to conduct business in Puerto Rico and the city where the project is taking place, and the Bidder must have qualified and licensed personnel as required by the Puerto Rico government to perform PV Systems and/or WSS installations.
- The Designer for the PV Systems must be a licensed engineer in compliance with Puerto Rico's Act Number 173 of August 12, 1988, with the Renewable Solar Energy Installer (Photovoltaic) Certificate from the Public Energy Policy Program (**PEPP**) under the Department of Economic Development and Commerce (**DDEC**, for its Spanish acronym). Must have at least five (5) years of experience performing PV system design. Such designer will also be in charge of the Pre-Installation Assessment.
- PV Systems installers must be a professional with the Renewable Solar Energy Installer (Photovoltaic) Certificate from the Public Energy Policy Program (**PEPP**) under the Department of Economic Development and Commerce (**DDEC**, for its Spanish acronym).
- The Designer for the WSS must be a licensed engineer in compliance with Puerto Rico's Act Number 173 of August 12, 1988. Must have at least two (2) years of experience performing WSS design. Such designer will also be in charge of the Pre-Installation Assessment.
- Uphold a professional demeanor while on a job site.
- Coordinate with PRDOH selected Program Managers (**PMs**) with tasks related to this Scope of Work.
- Coordinate with the selected PM in order to Conduct a Pre-Installation Assessment. This will provide the Designer with the necessary data to perform the design and/or to determine what remediation will be needed for the installation.
- Conduct a pre-award site visit. Assist the PMs during the applicant award process. The Bidder will be responsible for clarifying the owner any design-related clarification that might be needed.
- Perform a Pre-Installation Assessment site visit.
- Perform work after the corresponding reviews, approvals, and or notices to proceed are issued by the selected PRDOH Program Manager.
- Perform work as specified in accordance with all project requirements and all applicable laws and codes.
- Dispose of all materials in a safe manner in accordance with all local and federal regulations.
- Perform commissioning tests and correct any findings. Corrections will be paid by the Bidder, and PRDOH will not reimburse for them.

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- Participate in closeout inspections and address findings.
- Work with PMs to ensure the project is completed within the project timeline and budget while minimizing disturbance.

#### 4. Photovoltaic System:

##### 4.1. Pre-Installation Assessment:

The Bidder shall be responsible for the Pre-Installation Assessment of each project site where installation will be performed. A certified installer, a licensed professional engineer, and/or a licensed architect in Puerto Rico with the expertise of five years or more in the Photovoltaic system industry shall conduct the assessment. Assessment includes but is not limited to the following activities:

- Evaluate the property's roof capacity to support the PV system by completing a roof capacity checklist for home installations. The selected bidder will generate a scope of work based on the findings from the roof capacity checklist. A full evaluation shall provide information on roof load capacity, shading study, and other required studies to allow the system to function properly at the installation site. The Scope of Work generated shall detail the installation plan, either on the roof of the dwelling unit to support its installation and full functionality.
- Shading Analysis: Assess if the proposed array location supports a solar resource potential of more than 75 percent of the same site's optimal solar resource potential.
- Assess the home's interior and exterior elements and determine their conditions to facilitate the installation of conduits and electrical equipment. Home interior and exterior elements may include (but is not limited to):
  - Structural, electrical, plumbing, and HVAC systems installed in the roof;
  - Main panelboard
  - Branch circuits
  - Exterior Shade Element
  - Lightning protection
  - Electrical service entry including overhead wires, electric meter, service entry conductor
  - Other relevant components
- After examining the home's roof elements and determine their condition, other considerations may include (but are not limited to) home site elements:
  - Site restrictions
  - Site accessibility
  - Yards and courts

- Structural analysis: Verify the roof's load capacity to support the equipment load, home's exterior elements, and determine their conditions. Home external elements may include (but are not limited to):
  - Roof weatherproofing and covering including asphalt shingles, wood shingles or shakes, metal roofing, cement shingles, built-up roofing, single-ply membranes, and roll roofing, among others;
  - Skylights;
  - Gutters and downspouts; and
  - Parapets and gables.

The structural analysis shall be conducted by a licensed engineer with a structural engineer degree or studies.

- Equipment Location
  - Determine the best locations for the PV System and all components as per designer and manufacturer's specification.
  - In the Pre-Installation Assessment report and Scope of Work, the selected Bidder must clearly define the location of the PV System and all components in accordance with applicable codes.

#### **4.2. Design Service:**

- Selected Bidder must design a standard photovoltaic system with battery back-up for single-family homes. System shall be capable of running critical loads, some household appliances (refrigerators, water pump, etc.), life support devices, and permit the occupants to shelter-in-place during electrical grid outages. Design should be standard, with minimal deviation to allow for consistency in cost across various single-family homes. The selected Bidder shall adhere to the following design guidelines:
  - A licensed professional structural engineer must certify that the existing roofs are structurally sound for the installation of the PV System and that the proposed system meets code requirement and the requirement of this IFB.
  - System layout shall meet local fire department, code, and ordinance requirements for roof access.
  - The PV System installation shall not interfere with roof drains, water drainage, expansion joints, air intakes, existing electrical and mechanical equipment, and existing antennas.
  - The system shall be directly attached to the roof unless the structural engineer deems the roof incapable of holding the PV System. If the structural integrity of the house does not support the load of the system, then, the applicant will immediately be ineligible for the PV System installation.
  - Racking Structure needs to be corrosion resistant and meet applicable local building code requirements concerning rain, wind, and earthquake factors.

- All penetrations and structural connections associated with supports and conduit shall be kept to a minimum and shall be waterproof.
- All roof penetrations shall be designed and constructed in collaboration with a roofing professional or manufacturer responsible for the roof and roofing material warranty for the specific site. All roof installations and weatherproofing of penetrations shall not compromise the roof warranty, or if the roof has no warranty, accepted best practice. The roof penetration and roof connections shall be warranted for weather tightness from the installer, including parts and labor (see Section 7 in this document for warranty details). The roofing contractor shall provide a warranty letter specifying that the roofing impermeabilization warranty is still in effect after the installation of the PV System.

#### **4.3. Award Visit:**

Refer to Section 6, Other Tasks applicable for services of PV System and Water Storage System, for additional information.

#### **4.4. Permits**

The selected Bidder shall obtain all required permits and licenses for the project. Also, the selected Bidder shall be responsible for any certification and/or notification to the applicable state agencies regarding the services to be provided to each project, including interconnection certifications and fees in accordance with the Act 17 of April 11 of 2019 ("Ley de Política Pública Energética de Puerto Rico"). All fees associated with the permits, notifications, and licenses are the responsibility of the selected Bidder.

Any additional documentation required, or corrections of deficiencies identified by Puerto Rico Electric Power Authority (**PREPA**) or any other permitting agencies, after the certification and notification required by the Program, must be addressed and brought to a conclusion by the Bidder at no additional cost to PRDOH.

#### **4.5. PV System Installation Service:**

- Selected Bidder shall be responsible for acquiring all permits and endorsements for system installation, system operation, and system interconnection in accordance with Act 17 -2019 ("Ley de Política Pública Energética de Puerto Rico").
- Installation of PV System- selected Bidder shall supply, install, and commission the PV System. Installation costs shall be standardized to accommodate installation across various types of single-family homes. System shall only be installed at sites with at least an 75% solar access, systems shall not be installed on roofs with significant shading. If the site does not have at least an 75% solar access, then, the applicant will be ineligible for the PV System installation. Inverters and batteries shall be installed in a shaded location and shall not be exposed to direct sun light.
- Install materials following the manufacturer's requirements.

- Provide all labor, materials, tools, equipment, and services required to complete the project as specified.
- Responsible for the cost of all items required for a complete and operating system.
- The selected Bidder shall be obligated to maintain a torque log of the installations, following designers' specifications.
- No material should be installed if:
  - Materials are not compatible with existing conditions.
  - Installation of materials violates equipment warranty.
  - Installation is not to code or industry standard.
  - Such are not in compliance with the conditions established by the program, federal or state regulations or this IFB.
- The PV System installations shall follow the best installation practices described by the National Renewable Energy Laboratory (**NREL**) in the following documents or any other industry related document:
  - Solar Photovoltaic in Severe Weather: Cost Consideration for Storm Hardening PV Systems for Resilience
  - Solar Photovoltaic Systems in Hurricanes and Other Severe Weather

The United States Department of Energy Guidance's mentioned above are included as an attachment to this IFB.

#### **4.6. Commissioning**

- Perform commissioning and Inspection following the International Electrotechnical Commission (**IEC**) standard IEC 62446, any local or state regulation, program requirements, and correct any finding. The commissioning should verify that the project is performing as per project design.
- The designer shall perform commissioning of the entire PV system. This data shall be used to confirm the proper performance of the PV system. Performance tests shall be conducted at the final commissioning/acceptance testing. A digital copy of the commissioning report must be uploaded into Canopy and/or any other PRDOH management tool. A second system re-commissioning is mandatory at the end of the first year of operation. A re-commissioning report will be provided to PRDOH after the re-commissioning has been performed. In the event of a re-commissioning test failure, the Bidder will be responsible for the corrections, repairs, and proper functioning of the system.

#### **4.7. Inspection**

Refer to Section 6, Other Tasks applicable for services of PV System and Water Storage System, for additional information.

#### 4.8. Technical Specifications for PV systems:

- The program offers standard packages for PV systems and battery storage based on the following two scenarios:

- **Scenario #1:** For dwelling units where an ENERGY STAR refrigerator that consumes 489 kWh/yr or less is present, the following package will be installed. A standard package of a required system minimum of **3kW DC<sup>1</sup>** PV modules with a minimum Battery bank voltage of **48V<sup>2</sup>** and a required battery bank output of a minimum of **9 kWh<sup>3</sup>** with an **autonomy of 20 hours** for units with Energy Star Refrigerators; loads also includes one medical life support device. The required battery chemistry is Lithium-Ion.
- **Scenario #2:** For dwelling units where a non-ENERGY STAR refrigerator that consumes 489 kWh/yr or less is present and such refrigerator would not be replaced or the applicants do not wish to replace it with an ENERGY STAR Refrigerator, the following package will be installed. A standard package of a required system minimum of **4.3 kW DC** PV modules with a minimum Battery bank voltage of **48V** and a required battery bank output of a minimum of **12.8 kWh** with an **autonomy of 20 hours** for households with no Energy Star certified Refrigerators; loads also includes one medical life support device. The required battery chemistry is Lithium-Ion.

Both standard packages shall have the capability of supplying electricity to an itemized list of devices, appliances and lighting fixtures identified as critical loads. The system will supply electricity to the critical loads independently as a stand-alone system, with the capability of interconnecting with the grid. For the purpose of the CEWRI Program, the Bidder must submit to PREPA the Interconnection package. Nevertheless, the approval of the Interconnection by PREPA will not be required for the closeout of the case.

- Systems shall be capable of running critical electrical loads, some household appliances and equipment (refrigerators, lighting, water pump, etc.), life support or medical devices, and permit shelter-in-place occupants' ability during electrical grid outages. Design should be standard, with minimal deviation to allow for consistency in cost across various single-family homes. In the event of a power outage, the protected appliances, tank's water pump, medical devices, and any load connected to the PV and battery back-up system will continue to work with no disruptions.
- The selected Bidder shall perform all professional services as necessary to provide applicants with a complete design of the proposed project. The system shall be designed and engineered to maximize the solar energy resource, considering the residents' electrical demand and load patterns, proposed installation site, and available solar resource. After concurrence of a final design by PRDOH's Program Manager, the selected Bidder shall provide

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<sup>1</sup> kW stands for kilowatt and DC for direct current.

<sup>2</sup> V stands for voltage.

<sup>3</sup> kWh stands for kilowatt hour.

all necessary materials, equipment, and labor to complete the PV System installation and interconnection with the electrical grid in accordance with Act 17 of April 11 of 2019 ("Ley de Política Pública Energética de Puerto Rico").

- The selected Bidder shall also provide and install a manual transfer switch to allow for system operation in standalone mode.
- The selected Bidder shall also provide to the applicant written instructions and procedures for shutdown and start-up activities for all system components.
- Photovoltaic (**PV**) Modules
  - PV modules shall be a commercial off-the-shelf product, must be OGPe Certified.
  - PV modules shall have a 25-year limited warranty that modules will generate no less than 80 percent of rated output under Standard Test Conditions (**STC**). PV modules that do not satisfy this warranty condition shall be replaced.
  - Modules shall be through-bolted to the underlying racking; top down clamps shall not be used under any circumstances, unless the designer specify the contrary.
  - The PV system shall be physically attached to the building roof and tilted at 5 to 10 degrees to the south.
- Inverter(s)
  - Inverters shall be a commercial off-the-shelf product,
  - The inverter shall have at a minimum the following features:
    - OGPe Certification
    - UL/ETL<sup>4</sup> listed
    - Peak efficiency of 96 percent or higher
    - Inverter shall have operational indicators of performance and have built-in data acquisition and remote monitoring.
    - Warning labels shall be posted in compliance with local and federal regulations
    - Operating instructions shall be posted on or near the system and on file with facilities operation and maintenance documents.
    - Provide detailed instructions on how to turn of the equipment.
    - The inverter shall be 120/240 V split phase.
    - The inverter must provide a Pure Sine Wave.
- Electrical Wiring
  - Areas where wiring passes through ceilings, walls, or other areas of the residence shall be adequately restored, booted, sealed, and returned to their original condition.

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<sup>4</sup> Acronyms stand for the following respectively: Underwriters Laboratory/Electrical Testing Laboratories

- It is mandatory to include a subpanel for the critical loads served by the PV with battery inverter System.
- Structural Components
  - All structural components shall be non-corrosive (preferably marine stainless steel or aluminum). All hardware shall be marine stainless steel or aluminum. All components shall be designed to obtain a minimum 20-year design life.
  - All connections shall be bolted and torqued to specified value. Under no circumstances shall clamping systems or self-tapping sheet metal screws be used to hold:
    - Underlying structural frame members together
    - Module frame to underlying structural frame member
- Back-Up Storage System
  - The required battery chemistry is Lithium-Ion.
  - The required battery bank voltage is 48 V.

## 5. Water Storage System (WSS):

### 5.1. Pre-Installation Assessment"

The designer shall be responsible for the Pre-Installation Assessment of the projects to be performed a service. A certified installer, a licensed professional engineer, and/or licensed architect in Puerto Rico with the expertise of five years or more in the construction industry shall conduct the assessment (except for the load analysis, which must be performed by a licensed professional structural engineer). Such task includes but is not limited to the following activities:

- Evaluate the property's roof's capacity to support the WSS system by completing a roof capacity checklist for home installations. The selected bidder will generate a scope of work based on the findings from the roof capacity checklist. A full evaluation should provide information on roof load capacity and all required analysis to allow the system to function properly at the installation site. The Scope of Work generated shall detail the installation plan, either on the roof of the dwelling unit to support its installation and full functionality.
- Assess if the proposed equipment can be located on the rooftop without interfering with the other equipment mounted and/or to be mounted on it.
- Assess the home's interior and exterior elements and determine their conditions to facilitate the WSS components installation. This assessment should be included within the PV System assessment whenever possible. Home interior and exterior elements may include (but are not limited to):
  - Structural, electrical, plumbing, and Heating, Ventilation, and Air Conditioning (**HVAC**) systems installed in the roof.
  - Main panelboard

- Any electrical conduit that might interfere with the WSS components installation.
- After examining the home's roof elements and determining their condition, home site elements shall be examined which include (but are not limited to):
  - Site restrictions
  - Site accessibility
  - Yards and courts
- Verify the roof's load capacity to support the equipment load, home's exterior elements, and determine their conditions. Home external elements may include (but are not limited to):
  - Roof weatherproofing and covering including asphalt shingles, wood shingles or shakes, metal roofing, cement shingles, built-up roofing, single-ply membranes, and roll roofing, among others.
  - Skylights
  - Gutters and downspouts
  - Parapets and gables
  - Lightning protection
  - Electrical service entry including overhead wires, electric meter, service entry conductor

### **5.2. Design Service:**

Selected bidder must design the Water Storage System for single-family homes following the requirements stated in Section 4.8 of this Scope of Work (Technical Specifications for the Water Storage System).

### **5.3. Award Visit:**

Refer to Section 6, Other Tasks applicable for services of PV System and Water Storage System, for additional information.

### **5.4. Water Storage System Installation Services**

- Selected Bidder shall be responsible for acquiring all equipment and be responsible for its installation.
- Selected Bidder shall be responsible for all permits and endorsements for system installation (as required).
- Installation of Water Storage System- Selected Bidder shall install the Water Storage System. Installation costs shall be standardized to accommodate installation across various types of single-family homes.
- Install materials following the manufacturer's requirements. The Selected Bidder must coordinate with PV system installers to make sure the water pump is connected to a PV standalone electrical system circuit (as required).

- The water pump shall not shade or otherwise obstruct to the photovoltaic modules.
- Provide all labor, materials, tools, equipment, and services required to complete the project as specified.
- Responsible for the cost of all items required for a complete and operating system.
- No materials shall be installed if:
  - Materials are not compatible with existing conditions.
  - Installation of materials violates equipment warranty.
  - Installation is not to code or industry standard.
  - Materials are not in compliance with the conditions established by the program, federal or state regulation or this IFB.

**5.5. Inspection:**

Refer to Section 6, Other Tasks applicable for services of PV System and Water Storage System, for additional information.

**5.6. Technical Specifications for Water Storage System:** The selected Bidder shall obtain all necessary equipment, materials, design, and testing services for the installation of the WSS. The system shall:

- Provide domestic water to the home from the water storage tank using an electric water pump, controls and a diaphragm type pressurized tank to provide back-up water supply to the domestic water line. Tank should be sized to meet water needs of the home by providing an adequate level of pressure without damaging water fixtures. The WSS shall supply each household at least two days of potable water supply during a disaster scenario.
- If the roof structure allows, the water storage tank shall store a maximum capacity of 500 Gallons per household, complete with all its necessary accessories and instrumentation for full functionality of water storage and distribution within the home during a disaster scenario. The capacity of the tank should be defined by the designer according to the household needs. The water storage tank shall be connected to the utility's main water line with a water level control valve and backflow preventer designed to prevent backflow from the water storage tank to the utility main water line. The water storage tank shall have instrumentation to monitor and control pressure and water level.
- The water storage tank shall be located on the rooftop of the home. If the structural integrity of the house does not support the load of any of the applicable water tank size options, then, the applicant will immediately be ineligible for the WSS installation.

- In case the house loses power, the electric pump should be able to work off-grid from the main electrical utility supported by the PV and battery system granted to the applicant from the CEWRI program, when applicable.
- The water storage tank shall be constructed of ultraviolet (UV) and corrosion resistant material, approved for potable water, and have the Food and Drug Administration (FDA) and the National Safety Foundation (NSF) approval.
- Other related material for complete installation should include but is not limited to:
  - Pump: ½ horsepower with pressurized tank
  - Diaphragm type pressurized tank should be sized to provide adequate pressure to meet the water demands of the home.
  - Piping: Only copper piping is authorized. Sediment filter: Should be able to filtrate 10 microns particles.
  - Sensor level: Recommended use whenever possible.
  - Install a Buoy
  - Backflow prevention system to prevent cross-connection between household water system and water main.
  - The water storage tank must be watertight and intended for potable water use.
- All water storage tanks must be specifically manufactured for potable water use in accordance with FDA food-grade specifications, NSF standards, or other nationally recognized standards for potable water. Documentation from the manufacturer stating that tanks are approved for potable water must be available for inspection. Water Storage tanks must be installed according to the manufacturers' specific instructions.
- All water storage tanks must be vented to allow the free flow of air into and out of the tank as the water level inside the cistern changes. The vent opening must be turned down and must be screened with a 24-mesh screen cloth to prevent the entry of insects, birds, and other animals.
- Connect to water utility main to provide continuous flow of water through the water storage tank.
- Before filling and using, the water storage tank and pressure tank must first be cleaned and disinfected.
- Disinfection of the water storage tank and pressure tank after installation is mandatory, and the selected Bidder must follow the manufacturer's recommendation for potable water systems.

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## **6. Other tasks applicable for services of PV System and Water Storage System:**

### **6.1. Pre-Installation Assessment Visit, Report, and Case Work Orders**

- Perform a Pre-Installation Assessment visit to each dwelling units and develop the Pre-Installation Assessment report for each case project. Submit report to the PMs for approval.
- Develop case Scope of Work for each project. Submit scope of work to the PMs for approval.

### **6.2. Award Visit:**

The Selected Bidder will perform the following tasks during the award visit including but not limited to:

- Perform award visit with the PMs to each applicant's property to complete the Project Grant Agreement.
- Perform orientation to Applicants of the measures that are being offered and that may be installed in the unit.
- Ensure that the applicant is informed on the process, the works to be performed, and the conditions of the award prior to any work being performed.
- Assist the PMs during the applicant award process. The Bidder will be responsible for clarifying the owner any design-related clarification that might be needed.

### **6.3. Inspection**

The Selected Bidder will visit the project site along with the PRDOH Program Manager and inspect works for overall quality standards. Upon completion of the installation, PM's Inspector will perform an inspection of the physical installation, as well as all paperwork submitted by the selected Bidder. Once on-site, the PM's Inspector shall ensure that all contractually agreed upon work was completed and confirm:

- That the equipment installation is in accordance with the design and installation drawings and specifications.
- That the model of the equipment installed is in accordance with the designer's specifications.
- Quality workmanship of installation.
- A brief review of findings as compared to the initial description of the site, scope of work, any change order(s) and final invoice.
- All warranties are included and active.

During the post-install site inspection, the Inspector will record any corrections to the installation that need to be made by the selected Bidder. If, during the post-installation inspection, the Program finds discrepancies between the work performed and the scope of work, installation standards and/or equipment specifications, the selected Bidder will be responsible, at the selected Bidder's

expense, for bringing the installation into conformance before the selected Bidder is paid. Installation corrections, as noted during final acceptance or the post-installation inspection, shall be performed within ten (10) business days. If the selected Bidder cannot undertake corrective actions within ten (10) business days, the Selected Bidder shall deliver to the PM, in writing, reasons for the delay. PM shall determine validity and allow for a delay no longer than twenty (20) calendar days after validity is determined. Any discrepancies or disagreements between PM and selected Bidder shall be escalated to the adjudicating official within PRDOH.

#### **6.4. Orientation and Training to Applicants**

- The Selected Bidder shall perform orientation and training to the Applicants regarding operation and maintenance of the installed systems and equipment.
- Selected Bidder must deliver all applicable Operation and Maintenance Manuals of the installed systems to each Applicant receiving a system along with any other required documents.

#### **6.5. Health and Safety:**

The Selected Bidder shall observe and comply with all applicable laws, ordinances, codes, and regulations of governmental agencies, including federal, state, municipal, and local governing bodies having jurisdiction over any or all of the scope of services, including all provisions of the Occupational Safety and Health Act of 1979 as amended, and all other applicable federal, state, municipal and local safety regulations. All services performed by the Selected Bidder must be in accordance with these laws, ordinances, codes, and regulations. The Selected Bidder shall release, defend, indemnify and hold harmless the PRDOH, its officers, agents, volunteers, and employees from all damages, liability, fines, penalties, and consequences from any non-compliance or violation of any laws, ordinances, codes, or regulations. Additionally, the following requirements must be met:

- The Selected Bidder must develop and submit to the PMs a safety plan for approval.
- Provide a statement of how your firm will be prepared to work within the project timeline and on time, ensure conformance with quality control standards, and respond to quality control issues during and after completing the project.
- Develop, monitor, and implement health and safety policies as to ensure that projects follow health and safety laws and regulations, in order to reduce or prevent hazards, dangers, and accidents.
- All roof access points shall be securely locked at the end of each day.
- Suppose a release of hazardous materials or hazardous waste that cannot be controlled occurs connected with this contract's performance. In that case, the Selected Bidder shall immediately notify the appropriate public safety service (police, fire rescue, or emergency medical services), PRDOH Program Director, and project designees. The

Selected Bidder shall not store hazardous materials or hazardous waste without proper permits.

#### **6.6. Damage and Disposal:**

The Selected Bidder shall proceed with work in a manner that does not damage existing materials/infrastructure unless otherwise directed by Organization:

- The Selected Bidder shall document pre-existing damage to the materials/infrastructure and report any such damage to the PMs.
- The Selected Bidder shall repair at its expense damage to buildings and equipment caused by this project's work.
- The Selected Bidder shall remove all materials, equipment, and debris immediately upon completion of the project or at the end of each workday (unless the dwelling unit owner agrees to provide storage space).
- The Selected Bidder shall keep access to all areas of the dwelling unit clear.
- The Selected Bidder shall not use on-premises refuse containers for disposal of any material whatsoever without prior approval of CEWRI PMs.
- The Selected Bidder shall protect people and property from damage and debris at all times during the construction process.

#### **6.7. Hazardous Material Clean-Up:**

All surfaces and articles contaminated by hazardous materials during this work shall be cleaned in accordance with all applicable laws, codes, and ordinances and be transported safely to the appropriate destruction/servicing facilities. The Selected Bidder shall comply with the regulations to manage hazardous waste as specified in the [applicable state code].

#### **6.8. Reporting**

The selected Bidder should be responsible for the creation and submission of the following reports to the CEWRI Program Manager:

- Pre-Installation Assessment Report
- Systems Installation Report
- Project Commissioning Report
- Pre-Inspection Package documentation in support to the requested CEWRI inspection to ensure that current works performed merit the Final Inspection. If documentation submitted to the Program Manager does not merit a Final Inspection, the Program Manager shall deny the Final Inspection request to the PRDOH PV system and water storage system contractor and state the reasons as to why the CEWRI inspection was denied.

**7. Warranty:** Selected Bidder shall warrant all its products for the following period:

- **Ten (10) years** guarantee for the Solar Photovoltaic System Panels.

- **Twenty-five (25) years** of Linear Performance Guarantee for the Solar PV modules.
- **Ten (10) years** guarantee on Battery Bank and inverter.
- **Five (5) years** for the WSS.

Warranties shall include:

- Parts, labor, faulty material, manufacturing defects, defective items, emergency works of the systems and installation costs related to the failure of equipment under warranty (when due to equipment failure during the warranty period during the ten years of operation for PV system and five years of operation for the WSS).
- Repair or replacement of all system components for both systems, including but not limited to faulty material, manufacturing defects, during the warranty period.
- All unscheduled or emergency warranty works must be completed within (7) seven days of notification to Selected Bidder from the homeowner at no additional cost to PRDOH or the homeowner during the warranty period. If the 7-day period is not enough due to equipment shortage, the selected Bidder must provide a written explanation and a copy of the equipment's delivery documents.
- Full warranty documents for all installation shall be submitted to the Applicants and in duplicate to the CEWRI PMs firm.

**After full payment for the installation, no further costs will be paid by PRDOH**

**8. Deliverables:** The key deliverables to be provided include, but are not limited to, the following:

- Selected Bidder must submit monthly reports to CEWRI Program Manager and PRDOH. Monthly reports shall be due the fifth (5<sup>th</sup>) day of each month and shall include:
  - Copies of all notifications from CEWRI PMs
  - Inspection orders placed within previous calendar month and inspection reports, as applicable.
  - Notices to begin the design phase within the previous calendar month
  - Notices of accepted/rejected designs within previous calendar month
  - Locations of all pending and completed tasks within the previous calendar month.
  - Explanation of pending and completed design tasks within the previous calendar month.
  - Explanation of pending and completed installation tasks within the previous calendar month.
  - Copies of all payment requests sent to PM within the previous month.
  - Payment receipt notifications with the date payment was received.

- Selected Bidder must develop and submit to the PMs the following but not limited to:
  - Pre-Installation Assessment Visit and Report for each project
  - Case Scope of work for each project.
  - System Designs for each Projects
  - Systems Installation Report
  - Commissioning Report
  - All technical documentation, including Component's data sheets and listing
  - Warranties
  - Installation and operation manuals
  - As-built version of system drawings, cable lists and routing, wirings, grounding system,
  - Any other documentation required or requested by PRDOH.
- Selected Bidder must provide the equipment and installations in accordance with Section 9, Delivery Schedule.

## 9. Delivery Schedule

- Coordinate with Applicant and CEWRI Program Manager for any pre-installation assessment visits, installation, and closeout inspections.
- Upon notice from the CEWRI PM firm, the selected Bidder shall, within three (3) working days, perform the pre-installation assessment and report.
- Upon notice from the CEWRI PM firm, the selected Bidder shall, within six (6) working days, perform the design of the project.
- Upon notice from the CEWRI PM firm, the selected Bidder shall, within seven (7) working days, install the system(s), perform the commissioning of the project, submission of the Interconnection Package to PREPA, and submission of the Pre-Inspection Package. If the 7-day period is not enough due to equipment shortage, the selected Bidder must provide a written explanation and a copy of the equipment's delivery documents.
- Upon completion of installation, Selected Bidder shall submit the official payment request to CEWRI PM with all applicable documentation, including warranty. Warranty documentation shall be submitted in duplicate (one for PM/PRDOH and one for the homeowner/applicant) Selected Bidder is responsible for delivering warranty information to the homeowner/applicant.

## 10. Terms and Conditions

The following terms and conditions are designed to state expectations relating to the project and the selected Bidder's work performed. Should the Selected Bidder deviate from these standards and guidelines, all costs and liability associated with the observed deviation will be the Selected Bidder's sole responsibility.

### 10.1. Interpretation of Scope of Work:

The selected Bidder is responsible for reading and fully understanding the scope of work. The design-build approach allows for continual collaboration; however, any proposed changes to the original proposal must be approved in writing by the Selected Bidder and PM through the change order process before proceeding.

**10.2. Existing Conditions:**

The selected Bidder is responsible for verifying the installation site's existing conditions as reported in this Invitation for Bids before construction begins.

**10.3. Installation Schedule:**

The selected Bidder will complete the installation within the timeline described in **Section 9**. Once the installation has begun, the selected Bidder is required to be on-site every day during regular business hours (or at a time pre-arranged with PRDOH) for the full work period until the installation is complete.

- The selected Bidder shall have all required materials in stock prior to beginning installation.
- The selected Bidder shall give the PMs an estimate of the date the installation will be completed and shall inform the PMs if the installation appears to be taking longer than the original estimate.
- Corrections as identified during final acceptance or as a result of the quality control process shall be performed within ten (10) business days unless the problem interrupts PRDOH normal business operations or presents a health and safety threat, in which case the correction shall be made immediately. Exceptions to this rule shall be granted in circumstances beyond the control of the Selected Bidder (e.g., unforeseen existing conditions, material backorders, etc.). The selected Bidder shall notify PRDOH (verbally and in writing) that the correction will or may violate this provision.

**10.4. Communication:**

The selected Bidder shall respond to information requests within two (2) business days. Response form will be determined by the request. The response may be in the following forms but not be limited to: E-mail, hardcopy, fax.

**10.5. Change Orders and Scope of Work Modification:**

The contract may be increased or decreased after the proposal is accepted. Under no circumstances shall the selected Bidder deviate from the work defined in the scope of work without advance written approval from PRDOH.

**10.6. Final Acceptance:**

A project will not be considered complete until all project steps are completed, including quality control inspection, training, and all project deliverables.

**END SCOPE OF WORK**

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GOVERNMENT OF PUERTO RICO  
DEPARTMENT OF HOUSING

**Exhibit O-1  
COST FORM**

**Invitation for Bids  
Increase Capacity**

**PV Systems, Water Storage System Acquisition, and Installation Services  
Community Development Block Grant – Disaster Recovery/MIT  
CDBG-DR-IFB-2022-03**

**Name of Proposer:** Venegas Construction Corp.

**Cost Form 1. Unit Pricing**

Equipment Description <sup>(1)</sup>	Price per Unit
<b>Photovoltaic (PV) System with Battery Storage and related Services<sup>(5)(6)</sup></b>	
Cost per Watt (\$/W DC)	\$8.00
<b>Water Storage System (WSS) and related Services<sup>(4)(5)(6)(7)</sup></b>	
300 gallons WSS	\$4,100.00
350 gallons WSS	\$4,140.00
400 gallons WSS	\$4,150.00
450 gallons WSS	\$4,400.00
500 gallons WSS	\$4,435.00

**Notes**

- (1) All equipment to be submitted with the Bid to comply with the specifications for such included in the Scope of Work.
- (2) Bidder shall submit technical/specification documentation for all equipment offered as part of the bid.
- (3) All equipment offered as part of the bid is subject to the Warranty conditions set forth in the Scope of Work.
- (4) Bids which do not contain pricing for every item requested will be considered unresponsive by the PRDOH.
- (5) Pricing must include all services associated with the PV System and WSS included in the Scope of Work.
- (6) Pricing must include all expenses, including incidental, taxes, handling, and delivery costs, as well as any other administrative costs associated with the goods and services. The PRDOH will not consider any additional costs. Only the unit prices submitted will be taken into consideration. The PRDOH will not be responsible for reimbursement of expenses related to per-diem, tolls, parts, or labors for equipment under warranty.
- (7) Bidders shall provide the pricing for water storage systems inclusive of a 0.5 horsepower (hp) water pump with a pressurized tank and copper tubing/connections.

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Bidder's Initials: \_\_\_\_\_

**Name of Proposer:** Venegas Construction Corp.

**Cost Form 2. System Pricing**

Equipment Description <sup>(8)</sup>	Price per Unit	Qty. <sup>(16)</sup>	Total
<b>PV System with Battery Storage and related Services<sup>(11)(12)(13)</sup></b>			
3 kW DC with 9kWh/day Battery Storage	\$24,065.00	675	\$16,243,875.00
4.3 kW DC with 12.8 kWh/day Battery Storage	\$30,500.00	225	\$6,862,500.00
<b>[A] Sub-Total PV System</b>			<b>\$23,106,375.00</b>
<b>Water Storage System and related Services<sup>(11)(12)(13)(14)(15)</sup></b>			
500 Gallons	\$4,435.00	720	\$3,193,200.00
<b>[B] Sub-Total Water Storage System</b>			<b>\$3,193,200.00</b>
<b>Total (PV System + Water Storage System): [A]+[B]</b>			<b>\$26,299,575.00</b>

**Notes**

- (8) All equipment to be submitted with the Bid must comply with the specifications included in the Scope of Work.
- (9) Bidder shall submit technical/specification documentation for all equipment offered as part of the bid.
- (10) All equipment offered as part of the bid is subject to the Warranty conditions set forth in the Scope of Work.
- (11) Bids which do not contain pricing for every item requested will be considered unresponsive by the PRDOH.
- (12) Pricing must include all services associated with the PV System and WSS included in the Scope of Work.
- (13) Pricing must include all expenses, including incidental, taxes, handling, and delivery costs, as well as any other administrative costs associated with the goods and services. The PRDOH will not consider any additional costs. Only the unit prices submitted will be taken into consideration. The PRDOH will not be responsible for reimbursement of expenses related to per-diem, tolls, parts, or labors for equipment under warranty.
- (14) Bidders shall provide the pricing for water storage systems inclusive of a 0.5 horsepower (hp) water pump with a pressurized tank and copper tubing/connections.
- (15) For quotation purposes, the Bidder will quote for the 500-gallon WSS. The PRDOH will determine, during the assessments of applications, which WSS will be installed at each project from those included in Cost Form 1.
- (16) Maximum quantity of applications included in the Cost Form are the PRDOH's expectation for the current CEWRI allocation of the program at the moment. Therefore, the actual quantities of applications, and therefore units, to be included in the Selected Bidder's contract and that the Selected Proposer might be able to perform will be dependent on the final number of Selected Bidders that might be awarded through the IFB. For Level 1 Contractors, this does not limit the PRDOH in amending the contract of any Selected Bidder to include additional estimated quantities of applications based on performance metrics of the Selected Bidders and according to the Program funds availability. For Level 2 Contractors, PRDOH reserves the right to amend the contracts to include additional applications based on performance metrics up to 500 PV systems and 400 WSS.

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Bidder's Initials: \_\_\_\_\_

**Name of Proposer:** Venegas Construction Corp.

Cost Type	Total Amount
PV Systems- Acquisition and Installation	\$23,106,375.00
WSS – Acquisition and Installation	\$3,193,200.00

**TOTAL BID COST      \$26,299,575.00**

Sum of **(a)** PV Systems – Acquisition and Installation Cost; plus, **(b)** WSS – Acquisition and Installation Costs.

Notes on TOTAL PROPOSAL COST:

1. The TOTAL PROPOSAL COST represents the potential total cost for the equipment and services requested for all the PV Systems, Water Cisterns Acquisition and Installation Services.
2. The PRDOH aims to contract, at its discretion and in the best interest of the overall programs' implementation, one or more bidders(s).
3. Based on the number of Bidders finally awarded through this IFB, contracts may be signed to manage quantities of systems lower than those considered in this Cost Form.
4. PRDOH will reserve the discretion to amend contracts of awarded Bidders(s) to include additional amounts of systems based on performance metrics.
5. The Bid is to be awarded to the "Responsible Bidder" that submitted the "Responsive Bid" with the lowest cost, taking in consideration the Contractor Levels and Cost Forms. The Contractor Level must not be used as subterfuge to submit a lower Bid Bond.

**END OF COST FORM**

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GOVERNMENT OF PUERTO RICO  
DEPARTMENT OF HOUSING

## Attachment D

### ATTACHMENT D

### PERFORMANCE REQUIREMENTS

**Increase Capacity PV System and Water Storage System Acquisition and Installation Services  
Invitation for Bids. CDBG-DR-IFB-2022-03**

#### Scope of Work

The Contractor is responsible for compliance with all aspects of the Scope of Work included as **Attachment B** of the Contract.

#### Practice of Licensed Professions

Contractor and its subcontractors, agents, and employees, shall comply with all applicable federal and local laws and regulations, including but not limited to those that relate to the practice of licensed professions and those that could affect the Contractor's ability to carry out the Scope of Work under the Contract. Contractor certifies that it possesses all necessary permits, endorsements, and approvals necessary to perform the Work, which are to be valid and updated for the duration of the Contract. Contractor and each of its employees, agents, subcontractors, and subconsultants must have all licenses, permits, authorizations, consents, and approvals necessary for the performance of the Scope of Work under the contract, and such licenses, permit, authorizations, consents, and approvals are to be up to date and in full force and effect from the date of Contract execution and for the duration of the Contract. Contractor must always ensure that professional, architectural, or engineering work is performed by qualified professionals with the proper education, know-how, training, knowledge, expertise, experience, and license to perform such works, according to applicable federal and local rules and regulations.

#### Code Compliance

Installation and equipment shall comply with applicable building, mechanical, fire, seismic, structural, and electrical codes, included in the Joint Regulation for the Evaluation and Grant of Permits Related to Developments, Land Use, and Business Operations (Joint Regulation), as amended. The Contractor must abide by the "Joint Regulation", as amended, "Regulation No. 7796", "Regulation No. 8080," and any other State regulation that regulates the installations within this Program.

Contractor must install solar system equipment in compliance with Puerto Rico Residential Code 2018 (PRRC), National Electric Code (NEC), Puerto Rico Electrical Power Authority (PREPA) and Permit Management Office (OGPe, for its Spanish acronym) Regulations, as they may be amended.

#### Deliverables

The key deliverables to be provided include, but are not limited to, the following:

- Installer/Contractor must submit monthly reports to CEWRI Program Manager and PRDOH. Monthly reports shall be due the fifth (5th) day of each month and shall include:
  - Copies of all notifications from CEWRI PMs
  - Inspection orders placed within previous calendar month and inspection reports, as applicable.
  - Notices to begin the design phase within the previous calendar month
  - Notices of accepted/rejected designs within previous calendar month

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- Locations of all pending and completed tasks within the previous calendar month.
  - Explanation of pending and completed design tasks within the previous calendar month.
  - Explanation of pending and completed installation tasks within the previous calendar month.
  - Copies of all payment requests sent to PM within the previous month.
  - Payment receipt notifications with the date payment was received.
- Installer/Contractor must develop and submit to the PMs the following but not limited to:
- Pre-Installation Assessment Visit and Report for each project
  - Case Scope of work for each project
  - System Designs for each Projects
  - Commissioning Report
  - All technical documentation, including Component data sheets and listing
  - Warranties
  - Installation and operation manuals
  - As-built version of system drawings, cable lists and routing, wirings, grounding system,
  - Any other documentation required or requested by PRDOH.

#### **Delivery Schedule**

- Coordinate with Applicant and CEWRI Program Manager for any pre-installation assessment visits, installation, and closeout inspections.
- Upon notice from the CEWRI PM firm, the Installer/Contractor shall perform the pre-installation assessment and report within the timeframe indicated in the table below.
- Upon notice from the CEWRI PM firm, the Installer/Contractor shall perform the design of the project and submission of the Interconnection Package to PREPA within the timeframe indicated in the table below.
- Upon notice from the CEWRI PM firm, the Installer/Contractor shall install the system(s), perform the commissioning of the project, and submission of the Pre-Inspection Package within the timeframe indicated in the table below. If the afforded timeframe is not enough due to equipment shortage, the Installer/Contractor must provide a written explanation and a copy of the equipment's delivery documents.
- Upon completion of installation, Installer/Contractor shall submit the official payment request to CEWRI PM with all applicable documentation, including warranty. Warranty documentation shall be submitted in duplicate (one for PM/PRDOH and one for the homeowner/applicant) Installer/Contractor is responsible for delivering warranty information to the homeowner/applicant.

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Tasks and Services	DESCRIPTION	TIMEFRAME DATES	DELIVERABLES
<p><b>Pre-Installation Assessment and Scope of Work</b></p>	<p>- Perform a Pre-Installation Assessment visit to each dwelling units and develop the Pre-Installation Assessment report for each case project. Submit report to the PMs for approval.</p> <p>-Develop case Scope of Work for each project. Submit scope of work to the PMs for approval.</p>	<p>Upon notice from the CEWRI PM firm, the Installer/Contractor shall, <b>within ten (10) business days</b>, perform the pre-installation assessment and report.</p>	<p>For each Application, provide the Pre-Installation Report Form signed and sealed by the licensed professional, and provide any other document required by PRDOH.</p>
<p><b>Design Services &amp; Permits</b></p>	<p>The Installer/Contractor must design a standard photovoltaic system with battery back-up and/or Water Storage System for single-family homes.</p>	<p>Upon notice from the CEWRI PM firm, the Installer/Contractor shall, <b>within six (6) business days</b>, perform and submit the design of the project.</p>	<p>For each assigned project, the Installer/Contractor must submit System Designs and any applicable permit for each Projects.</p>
<p><b>Installation Service &amp; Commissioning</b></p>	<p>- For each assigned project, the Installer/Contractor shall install the system(s) and perform the commissioning of the project.</p> <p>- The Installer/Contractor shall perform orientation and training to the Applicants regarding operation and maintenance of the installed systems and equipment.</p> <p>- The Installer/Contractor must deliver all applicable Operation and Maintenance Manuals of the installed systems to each Applicant receiving a system along with any other required documents.</p>	<p>Upon notice from the CEWRI PM firm, the Installer/Contractor shall, <b>within seven (7) business days</b>, install the system(s), perform the commissioning of the project, and submission of the Pre-Inspection Package. If the 7-day period is not enough due to equipment shortage, the Installer/Contractor must provide a written explanation and a copy of the equipment's delivery documents.</p>	<p>For each assigned project, the Installer/Contractor must submit the Pre-Inspection Package, including but not limited to the Commissioning Report, all technical documentation, including components data sheets and listing, warranties, installation and operation &amp; maintenance manuals, as-built version of system drawings, cable lists and routing, wirings, grounding system, and any other document required by PRDOH. The Pre-Inspection package must also include evidence of submission of the Interconnection Package to the utility company.</p>

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Tasks and Services	DESCRIPTION	TIMEFRAME DATES	DELIVERABLES
<b>Award Visit</b>	<p>-Perform award visit with the PMs to each applicant's property to complete the Project Grant Agreement.</p> <p>-Perform orientation to Applicants of the measures that are being offered and that may be installed in the unit.</p> <p>-Ensure that the applicant is informed on the process, the works to be performed, and the conditions of the award prior to any work being performed.</p> <p>- Assist the PMs during the applicant award process.</p>	<p>- As per coordination with Applicant and CEWRI Program Manager for award visit.</p>	<p>For each assigned project, the Installer/Contractor must participate and assist in the Award Visit.</p>
<b>Inspections</b>	<p>For each project the Installer/Contractor will visit the project site along with the PRDOH Program Manager and inspect works for overall quality standards.</p>	<p>- As per coordination with Applicant and CEWRI Program Manager for closeout inspections.</p> <p>-Installation corrections, as noted during final acceptance or the post- installation inspection, shall be performed within ten <b>(10) business days</b>. If the Installer/Contractor cannot undertake corrective actions <b>within ten (10) business days</b>, the Installer/Contractor shall deliver to the PM, in writing, reasons for the delay.</p>	<p>For each assigned project, the Installer/Contractor must participate and assist in the Inspection Visit.</p>

Tasks and Services	DESCRIPTION	TIMEFRAME DATES	DELIVERABLES
<p><b>Reporting</b></p>	<p>-Periodic Reporting is required to update the Program's implementation and development status, while providing visibility of the Program's actual status to stakeholders.</p>	<p>-Installer/Contractor must submit monthly reports to CEWRI Program Manager and PRDOH. Monthly reports shall be <b>due the fifth (5th) day of each month</b></p>	<p>The Installer/Contractor shall submit the following:</p> <ul style="list-style-type: none"> <li>- Copies of all notifications from CEWRI PMs</li> <li>- Inspection orders placed within previous calendar month and inspection reports, as applicable.</li> <li>- Notices to begin the design phase within the previous calendar month</li> <li>- Notices of accepted/rejected designs within previous calendar month</li> <li>- Locations of all pending and completed tasks within the previous calendar month.</li> <li>- Explanation of pending and completed design tasks within the previous calendar month.</li> <li>- Explanation of pending and completed installation tasks within the previous calendar month.</li> <li>- Copies of all payment requests sent to PM within the previous month.</li> <li>- Payment log.</li> <li>- Any other document required by PRDOH.</li> </ul>

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At PRDOH's discretion and in benefit to the Program, taking into consideration the particular circumstances of each case, timelines may be modified without the need to amend the contract.

The Installer/Contractor shall develop workplans, schedules, reports and/or any other document as may be requested by PRDOH or Representative in connection to the above timelines and performance goals. The Installer/Contractor shall submit any of such documents for review and approval as requested by the PRDOH within the specified time frame provided for such request. PRDOH reserves the rights to request any information as part of the Grantee responsibilities. The Installer/Contractor is also responsible for providing and performing all the services stated in the Scope of Work.

**Liquidated Damages & Penalties**

Contractor performance is subject to the following liquidated damages and penalties:

- **Liquidated Damages:** The Contractor shall pay to PRDOH, as liquidated damages, as related to their timeframes of performance. The PRDOH and the Contractor will agree on the timetable for the deliverable of each task. The Contractor shall pay to the PRDOH, as

liquidated damages, the amount established below for each calendar day that a deliverable required is late until deemed in compliance subject to a maximum amount as established below.

<b>Type of Work</b>	<b>Liquidated Damages for each calendar day</b>	<b>Maximum Amount of Liquidated Damages per occurrence, deliverable and task</b>
PV System Equipment, Installation, and related services	\$500.00	\$5,000.00
WSS Equipment, Installation, and related services	\$100.00	\$1,000.00

Said sums, in view of the difficulty of accurately ascertaining the loss which PRDOH and/or homeowner will suffer by reason of delay in the completion of Works requested, are hereby fixed and agreed as the liquidated damages that PRDOH and/or the homeowner will suffer by reason of such delay. Liquidated damages received are not intended to be nor shall they be treated as either a partial or full waiver or discharge of the PRDOH's right to indemnification, or the Contractor's obligation to indemnify the PRDOH, or to any other remedy provided for as a provision of the Contract or Law. Liquidated damages may be assessed at the sole discretion of PRDOH. For the purpose of applying and calculating such liquidated damages, a grace period of ten (10) days shall be observed. The PRDOH may deduct and retain out of the monies which may become due to the Contractor, the amount of any such liquidated damages; and in case the amount which may become due is less than the amount of liquidated damages due to the PRDOH per the formula above, the Contractor shall be liable to pay the difference.

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**Insurance Requirements - Amended  
Invitation for Bid  
Increase Capacity  
PV Systems, Water Cisterns Acquisition and Installation Services  
CEWRI Program  
Community Development Block Grant – Disaster Recovery/Mitigation  
Puerto Rico Department of Housing  
Contract Division**

**SPECIAL INSURANCE AND BONDING SPECIFICATIONS  
FOR PROFESSIONAL SERVICES**

**LICITATION NUMBER: CDBG-DR-IFB-2022-03**

**A. All bidders will submit a BID BOND**

The bid will be accompanied of a bid bond of five percent (5%) of the amount of the bid and option of the bidder, which will be able to be my means of:

- a. Certified check, or
- b. Bank draft

The Bid Bond must be issued by a surety appearing in the latest US Department of Treasury's Listing of Approved Sureties (Circular Letter 570) and authorized to do business in Puerto Rico.

- B.** The successful bidder before commencing work or receiving a written notice to proceed with, or being allowed to start to work, must submit to the ***Puerto Rico Department of Housing (\*PRDOH)***, the hereafter mentioned insurance policies and/or bonds, thus including all endorsements and agreements required under the special contractual conditions as per the following:

**1. (X) State Insurance Fund Workmen's Compensation Insurance Policy**

In accordance with the Workmen's Compensation Act No. 45, to facilitate its acquisition, the ***\*PRDOH*** shall provide a letter to the successful bidder addressed to the State Insurance Fund.

2. (X) Commercial General Liability (Broad Form) including the following insurance coverage

COVERAGE	LIMIT
<b>I. Commercial General Liability:</b>	
• Each Occurrence	\$2,000,000
• General Aggregate	\$2,000,000
• Products & Complete Operations	\$2,000,000
• Personal Injury & Advertising	\$2,000,000
• Fire Damage	\$100,000 (Any one Fire)
• Medical Expense	\$10,000 (Any one person)
<b>II. Employer's Liability Stop Gap:</b>	
• Bodily Injury by Accident Each Employee Each Accident	\$1,000,000 \$1,000,000
• Bodily Injury by Disease Each Employee Each Accident	\$1,000,000 \$1,000,000

3. (X) Comprehensive Automobile Liability Form including the following insurance coverages

LIMIT
• Auto Liability - \$1,000,000
• Physical Damages - \$1,000,000
• Medical Payments - \$ 10,000
<b>The Commercial Auto cover must be applied to the following symbols:</b>
• Liability Coverage -1
• Physical Damages – 2 and 8
• Hired – Borrowed Auto – 8
• Non-Owned Auto Liability – 9

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4. **(X) Professional Liability and/or Errors & Omissions**

**(X) A.** Risk, interest, location and limits

**(X) A.1** Description of work to be done

**(X) A.2** Limit:

(X) each occurrence      \$ 5,000,000  
(X) Aggregate              \$ 5,000,000  
(X) Deductible              \$ 10,000

**(X) A.3** Certification that the insurance contract has been given as surplus lines coverage under the Commonwealth Insurance Code, when applicable.

5. **(X) Employment Practices Liability**

Limit - \$1,000,000

6. **(X) Contractor's Pollution Liability**

Limit - \$1,000,000

7. **(X) Umbrella**

Limit - \$10,000,000

8. **(X) Builder's Risk – 100% of Finished Value**

- (x) a.** Form for all risks including "DIC" and earthquake.
- (x) b.** 100% total finished cash value for all finished construction equipment and/or installation equipment.
- (x) c.** The "PRDOH", HUD and the Government of Puerto Rico must be included as additional insured.

9. **(X) Payment and Performance Bond, Wage Payment Bond, and Labor Materials Payment Bond:**

**(X) a.** The successful bidder must provide a Payment & Performance Bond for the total cost of the project under contract.

**(X) b.** The surety must be issued by a surety appearing in the latest US Department of Treasury's Listing of Approved Sureties (Circular Letter 570) and authorized to do business in Puerto Rico.

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(X) c. You must provide an endorsement on the Performance and Payment Bond to guarantee the payment of wages at the Department of Labor of the Government of Puerto Rico as an Obligated Guarantor under Laws of Puerto Rico.

(X) d. Certificate of Authority, Power of Attorney and Power of Attorney License issued by the Commissioner of Insurance.

(X) e. Performance and payment bonds will be required for 100% of the contract price to cover the construction work and the standard one year warranty/maintenance period after completion of the work.

10. The policies to be obtained must contain the following endorsements including as additional insured the **Puerto Rico Department of Housing (\*PRDOH)**, **U.S. Department of Housing and Urban Development (HUD)**, and the **Government of Puerto Rico**.

(X) a. Breach of warranty

(X) b. Waiver and / or Release of Subrogation

(X) c. Additional Insured Clause

(X) d. Hold Harmless Agreement

(X) e. 30 Days Cancellation Clause

11. The insurance carrier or carriers, which will present said certificates of insurance must have at least a B+ Rating according to the Best Rating Guide.

### C. TERMS AND CONDITIONS

1. All certified checks or bank drafts must be paid to the Order of the Bidding Agency.

2. All Bid Bonds must be issued by an Insurance Company authorized by the Insurance Commissioner of Puerto Rico and must be accompanied by the following documents:

3. Certificate of Authority in the name of the Insurer issued by the Insurance Commissioner.

4. Power of Attorney, issued by the Insurer, in the name of its attorney-in-fact.

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5. Power of Attorney License, issued by the Commissioner of Insurance pursuant to the power of attorney issued by said Insurer.

6. If, at the time the bidding, documents are opened, any of the documents referred to in paragraph a, band c above are missing, this shall not constitute grounds for disqualifying the contractor, but the successful bidder shall submit such documents within two (2) working days from the date and time of the auction.

7. It is implicit that, by issuing the Bid Bond, the insurer undertakes to issue a Performance and Payment Bond in accordance with the conditions of the auction.

8. In any bidding or protest, the interested party shall be obliged to write down each risk with its individual cost of premium and shall then reflect the total sum of all insurance premiums as project costs.

**D. IMPORTANT NOTICE TO INSURANCE AND SURETY COMPANIES AND THEIR REPRESENTATIVES**

All insurance companies and all guarantors who issue policies or bonds under our special contractual conditions are subject to:

1. Be authorized to do business within the Commonwealth of Puerto Rico and have the corresponding license issued by the Commissioner of Insurance.
2. To be enjoying a good economic situation and to be classified under the Category of B+ Rating according to the "Best Rating Guide".
3. Submit to the **\*PRDOH** a written certification as evidence of full payment of premiums by the Contractor. Mention each risk coverage premium separately.
4. Avoid sub-contractual obligations of premium financing or any other kind, which may be detrimental to the public interest.
5. Avoid any request for cancellation by the contractor prior to the expiration date of the policy, without the consent of the Contract Division of the **\*PRDOH**: Discuss any refund of unearned premium.

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6. Follow all Federal Bail and Acceptance Insurance Regulations, when applicable.
7. Indicate in the appropriate place of all insurance policies and/or bonds, the full description of the project, work or service to be rendered.
8. Not to make any amendments to insurance policies and bonds issued under the special conditions mentioned above, unless approved by the Insurance Section of the **\*PRDOH**.
9. To ensure that all insurance policies or bonds are issued to comply with all of our special insurance conditions with respect to the period of coverage, type of risk coverage, as well as all limits, as specified, and also to eliminate those exclusions in accordance with our request.
10. Clarify any questions regarding insurance requirements by any means of communication with the Insurance Section of the **\*PRDOH** under the Secretary for Legal Affairs.

**E. EVIDENCE OF INSURANCE COVERAGE OF EACH SUBCONTRACTOR TO BE SUBMITTED BY THE SUCCESSFUL BIDDER AS THE PRIME CONTRACTOR:**

The successful bidder, as the prime contractor, has the duty to require each of the subcontractors or sub-contractors to maintain in force all insurance policies and/or bonds necessary to cover their individual participation in the risk or risks related to the subcontracted work or service to be rendered.

Therefore, we emphasize that prior to commencing work or receiving written notice to proceed with such work or being authorized to commence work, the successful prime contractor has the responsibility to provide the **\*PRDOH** with evidence to the effect that all insurance and/or bonds required under the special conditions or required under the sub-contract to each of the sub-contractors or sub-sub-contractors are current and duly approved by the Contract Division of the **\*PRDOH**.

All insurance policies shall remain in effect for the entire contractual period, so that with any order of change and/or amendment resulting in alteration of the original project completion date or total

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original cost, the prime contractor shall take the necessary steps to request the insurer to include such changes in all related insurance policies and/or bonds and to submit evidence by appropriate endorsements with effective dates. Cancellations without consent are not accepted.

The \***PRDOH** reserves the right to stop any work or service under contract until the breach of these requirements has been remedied, so that any delay in the performance of the contract based on any breach of the insurance coverage requirements shall be deemed the sole responsibility of the Main Contractor.

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**F. CONFLICT OR DIFFERENCE BETWEEN THE SPECIFICATIONS OF THE TENDERING, PROCEDURE AND SPECIAL INSURANCE CONDITIONS AND BONDS**

In the event of any conflict or difference in the description of coverage or in amounts or limits, etc., with respect to insurance requirements, the "Special Conditions of Insurance and Bonds" as set forth in this **Insurance Requirements** shall prevail over any other insurance specifications.

***\*PRDOH reserves the right to modify any Insurance Requirements at any time, in accordance with the Program's needs.***

**G. CERTIFICATE OF CONTRACT DIVISION**

We hereby certify, to our best knowledge and understanding, that we have prepared the aforementioned "*Insurance and Bonds Special Conditions*" after a proper evaluation of the related risks, based on the information of the nature of the project and description submitted to us, as requested by the Contracting Program through a written application.

**DESCRIPTION OF THE SERVICES:**

**Increase Capacity  
PV Systems, Water Cisterns Acquisition and Installation Services  
CEWRI Program**

March 3rd, 2022

Date

*Candice M. Noriega Morales*

Candice M. Noriega Morales  
Insurance Specialist  
CDBG-DR Program

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## ATTACHMENT F HUD GENERAL PROVISIONS

Given that the Contract involves funds for which the U.S. Department of Housing and Urban Development (**HUD**) is the oversight agency, the following terms and conditions may apply to this Contract. In addition, Contractor shall comply with the Federal Labor Standards Provisions set forth in Form HUD-4010, available at <https://www.hudexchange.info/resource/2490/hud-form-4010-federal-labor-standards-provisions/>.

The CONTRACTOR shall include these terms and conditions in all subcontracts or purchase orders directly servicing the Contract.

These general provisions may be updated from time to time. It is the sole responsibility of the CONTRACTOR to be aware of any changes hereto, to amend and implement such changes and to ensure subcontracts terms and conditions are modified as necessary, if any.

### General Provisions:

#### 1. PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion or correction.

#### 2. STATUTORY AND REGULATORY COMPLIANCE

CONTRACTOR shall comply with all laws and regulations applicable to the Community Development Block Grant-Disaster Recovery funds appropriated by: the Continuing Appropriations Act, 2018, and Supplemental Appropriations for Disaster Relief Requirements, 2017 (**Pub. L. 115-56**) approved on September 8, 2017, as amended; the Bipartisan Budget Act of 2018 (**Pub. L. 115-123**) approved on February 9, 2018, as amended; the Additional Supplemental Appropriations for Disaster Relief Act, 2019, (**Pub. L. 116-20**) approved on June 6, 2019, as amended; as well as including, but not limited ,to the applicable Office of Management and Budget Circulars, which may impact the administration of funds and/or set forth certain cost principles, including if certain expenses are allowed.

**3. BREACH OF CONTRACT TERMS**

The Puerto Rico Department of Housing (PRDOH) reserves its right to all administrative, contractual, or legal remedies, including but not limited to suspension or termination of this Contract, in instances where the CONTRACTOR or any of its subcontractors violate or breach any Contract term. If the CONTRACTOR or any of its subcontractors violate or breach any Contract term, they shall be subject to such sanctions and penalties as may be appropriate. The duties and obligations imposed by the Contract documents, and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

**4. REPORTING REQUIREMENTS**

The CONTRACTOR shall complete and submit all reports, in such form and according to such schedule, as may be required by PRDOH and/or the Government of Puerto Rico. The CONTRACTOR shall cooperate with all the PRDOH and/or the Government of Puerto Rico efforts to comply with HUD requirements and regulations pertaining to reporting, including but not limited to 24 C.F.R. §§ 85.40-41 (or 84.50-52, if applicable) and § 570.507, when applicable.

**5. ACCESS TO RECORDS**

The Government of Puerto Rico, the PRDOH, HUD, the Comptroller General of the United States, or any of their duly authorized representatives, shall have, at any time and from time to time during normal business hours, access to any work product, books, documents, papers, and records of the CONTRACTOR which are related to this Contract, for the purpose of inspection, audits, examinations, and making excerpts, copies and transcriptions.

**6. MAINTENANCE/RETENTION OF RECORDS**

All records (files, data, work product) connected with this Contract will be turned over to PRDOH following the Agreement termination to be maintained for the remainder of the grant and post grant closeout.

**7. SMALL AND MINORITY FIRMS, WOMEN'S BUSINESS ENTERPRISES, AND LABOR SURPLUS AREA FIRMS**

The CONTRACTOR will take necessary affirmative steps to assure that minority firms, women's business enterprises, and labor surplus area firms are used in subcontracting when possible. Steps include, but are not limited to:

- (i) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

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- (ii) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
- (iii) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority business, and women's business enterprises;
- (iv) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority business, and women's business enterprises; and
- (v) Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce.

Additionally, for contracts of **\$10,000 or more**, the CONTRACTOR shall file Form HUD 2516 (Contract and Subcontract Activity) with the PRDOH on a quarterly basis.

#### **8. RIGHTS TO INVENTIONS MADE UNDER A CONTRACT OR AGREEMENT**

Contracts or agreements for the performance of experimental, developmental, or research work shall provide for the rights of the Federal Government and the recipient in any resulting invention in accordance with 37 C.F.R. Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements", and any implementing regulations issued by HUD.

#### **9. TITLE VI OF THE CIVIL RIGHTS ACT OF 1964**

The Proposer will comply with the provisions of Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color, or national origin in any program or activity that receives Federal funds or other Federal financial assistance. Programs that receive Federal funds cannot distinguish among individuals on the basis of race, color or national origin, either directly or indirectly, in the types, quantity, quality or timelines of program services, aids or benefits that they provide or the manner in which they provide them. This prohibition applies to intentional discrimination as well as to procedures, criteria or methods of administration that appear neutral but have a discriminatory effect on individuals because of their race, color, or national origin. Policies and practices that have such an effect must be eliminated unless a recipient can show that they were necessary to achieve a legitimate nondiscriminatory objective.

#### **10. SECTION 109 OF THE HOUSING AND COMMUNITY DEVELOPMENT ACT OF 1974**

The CONTRACTOR shall comply with the provisions of Section 109 of the Housing and Community Development Act of 1974. No person in the United States shall on the grounds of race, color, national origin, religion or sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity funded in whole or in part with funds made available under this title. Section 109 further provides

that discrimination on the basis of age under the Age Discrimination Act of 1975 or with respect to an otherwise qualified handicapped individual as provided in Section 504 of the Rehabilitation Act of 1973, as amended, is prohibited.

**11. SECTION 504 OF THE REHABILITATION ACT OF 1973**

The CONTRACTOR shall comply with Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794), as amended, and any applicable regulations.

The CONTRACTOR agrees that no qualified individual with handicaps shall, solely on the basis of handicap, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity that receives Federal financial assistance from HUD.

**12. AGE DISCRIMINATION ACT OF 1975**

The CONTRACTOR shall comply with the Age Discrimination Act of 1975 (42 U.S.C. § 6101 *et seq.*), as amended, and any applicable regulations. No person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to, discrimination under, any program or activity receiving Federal financial assistance.

**13. DEBARMENT, SUSPENSION, AND INELIGIBILITY**

The CONTRACTOR represents and warrants that it and its subcontractors are not debarred or suspended or otherwise excluded from or ineligible for participation in Federal assistance programs subject to 2 C.F.R. Part 2424.

**14. CONFLICTS OF INTEREST**

The CONTRACTOR shall notify the PRDOH as soon as possible if this Contract or any aspect related to the anticipated work under this Contract raises an actual or potential conflict of interest (as defined at 2 C.F.R. Part 215 and 24 C.F.R. § 85.36 or 84.42, if applicable). The CONTRACTOR shall explain the actual or potential conflict in writing in sufficient detail so that the PRDOH is able to assess such actual or potential conflict. The CONTRACTOR shall provide the PRDOH any additional information necessary to fully assess and address such actual or potential conflict of interest. The CONTRACTOR shall accept any reasonable conflict mitigation strategy employed by the PRDOH, including but not limited to the use of an independent subcontractor(s) to perform the portion of work that gives rise to the actual or potential conflict.

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## 15. SUBCONTRACTING

When subcontracting, the CONTRACTOR shall solicit for and contract with such subcontractors in a manner providing for fair competition. Some of the situations considered to be restrictive of competition include, but are not limited to:

- (i) Placing unreasonable requirements on firms in order for them to qualify to do business;
- (ii) Requiring unnecessary experience and excessive bonding;
- (iii) Noncompetitive pricing practices between firms or between affiliated Companies;
- (iv) Noncompetitive awards to consultants that are on retainer contracts,
- (v) Organizational conflicts of interest;
- (vi) Specifying only a brand name product instead of allowing an equal product to be offered and describing the performance of other relevant requirements of the procurement; and
- (vii) Any arbitrary action in the procurement process.

The CONTRACTOR represents to the PRDOH that all work shall be performed by personnel experienced in the appropriate and applicable profession and areas of expertise, taking into account the nature of the work to be performed under this Contract.

The CONTRACTOR will include these HUD General Provisions in every subcontract issued by it, so that such provisions will be binding upon each of its subcontractors as well as the requirement to flow down such terms to all lower-tiered subcontractors.

## 16. ASSIGNABILITY

The CONTRACTOR shall not assign any interest in this Agreement, and shall not transfer any interest in the same (whether by assignment or novation) without prior written approval of the PRDOH.

## 17. INDEMNIFICATION

The CONTRACTOR shall indemnify, defend, and hold harmless the Government of Puerto Rico and PRDOH, its agents and employees, from and against any and all claims, actions, suits, charges, and judgments arising from or related to the negligence or willful misconduct of the CONTRACTOR in the performance of the services called for in this Contract.

## 18. COPELAND "ANTI-KICKBACK" ACT

### (Applicable to all construction or repair contracts)

Salaries of personnel performing work under this Contract shall be paid unconditionally and not less often than once a month without payroll deduction or rebate on any account except only such payroll deductions as are mandatory by law or permitted by

the applicable regulations issued by the Secretary of Labor pursuant to the Copeland "Anti-Kickback Act" of June 13, 1934 (48 Stat. 948; 62 Stat. 740; 63 Stat. 108; Title 18 U.S.C. § 874; and Title 40 U.S.C. § 276c). The CONTRACTOR shall comply with all applicable "Anti-Kickback" regulations and shall insert appropriate provisions in all subcontracts covering work under this Agreement to ensure compliance by subcontractors with such regulations, and shall be responsible for the submission of affidavits required of subcontractors thereunder except as the Secretary of Labor may specifically provide for variations of or exemptions from the requirements thereof.

**19. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT**

**(Applicable to construction contracts exceeding \$2,000 and contracts exceeding \$2,500 that involve the employment of mechanics or laborers)**

The CONTRACTOR shall comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. §§ 3701-3708) as supplemented by Department of Labor regulations (29 C.F.R. Part 5).

All laborers and mechanics employed by CONTRACTORS or subcontractors shall receive overtime compensation in accordance with and subject to the provisions of the Contract Work Hours and Safety Standards Act, and the CONTRACTORS and subcontractors shall comply with all regulations issued pursuant to that act and with other applicable Federal laws and regulations pertaining to labor standards.

**20. DAVIS-BACON ACT**

**(Applicable to construction contracts exceeding \$2,000 when required by Federal program legislation)**

The CONTRACTOR shall comply with the Davis Bacon Act (40 U.S.C. §§ 3141, *et seq.*) as supplemented by Department of Labor regulations (29 C.F.R. Part 5).

All laborers and mechanics employed by CONTRACTORS or subcontractors, including employees of other governments, on construction work assisted under this Contract, and subject to the provisions of the federal acts and regulations listed in this paragraph, shall be paid wages at rates not less than those prevailing on similar construction in the locality as determined by the Secretary of Labor in accordance with the Davis-Bacon Act.

On a semi-annual basis, the CONTRACTOR shall submit Form HUD 4710 (Semi-Annual labor Standards Enforcement Report) to PRDOH.

**21. TERMINATION FOR CAUSE**

**(Applicable to contracts exceeding \$10,000)**

If, through any cause, the CONTRACTOR shall fail to fulfill in a timely and proper manner his or her obligations under this Contract, or if the CONTRACTOR shall violate any of the covenants, agreements, or stipulations of this Contract, the PRDOH shall thereupon have the right to terminate this Contract by giving written notice to the CONTRACTOR of such termination and specifying the effective date thereof, at least five (5) days before the effective date of such termination. In such event, all finished or unfinished documents, data, studies, surveys, drawings, maps, models, photographs, and reports prepared by the CONTRACTOR under this Agreement shall, at the option of the PRDOH, become the PRDOH's property and the CONTRACTOR shall be entitled to receive just and equitable compensation for any work satisfactorily completed hereunder. Notwithstanding the above, the CONTRACTOR shall not be relieved of liability to the Government of Puerto Rico and PRDOH for damages sustained by the Government of Puerto Rico and/or PRDOH by virtue of any breach of the Agreement by the CONTRACTOR, and the Government of Puerto Rico and/or PRDOH may withhold any payments to the CONTRACTOR for the purpose of set-off until such time as the exact amount of damages due to the Government of Puerto Rico and/or PRDOH from the CONTRACTOR is determined.

**22. TERMINATION FOR CONVENIENCE**

**(Applicable to contracts exceeding \$10,000)**

The PRDOH may terminate this Contract at any time by giving at least ten (10) days' notice in writing to the CONTRACTOR. If the Contract is terminated by the PRDOH as provided herein, the CONTRACTOR will be paid for the time provided and expenses incurred up to the termination date.

**23. SECTION 503 OF THE REHABILITATION ACT OF 1973**

**(Applicable to contracts exceeding \$10,000)**

The CONTRACTOR shall comply with Section 503 of the Rehabilitation Act of 1973 (29 U.S.C. § 793), as amended, and any applicable regulations.

Equal Opportunity for Workers with Disabilities:

- 1) The CONTRACTOR will not discriminate against any employee or applicant for employment because of physical or mental disability in regard to any position for which the employee or applicant for employment is qualified. The CONTRACTOR agrees to take affirmative action to employ, advance in employment and otherwise treat qualified individuals with disabilities without discrimination based on their physical or mental disability in all employment practices, including the following:

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- (i) Recruitment, advertising, and job application procedures;
- (ii) Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff and rehiring;
- (iii) Rates of pay or any other form of compensation and changes in compensation;
- (iv) Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;
- (v) Leaves of absence, sick leave, or any other leave;
- (vi) Fringe benefits available by virtue of employment, whether or not administered by the CONTRACTOR;
- (vii) Selection and financial support for training, including apprenticeship, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;
- (viii) Activities sponsored by the CONTRACTOR including social or recreational programs; and
- (ix) Any other term, condition, or privilege of employment.

- 2) The CONTRACTOR agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the act.
- 3) In the event of the CONTRACTOR's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the act.
- 4) The CONTRACTOR agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Deputy Assistant Secretary for Federal Contract Compliance Programs, provided by or through the contracting officer. Such notices shall state the rights of applicants and employees as well as the CONTRACTOR'S obligation under the law to take affirmative action to employ and advance in employment qualified employees and applicants with disabilities. The CONTRACTOR must ensure that applicants and employees with disabilities are informed of the contents of the notice (e.g., the CONTRACTOR may have the notice read to a visually disabled individual, or may lower the posted notice so that it might be read by a person in a wheelchair).
- 5) The CONTRACTOR will notify each labor organization or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the CONTRACTOR is bound by the terms of Section 503 of the Rehabilitation Act

of 1973, as amended, and is committed to take affirmative action to employ and advance in employment individuals with physical or mental disabilities.

- 6) The CONTRACTOR will include the provisions of this clause in every subcontract or purchase order in excess of \$10,000, unless exempted by the rules, regulations, or orders of the Secretary issued pursuant to Section 503 of the act, as amended, so that such provisions will be binding upon each subcontractor or vendor. The CONTRACTOR will take such action with respect to any subcontract or purchase order as the Deputy Assistant Secretary for Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

#### **24. EQUAL EMPLOYMENT OPPORTUNITY**

##### **(Applicable to construction contracts and subcontracts exceeding \$10,000)**

The CONTRACTOR shall comply with Executive Order 11246 of September 24, 1965, entitled "Equal Employment Opportunity," as amended by Executive Order 11375 of October 13, 1967, and as supplemented in Department of Labor regulations (41 C.F.R. chapter 60).

During the performance of this Agreement, the CONTRACTOR agrees as follows:

- 1) The CONTRACTOR shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The CONTRACTOR shall take affirmative action to ensure that applicants for employment are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.
- 2) The CONTRACTOR shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by Contracting Officer setting forth the provisions of this non-discrimination clause. The CONTRACTOR shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
- 3) The CONTRACTOR will, in all solicitations or advertisements for employees placed by or on behalf of the CONTRACTOR, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.

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- 4) The CONTRACTOR will send to each labor union or representative of workers with which he or she has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers representative of the CONTRACTOR's commitments under Section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- 5) The CONTRACTOR will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations and relevant orders of the Secretary of Labor.
- 6) The CONTRACTOR will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and will permit access to books, records and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.
- 7) In the event of the CONTRACTOR's non-compliance with the non-discrimination clause of this Agreement or with any of such rules, regulations or orders, this Agreement may be cancelled, terminated or suspended in whole or in part and the CONTRACTOR may be declared ineligible for further government contracts in accordance with procedures authorized in Executive Order 11246 and such other sanctions as may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.
- 8) CONTRACTOR shall incorporate the provisions of 1 through 7 above in every subcontract or purchase order unless exempted by rules, regulations or orders of the Secretary of Labor so that such provisions shall be binding on such subcontractor. The CONTRACTOR will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for non-compliance, provided, however, that in the event the CONTRACTOR becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the CONTRACTOR may request the United States to enter into such litigation to protect the interests of the United States.

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**25. CERTIFICATION OF NONSEGREGATED FACILITIES**  
**(Applicable to construction contracts exceeding \$10,000)**

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The CONTRACTOR certifies that it does not maintain or provide for its establishments, and that it does not permit employees to perform their services at any location, under its control, where segregated facilities are maintained. It certifies further that it will not maintain or provide for employees any segregated facilities at any of its establishments, and it will not permit employees to perform their services at any location under its control where segregated facilities are maintained. The CONTRACTOR agrees that a breach of this certification is a violation of the equal opportunity clause of this Agreement.

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As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason.

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The CONTRACTOR further agrees that (except where it has obtained for specific time periods) it will obtain identical certification from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the equal opportunity clause; that it will retain such certifications in its files; and that it will forward the preceding notice to such proposed subcontractors (except where proposed subcontractors have submitted identical certifications for specific time periods).

**26. CERTIFICATION OF COMPLIANCE WITH CLEAN AIR AND WATER ACTS**  
**(Applicable to contracts exceeding \$100,000)**

**CLEAN AIR ACT**

- 1)--The CONTRACTOR agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq.
- 2)--The CONTRACTOR agrees to report each violation to the PRDOH and understands and agrees that the PRDOH will, in turn, report each violation as required to assure notification to the Government of Puerto Rico, HUD, and the appropriate Environmental Protection Agency Regional Office.

- 3)--The CONTRACTOR agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by HUD.

#### **WATER POLLUTION CONTROL ACT**

- 1)--The CONTRACTOR agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. § 1251, *et seq.*
- 2)--The CONTRACTOR agrees to report each violation to the PRDOH and understands and agrees that the PRDOH will, in turn, report each violation as required to assure notification to the Government of Puerto Rico, HUD, and the appropriate Environmental Protection Agency Regional Office.
- 3)--The CONTRACTOR agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by HUD.

The CONTRACTOR and all subcontractors shall comply with the requirements of the Clean Air Act, as amended, 42 U.S.C. § 7401 *et seq.*, the Federal Water Pollution Control Act, as amended, 33 U.S.C. § 1251 *et seq.*, and the regulations of the Environmental Protection Agency with respect thereto, at 40 C.F.R. Part 15 and 32, as amended, Section 508 of the Clean Water Act (33 U.S.C. § 1368) and Executive Order 11738.

In addition to the foregoing requirements, all nonexempt contractors and subcontractors shall furnish to the owner, the following:

- 1) A stipulation by the CONTRACTOR or subcontractors, that any facility to be utilized in the performance of any nonexempt contract or subcontract, is not listed on the Excluded Party Listing System pursuant to 40 C.F.R. Part 32 or on the List of Violating Facilities issued by the Environmental Protection Agency (**EPA**) pursuant to 40 C.F.R. Part 15, as amended.
- 2) Agreement by the CONTRACTOR to comply with all the requirements of Section 114 of the Clean Air Act, as amended, (42 U.S.C. § 7414) and Section 308 of the Federal Water Pollution Control Act, as amended, (33 U.S.C. § 1318) relating to inspection, monitoring, entry, reports and information, as well as all other requirements specified in said Section 114 and Section 308, and all regulations and guidelines issued thereunder.

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- 3) A stipulation that as a condition for the award of the Agreement, prompt notice will be given of any notification received from the Director, Office of Federal Activities, EPA, indicating that a facility utilized, or to be utilized for the Agreement, is under consideration to be listed on the Excluded Party Listing System or the EPA List of Violating Facilities.
- 4) Agreement by the CONTRACTOR that he or she will include, or cause to be included, the criteria and requirements in paragraph (1) through (4) of this section in every nonexempt subcontract and requiring that the CONTRACTOR will take such action as the government may direct as a means of enforcing such provisions.

**27. ANTI-LOBBYING (Applicable to contracts exceeding \$100,000)**

By the execution of this Contract, the CONTRACTOR certifies, to the best of his or her knowledge and belief, that:

- 1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the CONTRACTOR, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- 2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the CONTRACTOR shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities", in accordance with its instructions.
- 3) The CONTRACTOR shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title

31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

**28. BONDING REQUIREMENTS**  
**(Applicable to construction and facility improvement contracts exceeding \$100,000)**

The CONTRACTOR shall comply with Puerto Rico bonding requirements, unless they have not been approved by HUD, in which case the CONTRACTOR shall comply with the following minimum bonding requirements:

- 1) A bid guarantee from each bidder equivalent to five percent (5%) of the bid price. The "bid guarantee" shall consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of his or her bid, execute such contractual documents as may be required within the time specified.
- 2) A performance bond on the part of the CONTRACTOR for one hundred percent (100%) of the Agreement price. A "performance bond" is one executed in connection with a contract to secure fulfillment of all the CONTRACTOR's obligations under such contract.
- 3) A payment bond on the part of the CONTRACTOR for one hundred percent (100%) of the Agreement price. A "payment bond" is one executed in connection with a contract to assure payment as required by law of all persons supplying labor and material in the execution of the work provided for in the contract.

**29. SECTION 3 OF THE HOUSING AND URBAN DEVELOPMENT ACT OF 1968 (As required by applicable thresholds)**

- 1) The work to be performed under this Agreement is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. § 1701u (**Section 3**). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- 2) The parties to this Agreement agree to comply with HUD's regulations in 24 C.F.R. Part 75 which implement Section 3. As evidenced by their execution of this Agreement,

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the parties to this Agreement certify that they are under no contractual or other impediment that would prevent them from complying with the Part 75 regulations.

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- 3) The CONTRACTOR agrees to send to each labor organization or representative of workers with which the CONTRACTOR has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the CONTRACTOR's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.
  - 4) The CONTRACTOR agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 C.F.R. Part 75, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 C.F.R. Part 75. The CONTRACTOR will not subcontract with any subcontractor where the CONTRACTOR has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 C.F.R. Part 75.
  - 5) The CONTRACTOR will certify that any vacant employment positions, including training positions, that are filled: (1) after the CONTRACTOR is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 C.F.R. Part 75 require employment opportunities to be directed, were not filled to circumvent the CONTRACTOR's obligations under 24 C.F.R. Part 75.
  - 6) Noncompliance with HUD's regulations in 24 C.F.R. Part 75 may result in sanctions, termination of this Agreement for default, and debarment or suspension from future HUD assisted contracts.
  - 7) With respect to work performed in connection with Section 3 covered Indian housing assistance, Section 7(b) of the Indian Self-Determination and Education Assistance Act (46 U.S.C. § 5307) also applies to the work to be performed under this Agreement. Section 7(b) requires that to the greatest extent feasible: (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this Agreement that are subject to the provisions of Section 3 and Section 7(b) agree to comply with

Section 3 to the maximum extent feasible, but not in derogation of compliance with Section 7(b).

- 8) For contracts exceeding \$100,000, the CONTRACTOR shall submit Form HUD 60002 (Section 3 Summary Report) to PRDOH on a quarterly basis, notwithstanding the annual reporting requirement set forth in that form's instructions.

**30. FAIR HOUSING ACT**

CONTRACTOR shall comply with the provisions of the Fair Housing Act of 1968, as amended. The act prohibits discrimination in the sale or rental of housing, the financing of housing or the provision of brokerage services against any person on the basis of race, color, religion, sex, national origin, handicap or familial status. The Equal Opportunity in Housing Act prohibits discrimination against individuals on the basis of race, color, religion, sex or national origin in the sale, rental, leasing or other disposition of residential property, or in the use or occupancy of housing assisted with Federal funds.

**31. ENERGY POLICY AND CONSERVATION ACT**

CONTRACTOR shall comply with mandatory standards and policies relating to energy efficiency as contained in the Government of Puerto Rico's energy conservation plan, issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. 6201 *et seq.*).

**32. HATCH ACT**

CONTRACTOR agrees to comply with mandatory standards and policies relating to Hatch Act, Public Law 76-252, as amended.

The Hatch Act applies to political activities of certain state and local employees. As a Puerto Rico Department of Housing CONTRACTOR, you may do any of the following activities: be a candidate in nonpartisan elections; attend political meetings and conventions; contribute money; campaign in partisan elections; and hold office in political parties.

The CONTRACTOR may not do the following activities: be a candidate in partisan elections; use official influence to interfere in elections; coerce political contributions from subordinates in support of political parties or candidates. The office of special counsel operates a website that provides guidance concerning hatch act issues.

**33. HEALTH AND SAFETY STANDARDS**

All parties participating in this project agree to comply with Sections 107 and 103 of the Contract Work Hours and Safety Standards Act. Section 107 of the Act is applicable to construction work and provides that no laborer or mechanic shall be required to work in

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surroundings or under working conditions, which are unsanitary, hazardous, or dangerous to his or her health and safety as determined under construction, safety, and health standards promulgated by the Secretary of Labor. These requirements do not apply to the purchase of supplies or materials or articles ordinarily available on the open market, or contracts for transportation.

#### **34. PERSONNEL**

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The CONTRACTOR represents that it has, or will secure at its own expense, all personnel required in performing the services under this Agreement. Such personnel shall not be employees of, or have any contractual relationship with, the contracting party. All the services required hereunder will be performed by the CONTRACTOR or under its supervision, and all personnel engaged in the work shall be fully qualified and shall be authorized or permitted under State and local law to perform such services. No person who is serving sentence in a penal or correctional institution shall be employed on work under this Contract.

#### **35. WITHHOLDING OF WAGES**

If in the performance of this Agreement, there is any underpayment of wages by the CONTRACTOR or by any subcontractor thereunder, the PRDOH may withhold from the CONTRACTOR out of payment due to him or her an amount sufficient to pay to employees underpaid the difference between the wages required thereby to be paid and the wages actually paid such employees for the total number of hours worked. The amounts withheld may be disbursed by the PRDOH for and on account of the CONTRACTOR or subcontractor to the respective employees to whom they are due.

#### **36. CLAIMS AND DISPUTES PERTAINING TO WAGE RATES**

Claims and disputes pertaining to wage rates or to classifications of professional staff or technicians performing work under this Contract shall be promptly reported in writing by the CONTRACTOR to the PRDOH for the latter's decision, which shall be final with respect thereto.

#### **37. DISCRIMINATION BECAUSE OF CERTAIN LABOR MATTERS**

No person employed on the services covered by this Agreement shall be discharged or in any way discriminated against because he or she has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable hereunder to his or her employer.

#### **38. INTEREST OF MEMBERS OF LOCAL PUBLIC AGENCY AND OTHERS**

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The CONTRACTOR agrees to establish safeguards to prohibit employees from using positions for a purpose that is or gives the appearance of being motivated by a desire for private gain for themselves or others, particularly those with whom they have a family, business, or other tie. The CONTRACTOR will be aware of and avoid any violation of the laws of this State which prohibit municipal officers and employees from having or owning any interest or share, individually or as agent or employee of any person or corporation, either directly or indirectly, in any contract made or let by the governing authorities of such municipality for the construction or doing of any public work, or for the sale or purchase of any materials, supplies or property of any description, or for any other purpose whatsoever, or in any subcontract arising therefrom or connected therewith, or to receive, either directly or indirectly, any portion or share of any money or other thing paid for the construction or doing of any public work, or for the sale or purchase of any property, or upon any other contract made by the governing authorities of the municipality, or subcontract arising therefore or connected therewith.

The CONTRACTOR will also be aware of and avoid any violation of the laws of this State which prescribe a criminal penalty for any public officer who has an interest in any contract passed by the board of which he or she is a member during the time he or she was a member and for one year thereafter.

#### **39. INTEREST OF CERTAIN FEDERAL OFFICERS**

No member of, or delegate to, the Congress of the United States and no Resident Commissioner shall be admitted any share or part of this Agreement or to any benefit to arise therefrom.

#### **40. INTEREST OF CONTRACTOR**

The CONTRACTOR agrees that it presently has no interest and shall not acquire any interest, direct or indirect, in the above described project or any parcels therein or any other interest which would conflict in any manner or degree with the performance of the Work hereunder. The CONTRACTOR further agrees that no person having any such interest shall be employed in the performance of this Agreement.

#### **41. POLITICAL ACTIVITY**

The CONTRACTOR will comply with the provisions of the Hatch Act (5 U.S.C. § 1501 *et seq.*), which limits the political activity of employees.

#### **42. RELIGIOUS ACTIVITY**

The CONTRACTOR agrees to abstain from using any funds related to this Agreement for inherently religious activities prohibited by 24 C.F.R. § 570.200(j), such as worship, religious instruction, or proselytization.

#### **43. FLOOD DISASTER PROTECTION ACT OF 1973**

The CONTRACTOR will ensure that procedures and mechanisms are put into place to monitor compliance with all flood insurance requirements as found in the Flood Disaster Protection Act of 1973, 24 C.F.R. § 570.605.

#### **44. LEAD BASED PAINT**

The CONTRACTOR must comply with the regulations regarding lead-based paint found at 24 C.F.R. Part 35 on LEAD-BASED PAINT POISONING PREVENTION IN CERTAIN RESIDENTIAL STRUCTURES with regards to all housing units assisted using CDBG-DR funds.

#### **45. VALUE ENGINEERING**

**(Applicable to construction contracts exceeding \$2,000 when required by Federal program legislation)**

The CONTRACTOR must comply with the regulations regarding systematic and organized approach to analyze functions of systems, equipment, facilities, services, and materials to ensure they achieve their essential functions at the lowest cost consistent to life cycle in execution, reliability, quality, and safety, in accordance with 24 C.F.R. § 200.318(g).

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**APPENDIX C  
CONTRACTOR CERTIFICATION  
FINANCIAL OVERSIGHT AND MANAGEMENT BOARD FOR PUERTO RICO  
CONTRACTS REVIEW POLICY**

**VENEGAS CONSTRUCTION CORP.**

The following is hereby certified to the Oversight Board regarding the request for authorization for the **Increased Capacity- PV Systems, Water Cisterns Acquisition and Installation Services for the Community Energy and Water Resilience Installation Services** contract by and between the **Puerto Rico Department of Housing** and **Venegas Construction Corp.**:

1. The expected contractor's subcontractor(s) in connection with the contract<sup>1</sup> is (are) the following:

**YB Energy Solutions, C.P.**, Puerto Rico Department of State, domestic, for profit, professional corporation; registration number **378175**, organized in July 2016.

2. Neither the contractor nor any of its owners<sup>2</sup>, partners, directors, officials or employees, has agreed to share or give a percentage of the contractor's compensation under the contract to, or otherwise compensate, any third party, whether directly or indirectly, in connection with the procurement, negotiation, execution, or performance of the contract, except as follows:

NONE

3. To the best knowledge of the signatory (after due investigation), no person has unduly intervened in the procurement, negotiation, or execution of the contract, for its own benefit or that of a third person, in contravention of applicable law.
4. To the best knowledge of the signatory (after due investigation), no person has: (i) offered, paid, or promised to pay money to; (ii) offered, given, or promised to give anything of value to; or (iii) otherwise influenced any public official or employee with the purpose of securing any advantages, privileges, or favors for the benefit of such person in connection with the contract (such as the execution of a subcontract with contractor, beneficial treatment under the contract, or the written or unwritten promise of a gift, favor, or other monetary or non-monetary benefit).

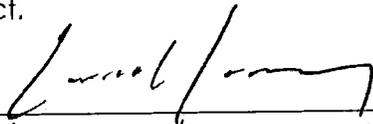
<sup>1</sup> As used herein, the term "contract" is inclusive of any amendments, modifications or extensions.

<sup>2</sup> For purposes of this certification, a contractor's "owner" shall mean any person or entity with more than a ten percent (10%) ownership interest in the contractor.

5. Neither the contractor, nor any of its owners, partners, directors, officials or employees or, to the best of its knowledge (after due investigation), its representatives or sub-contractors, has required, directly or indirectly, from third persons to take any action with the purpose of influencing any public official or employee in connection with the procurement, negotiation, or execution of the contract.
  
6. Any incorrect, incomplete or false statement made by the contractor's representative as part of this certification shall cause the nullity of the proposed contract and the contractor must reimburse immediately to the Commonwealth any amounts, payments or benefits received from the Commonwealth under the proposed contract.

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I hereby certify under penalty of perjury that the foregoing is complete, true and correct.

  
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Signature

September 22nd, 2022  
Date

Emilio R. Venegas  
Printed Name

Vice-president  
Position

Venegas Construction Corp. - Principals & Stakeholders

1. Emilio M. Venegas, President and 100% Shareholder
2. Emilio R. Venegas, Vice-president



GOVERNMENT OF PUERTO RICO  
DEPARTMENT OF HOUSING

**GOVERNMENT OF PUERTO RICO**  
**PROJECT LABOR AGREEMENT**  
**BETWEEN**  
**PUERTO RICO DEPARTMENT OF HOUSING (PRDOH)**  
**AND**  
**VENEGAS CONSTRUCTION CORPORATION**

**ARTICLE 1. —LEGAL BASIS**

This Project Labor Agreement (hereinafter, "Agreement") is hereby adopted in accordance and in compliance with Section 3 of Administrative Bulletin No. OE-2018-033, titled "Executive Order of the Governor of Puerto Rico, Hon. Ricardo A. Rosselló Nevares, to increase minimum wage for construction workers, implement laws that require the use of cement produced in Puerto Rico, and require the use of labor agreements in construction projects paid using public funds", enacted on July 30, 2018 (hereinafter, "OE-2018-033").

**ARTICLE 2. —PURPOSE**

The Government of Puerto Rico wishes to contribute to the economic welfare of construction workers, increase peace in the workplace and employee safety, and promote efficient and punctual performance of the Construction Project, as defined in Article 4 of this Agreement, in such a way that complies with the public policy set forth in OE-2018-033. In accordance with Section 4 of OE-2018-033, this Agreement shall promote these objectives and it exclusively: binds all contractors and subcontractors who participate in the Construction Project; contains tools to avoid interruptions based on labor disputes; promotes harmony in the workplace; provides uniform mechanisms to solve labor conflicts, and increases cooperation between contractors and workers in matters related to productivity and occupational safety.

**ARTICLE 3. —PARTIES TO THE AGREEMENT**

This document is a Project Labor Agreement entered into by Puerto Rico Department of Housing (PRDOH), as agency of the Executive Branch of the Government of Puerto Rico (hereinafter, "Agency"), and **Venegas Construction Corporation** as a contractor who employs construction workers for the Construction Project (hereinafter, "Contractor"). Project Labor Agreement (AGENCY AND CONTRACTOR)

**ARTICLE 4. —CONSTRUCTION PROJECT**

The Construction Project (hereinafter, "Construction Project") is described in the Agreement between PRDOH and the Contractor, to which this Project Labor Agreement is an attachment of.

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**ARTICLE 5. —RESPONSIBILITIES AND OBLIGATIONS OF THE PARTIES**

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This Agreement shall be binding on the Agency and on all Contractors at all levels who are part of the Construction Project, as defined in OE-2018-033 and Circular Letter No. 2018-01 of the Department of Labor and Human Resources (hereinafter, "DTRH" for its Spanish acronym). Contractors shall include a clause in any subcontract entered into during the term of this Agreement to the effect that their subcontractors, on all levels, shall be parties that are governed by this Agreement as to any work subcontracted within the scope of the Construction Project. Furthermore, all Contractors and subcontractors who are a part of the Construction Project, as defined in OE-2018-033 and DTRH Circular Letter No. 2018-01, shall include a clause in the contract in which they agree to comply with the provisions of this Agreement.

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The Agency shall not be responsible for any violation of this Agreement. The Agency and any Contractor shall not be liable for violations to this Agreement committed by other Contractors. Liability of any Contractor under this Agreement shall be individual and shall not be joint liability ("mancomunada", in Spanish). The Agency and any Contractor shall not be liable for violations to this Agreement committed by another Contractor. It is further provided that the Contractor shall be responsible for compensating workers hired by subcontractors who did not comply with the minimum wage requirement.

Nothing in this Article shall limit the exclusive discretion of the Agency to determine what Contractor to award contracts to for the Construction Project. The Agency retains the authority to totally or partially cancel, delay, or suspend the Construction Project.

In addition to the provisions of this Agreement, in the event that there is a collective bargaining agreement between the Contractor and an exclusive union representative of its employees, or a certification of a relevant forum establishing a labor union as the exclusive union representative of the workers or group of workers for the Contractor, the liability of the latter shall be governed as expressly agreed in the appropriate collective bargaining agreement and/or relevant case law of the National Labor Relations Board.

**ARTICLE 6. —WAGES**

All workers covered by this Agreement shall be paid a wage of no less than fifteen dollars (\$15.00) per hour, in accordance with OE-2018-033, DTRH Circular Letter No. 2018-01 and Article 9 of this Agreement. In the event that the worker is entitled to earn a wage greater than what is contemplated under OE-2018-033, due to some federal or state law, the contractor and subcontractors shall be required to pay the higher wage. The Contractor shall put up the poster made by the DTRH as to minimum wage established under OE-2018-033 in a visible location in the Construction Project. It is further provided that the classification of a person as independent contractor shall not, in and of itself, be grounds to avoid the minimum wage provided under OE-2018-033.

As provided by Section 3 of Law No. 17 enacted on April 17, 1931, as amended, known as "Wage Payment Law", workers shall receive compensation either in cash,

by check, direct deposit, transfer, or credit to a payroll card, in intervals that shall not exceed fifteen (15) days. When a worker is terminated or resigns from his or her job during any day of the week, the Contractor shall pay the amount for the number of days worked, no later than the next official pay day in the manner agreed upon.

If the provisions of Law No. 379 enacted on May 15, 1948, as amended, known as the "Law to Establish Work Hours in Puerto Rico", is applicable because there is no collective bargaining agreement in effect negotiated by a labor organization, the Contractor shall provide each worker with a pay stub containing the following information: name and address of the Contractor, name of the employee, position, dates and period of work covered by the payment, total regular hours and overtime, salary earned for regular hours and overtime; additions and deductions, indicating the reasons therefor; and the net amount received by the worker. The employer shall provide, within five (5) calendar days subsequent to payment, a check stub through a method that guarantees delivery in accordance with Article XV of DTRH Regulation No. 9017 enacted on April 4, 2018, "Regulations to Administer Law No. 379 enacted on May 15, 1948, as amended, known as the 'Law to Establish Work Hours in Puerto Rico'".

The Parties reaffirm their policy of non-discrimination in the workplace based on any of the reasons prohibited by law, as well as public policy, intended to promote equal pay for equal work in accordance with Law 16-2017, "Puerto Rico Equal Salary Act," and Law 61-2017. Furthermore, the Contractor acknowledges that he or she has consulted the "Uniform Guidelines for Self-Study as to Equal Salary in the Workplace" of August 10, 2017, in order to make any internal assessment to corroborate that it does not engage in salary discrimination of its employees based on sex.

Every other aspect of the legislation and federal and state regulations regarding how minimum wage is paid and what is considered to be work hours or time shall be applicable.

#### **ARTICLE 7. —PROCEEDINGS BEFORE THE LABOR AND HUMAN RESOURCES DEPARTMENT**

Any worker covered by this Agreement, by the provisions of OE-2018-033 and by DTRH Circular Letter No. 2018-01, who alleges a violation of the wage provisions may contact the DTRH's Work Regulations Bureau to report the violation. The DTRH shall initiate an expedited process to hear these claims for prompt decision in accordance with the Secretary's Memorandum No. 2018-05.

The Contractor shall cooperate with the Investigators of the Work Regulations Bureau and with any other employee or officer granted authority by the Secretary of the DTRH to investigate these claims. Furthermore, the Contractor shall be required to deliver payroll documents, a copy of the contracts or any other documents requested by said employees and/or officers with delegated authority.

In accordance with Law 115-1991, as amended, the Contractor shall not be able to terminate, threaten, or discriminate against any worker in relation to the terms, conditions, compensation, location, benefits, or privileges of employment based on the worker offering or attempting to offer any verbal or written testimony, statement or information, related to the rights given by the OE-2018-033, before the DTRH or any

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other judicial, administrative, or legislative forum, if said statements are not defamatory or constitute a disclosure of privileged information established by law.

Nothing provided in this Article prevents workers from turning to the courts to enforce their rights, request any other legal remedies that are necessary to enforce the terms of the OE-2018-033, and compel compliance with the rules, orders, and determinations issued by the Secretary of the DTRH in the exercise of the powers given to the same under it.

#### **ARTICLE 8. —DISPUTE RESOLUTION**

The Contractor, as well as any other subcontractor, must take affirmative steps to solve labor controversies in order to avoid, but not prohibit, cessation of work, strikes, stoppages, or closures, which could put at risk the timely conclusion of the Construction Project. If, after attempting to solve the controversy internally, any of these conflicts materializes, both the Agency and the Contractor agree to notify the DTRH within a period of forty-eight (48) hours from conclusion of the internal resolution attempts. The DTRH shall send a DTRH mediator or arbitrator, within a period of two (2) business days from notice to the same, who shall attempt to solve the situation. The alternative conflict resolution process before the DTRH shall have priority and must be concluded within thirty (30) days from designation of the mediator or arbitrator.

Nothing provided in this Article prevents the parties from turning to any other judicial, administrative, or legislative forum to enforce their rights.

#### **ARTICLE 9. —SAFETY AND PROTECTION REQUIREMENTS**

At the Construction Project site, each Contractor must comply with and maintain the current safety requirements in accordance with the applicable state and federal rules and regulations, including the ones promulgated by the Puerto Rico Occupational Safety and Health Administration ("PR OSHA"), an entity under the DTRH.

Within sixty (60) days of signing the agreement, the Contractor must contact PR OSHA to request training regarding the occupational safety and health standards which must be implemented during the course of the Construction Project.

Furthermore, each Contractor must make sure that non-skillful workers ("obrerros no-diestros" in Spanish) participate in training programs regarding subjects that are relevant to the construction industry, related to construction codes, safety, permits, among others, in accordance with the procedures and guidelines issued by the Office of Management and Permits of the Government of Puerto Rico ("OGPe," for its acronym in Spanish) in this regard. Compliance with said training programs shall be an indispensable requirement for non-skillful workers to be able to continue earning the minimum salary of fifteen dollars (\$15.00) per hour provided in the OE-2018-033 and interpreted in DTRH Circular Letter No. 2018-01. It shall be the responsibility of each Contractor to comply with the duties and guidelines issued by the OGPe in this regard.

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**ARTICLE 10. —UNIONS**

The implementation of the provisions of this Agreement shall not be considered as the recognition by the Contractor or the Agency of a labor union as the exclusive union representative of any group of employees at the shop, in accordance with Section 9 of the OE-2018-033.

In the event that there is a collective bargaining agreement between the Contractor and an exclusive union representative of its employees, or a certification from a relevant forum establishing a labor union as the exclusive union representative of the workers or group of workers of the Contractor, it shall be the responsibility of the latter to negotiate work conditions and the controversy resolution process with the union representative. Therefore, the relationship between the Contractor and the workers shall be governed by the specific agreements in the corresponding collective bargaining agreement and/or relevant case law of the National Labor Relations Board, in all parts and sections that are not incompatible with the Agreement.

**ARTICLE 11. —APPLICABILITY TO EMPLOYEES**

The provisions of this agreement apply to all (skillful or non-skillful ("diestro o no diestro", in Spanish) construction workers who perform manual or physical duties in the Construction Project, as defined in the OE-2018-033 and the DTRH Circular Letter No. 2018-01. The following persons are not subject to the provisions of this Agreement, even if they perform Construction Project duties:

- a. "Professionals", "executives", and "administrators", as defined by the Regulations of the DTRH No. 7082 dated January 18, 2006, known as "Regulation Number 13 — Fifth Revision (2005)."
- b. Employees who do not directly perform manual or physical duties in the Construction Project, only performing duties in connection to public work, such as: security/surveillance area monitors, timekeepers, mailpersons, office works, secretaries, messengers, guards, accounting duties (payroll, bookkeeping), technicians, receptionists, switchboard operators, electronic data processing, record keepers, and other analogous duties, and all other employees who only perform administrative duties.
- c. Employees of the Agency, or of any other state entity, even if they work at the Construction Project site while it is in progress.

**ARTICLE 12. —APPLICABILITY TO ENTITIES**

This Agreement shall be available and shall be fully applied to any winning bidder for the Construction Project who becomes the signer of the same, regardless of whether or not it performs work in other projects. This Agreement shall not apply to the work of any Contractor performed in other projects. Furthermore, it shall not apply to the headquarters, subsidiaries, or affiliates of any Contractor, which does not participate in the Construction Project directly.

Work conditions under this Agreement shall not apply to the Agency, nor to any other public entity, and nothing contained in this document shall be interpreted to prohibit its employees from working in or outside of the Construction Project location.

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**ARTICLE 13. —SEVERABILITY**

If any part of this Agreement is nullified, found to violate the law, or to potentially result in the loss of all or part of the Construction Project financing, it shall be considered temporarily or permanently null and void. However, the rest of the Agreement shall remain in full force and effect to the extent allowed by law. It is the express and unequivocal will of the Parties that the corresponding forums enforce the provisions and the application of this Agreement to the greatest extent possible, even if any part of it, or its application to any person or circumstance, is revoked, nullified, invalidated, affected, or declared unconstitutional.

**ARTICLE 14. —EXCLUSIVITY OF AGREEMENTS**

This document contains the only agreements of all signers in relation to the labor conditions governing the Construction Project and replace any other agreement between the parties regarding labor conditions which would otherwise completely or partially apply to the Construction Project. It shall not be required for any Contractor to execute another agreement regarding labor conditions as a requirement to carry out Construction Project.

**ARTICLE 15. —EFFECTIVE PERIOD**

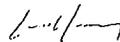
This Agreement shall come into effect immediately upon being approved and signed by (1) the Agency appointing authority and (2) the Contractor. It is understood that this Agreement, along with all of its provisions, shall remain in effect for the entire Construction Project until it is concluded, even if it is not completed before the agreement expiration date.

AND SINCE THEY ARE IN AGREEMENT AS TO THE FOREGOING, the parties sign this Agreement on December 19, 2022.

**PUERTO RICO DEPARTMENT OF HOUSING**

**VENEGAS CONSTRUCTION CORPORATION**

William O. Rodríguez Rodríguez  
William O. Rodríguez Rodríguez (Dec 19, 2022 15:04 AST)



**William O. Rodríguez Rodríguez, Esq.,**  
Secretary

**Emilio R. Venegas**  
Vice-President

**A. APPLICABILITY**

The Project or Program to which the construction work covered by this Contract pertains is being assisted by the United States of America, and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

**(1) MINIMUM WAGES**

- (i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment, computed at rates not less than those contained in the wage determination of the Secretary of Labor (which is attached hereto and made a part hereof), regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH1321)) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place, where it can be easily seen by the workers.

**(ii) Additional Classifications.**

- (A) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:
  - (1) The work to be performed by the classification requested is not performed by a classification in the wage determination;
  - (2) The classification is utilized in the area by the construction industry; and
  - (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (B) If the contractor, the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division ("Administrator"), Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget ("OMB") under OMB control number 1235-0023.)
- (C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, or HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1235-0023.)

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(D) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (1)(ii)(B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this Contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1235-0023.)

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(2) **Withholding.** HUD or its designee shall, upon its own action or upon written request of an authorized representative of the U.S. Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The U.S. Department of Labor shall make such disbursements in the case of direct Davis-Bacon Act contracts.

**(3) Payrolls and basic records.**

(i) **Maintaining Payroll Records.** Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification(s), hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid.

Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1235-0023 and 1215-0018)

(ii) **Certified Payroll Reports.**

(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead, the payrolls only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/agencies/whd/forms> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the U.S. Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1235-0008.)

- (B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
- (1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;
  - (2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;
  - (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract; and
- (C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (a)(3)(ii)(b).
- (D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph (a)(3)(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the U.S. Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### (4) Apprentices and Trainees.

- (i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency (where appropriate), to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program.

If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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- (ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed, unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (iii) **Equal employment opportunity.** The utilization of apprentices, trainees, and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.
- (5) **Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this Contract.
- (6) **Subcontracts.** The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs (1) through (11) in this paragraph (a) and such other clauses as HUD or its designee may, by appropriate instructions, require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.
- (7) **Contract termination; debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
- (8) **Compliance with Davis-Bacon and Related Act Requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this Contract.
- (9) **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.
- (10) **Certification of Eligibility.**
- (i) By entering into this Contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) Anyone who knowingly makes, presents, or submits a false, fictitious, or fraudulent statement, representation or certification is subject to criminal, civil and/or administrative sanctions, including fines, penalties, and imprisonment (e.g., 18 U.S.C. §§ 287, 1001, 1010, 1012; 31 U.S.C. §§ 3729, 3802).

**(11) Complaints, Proceedings, or Testimony by Employees.** No laborer or mechanic, to whom the wage, salary, or other labor standards provisions of this Contract are applicable, shall be discharged or in any other manner discriminated against by the contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

## B. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The provisions of this paragraph (b) are applicable where the amount of the prime contract exceeds **\$100,000**. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

**(1) Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work, which may require or involve the employment of laborers or mechanics, shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek, unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

**(2) Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in subparagraph B(1) of this paragraph, the contractor, and any subcontractor responsible therefor, shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph B(1) of this paragraph, **in the sum set by the U.S. Department of Labor at 29 CFR 5.5(b)(2)** for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph B(1) of this paragraph. In accordance with the Federal Civil Penalties Inflation Adjustment Act of 1990 (28 U.S.C. § 2461 Note), the DOL adjusts this civil monetary penalty for inflation no later than January 15 each year.

**(3) Withholding for unpaid wages and liquidated damages.** HUD or its designee shall, upon its own action or upon written request of an authorized representative of the U.S. Department of Labor, withhold or cause to be withheld from any moneys payable on account of work performed by the contractor or subcontractor under any such contract, or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages, as provided in the clause set forth in subparagraph B(2) of this paragraph.

**(4) Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph B(1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs B(1) through (4) of this paragraph.

## C. HEALTH AND SAFETY

The provisions of this paragraph (c) are applicable where the amount of the prime contract exceeds **\$100,000**.

**(1)** No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his or her health and safety, as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

**(2)** The contractor shall comply with all regulations issued by the Secretary of Labor pursuant to 29 CFR Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96), 40 U.S.C. § 3701 et seq.

**(3)** The contractor shall include the provisions of this paragraph in every subcontract, so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

**A. APLICABILIDAD**

El Proyecto o Programa al que se refiere el trabajo de construcción cubierto por este Contrato está siendo asistido por los Estados Unidos de América, y las siguientes Disposiciones de Normas Laborales Federales están incluidas en este Contrato de conformidad con las disposiciones aplicables a dicha asistencia federal.

**(1) SALARIOS MÍNIMOS**

- (i) Todos los trabajadores y mecánicos empleados o que trabajen en el sitio del trabajo serán pagados incondicionalmente y con una frecuencia no inferior a una vez por semana, y sin deducciones o descuentos subsiguientes en ninguna cuenta (excepto las deducciones de nómina permitidas por los reglamentos emitidos por el Secretario de Trabajo en virtud de la Ley Copeland (29 CFR Parte 3)), el monto total de los salarios y los beneficios complementarios de buena fe (o sus equivalentes en efectivo) adeudados al momento del pago, calculados a tasas no inferiores a las contenidas en la determinación del salario del Secretaría del Trabajo (que se adjunta al presente y forma parte del mismo), independientemente de cualquier relación contractual que pueda alegarse que existe entre el contratista y dichos trabajadores y mecánicos. Las contribuciones hechas o los costos razonablemente anticipados por beneficios complementarios de buena fe bajo la Sección 1(b)(2) de la Ley Davis-Bacon en nombre de trabajadores o mecánicos se consideran salarios pagados a dichos trabajadores o mecánicos, sujeto a las disposiciones de 29 CFR 5.5 (a)(1)(iv); también, las contribuciones periódicas realizadas o los costos incurridos durante más de un período semanal (pero con una frecuencia no inferior a la trimestral) en virtud de planes, fondos o programas que cubran el período semanal en particular, se considerarán realizados o incurridos de manera constructiva durante dicho período semanal.

Dichos trabajadores y mecánicos recibirán el salario correspondiente y los beneficios complementarios según la determinación del salario para la clasificación del trabajo realmente realizado, sin tener en cuenta la habilidad, excepto según lo dispuesto en 29 CFR 5.5(a)(4).

Los trabajadores o mecánicos que realicen trabajos en más de una clasificación podrán ser compensados a la tarifa especificada para cada clasificación por el tiempo realmente trabajado en la misma: Siempre que los registros de nómina del empleador establezcan con precisión el tiempo empleado en cada clasificación en la que se realiza el trabajo. El contratista y sus subcontratistas deberán publicar en todo momento la determinación del salario (incluida cualquier clasificación adicional y tarifas salariales conforme a 29 CFR 5.5(a)(1)(ii) y el cartel de Davis-Bacon (WH1321)) en el sitio de la obra en un lugar visible y accesible, donde los trabajadores puedan verla fácilmente.

**(ii) Clasificaciones Adicionales.**

- (A) Cualquier clase de trabajadores o mecánicos que no figuren en la determinación del salario y que deban emplearse en virtud del contrato se clasificarán de conformidad con la determinación del salario. HUD aprobará una clasificación adicional y una tasa de salario y beneficios complementarios solo cuando se cumplan los siguientes criterios:
- (1) El trabajo para realizar por la clasificación solicitada no es realizado por una clasificación en la determinación del salario;
  - (2) La clasificación es utilizada en el área por la industria de la construcción; y
  - (3) La tasa salarial propuesta, incluidos los beneficios complementarios de buena fe, tiene una relación razonable con las tasas salariales contenidas en la determinación del salario.
- (B) Si el contratista, los trabajadores y los mecánicos que se emplearán en la clasificación (si se conocen), o sus representantes, y HUD o su designado acuerdan la clasificación propuesta y la tarifa salarial (incluida la cantidad designada para beneficios complementarios, cuando corresponda), HUD o su designado enviará un informe de la acción tomada al Administrador de la División de Horas y Salarios ("Administrador"), Administración de Normas Laborales, Departamento de Trabajo de EE. UU., Washington, D.C. 20210. El Administrador, o un representante autorizado, aprobará, modificará o desaprobará cada acción de clasificación adicional dentro de los 30 días posteriores a la recepción y así informará a HUD o su designado o notificará a HUD o su designado dentro del período de 30 días que se requiere de tiempo adicional. (Aprobado por la Oficina de Gerencia y Presupuesto ("OMB") bajo el número de control OMB 1235-0023).
- (C) En caso de que el contratista, los trabajadores o mecánicos que se emplearán en la clasificación o sus

representantes, o HUD o su designado no estén de acuerdo con la clasificación propuesta y la tarifa salarial (incluida la cantidad designada para beneficios complementarios, cuando corresponda), HUD o su designado remitirá las preguntas, incluidas las opiniones de todas las partes interesadas y la recomendación de HUD o su designado, al Administrador para su determinación. El Administrador, o un representante autorizado, emitirá una determinación dentro de los 30 días posteriores a la recepción y así informará a HUD o su designado o notificará a HUD o su designado dentro del período de 30 días que se necesita tiempo adicional. (Aprobado por la Oficina de Gerencia y Presupuesto bajo el Número de Control OMB 1235-0023).

- (D) El salario (incluidos los beneficios complementarios, cuando corresponda) determinado de conformidad con los subpárrafos (1)(ii)(B) o (C) de este párrafo, se pagará a todos los trabajadores que realicen trabajos en la clasificación conforme a este Contrato desde el primer día en que se realiza el trabajo en la clasificación.
- (iii) Siempre que la tasa de salario mínimo prescrita en el contrato para una clase de trabajadores o mecánicos incluya un beneficio adicional que no se exprese como una tarifa por hora, el contratista deberá pagar el beneficio según se establece en la determinación del salario o deberá pagar otro bono beneficio marginal de buena fe o un equivalente en efectivo por hora del mismo.
- (iv) Si el contratista no realiza pagos a un fideicomisario u otra tercera persona, el contratista puede considerar como parte de los salarios de cualquier trabajador o mecánico el monto de cualquier costo razonable anticipado al proporcionar beneficios complementarios de buena fe bajo un plan o programa, siempre que la Secretaría del Trabajo haya determinado, previa solicitud por escrito del contratista, que se han cumplido las normas aplicables de la Ley Davis-Bacon. La Secretaría del Trabajo podrá requerir al contratista que aparte en una cuenta separada activos para el cumplimiento de las obligaciones bajo el plan o programa. (Aprobado por la Oficina de Gerencia y Presupuesto bajo el Número de Control OMB 1235-0023).
- (2) **Retenciones.** HUD o su designado deberá, por su propia acción o por solicitud por escrito de un representante autorizado del Departamento de Trabajo de EE. UU., retener o hacer que se retenga del contratista en virtud de este contrato o cualquier otro contrato federal con el mismo contratista principal, o cualquier otro contrato con asistencia federal sujeto a los requisitos de salario prevaleciente de Davis-Bacon que esté en manos del mismo contratista principal, tanto de los pagos o anticipos devengados según se considere necesario para pagar a los trabajadores y mecánicos, incluidos los aprendices, personas en entrenamiento y ayudantes, empleados por el contratista o cualquier subcontratista, el monto total de los salarios requeridos por el contrato. En caso de que no se pague a cualquier trabajador o mecánico, incluido cualquier aprendiz, persona en entrenamiento o ayudante, empleados o que trabaje en el sitio de trabajo, la totalidad o parte de los salarios requeridos por el contrato, HUD o su designado puede, después de un aviso por escrito al contratista, patrocinador, solicitante o propietario, tomar las medidas que sean necesarias para provocar la suspensión de cualquier otro pago, adelanto o garantía de fondos hasta que tales violaciones hayan cesado. HUD o su designado puede, después de una notificación por escrito al contratista, desembolsar dichos montos retenidos por y a cuenta del contratista o subcontratista a los respectivos empleados a quienes se les adeuda. El Departamento de Trabajo de los Estados Unidos hará tales desembolsos en el caso de contratos directos de la Ley Davis-Bacon.

### (3) Nóminas y registros básicos.

- (i) **Mantenimiento de registros de nómina.** Las nóminas y los registros básicos relacionados con las mismas deberán ser mantenidos por el contratista durante el curso del trabajo y conservados por un período de tres años a partir de entonces para todos los trabajadores y mecánicos que laboren en el sitio del trabajo. Dichos registros deberán contener el nombre, la dirección y el número de seguro social de cada trabajador, su(s) clasificación(es) correcta(s), las tarifas por hora de los salarios pagados (incluidas las tasas de contribuciones o los costos previstos para los beneficios complementarios de buena fe o los equivalentes en efectivo de los mismos de los tipos descritos en la Sección 1(b)(2)(B) de la Ley Davis-Bacon), el número de horas diarias y semanales trabajadas, las deducciones realizadas y los salarios reales pagados.

Siempre que la Secretaría del Trabajo haya determinado, conforme a 29 CFR 5.5(a)(1)(iv), que los salarios de cualquier trabajador o mecánico incluyen el monto de cualquier costo anticipado razonablemente al brindar beneficios bajo un plan o programa descrito en la Sección 1(b)(2)(B) de la Ley Davis-Bacon, el contratista deberá mantener registros que demuestren que el compromiso de proporcionar dichos beneficios es exigible, que el plan o programa es financieramente responsable y que el plan o programa ha sido comunicados por escrito a los trabajadores o mecánicos afectados, y registros que muestren los costos previstos o el costo real incurrido en la prestación de dichos beneficios.

Los contratistas que empleen aprendices o personas en entrenamiento bajo programas aprobados deberán mantener evidencia escrita del registro de los programas de aprendices y la certificación de los programas de aprendizaje, el

registro de los aprendices y personas en entrenamiento, y las proporciones y tarifas salariales prescritas en los programas aplicables. (Aprobado por la Oficina de Gerencia y Presupuesto bajo los Números de Control OMB 1235-0023 y 1215-0018)

**(ii) Informes Certificados de Nómina.**

**(A)** El contratista deberá presentar semanalmente, por cada semana en la que se realice cualquier trabajo por contrato, una copia de todas las nóminas a HUD o su designado si la agencia es una parte del contrato, pero si la agencia no es tal parte, el contratista enviará las nóminas al patrocinador solicitante o propietario, según sea el caso, para su transmisión a HUD o a su designado. Las nóminas enviadas deberán establecer de manera precisa y completa toda la información que se requiere mantener según 29 CFR 5.5(a)(3)(i), exceptuando los números de seguro social completos y las direcciones de las casas que no se incluirán en las transmisiones semanales. En cambio, las nóminas solo deben incluir un número de identificación individual para cada empleado (por ejemplo, los últimos cuatro dígitos del número de seguro social del empleado). La información de nómina semanal requerida se puede enviar en cualquier forma deseada. El formulario opcional WH-347 está disponible para este propósito en el sitio web de la División de Horas y Salarios en <https://www.dol.gov/agencies/whd/forms> o en su sitio sucesor. El contratista primario es responsable de la presentación de copias de las nóminas por parte de todos los subcontratistas.

Los contratistas y subcontratistas deberán mantener el número de seguro social completo y la dirección actual de cada trabajador cubierto, y deberán proporcionarlos a pedido del HUD o su designado si la agencia es una parte del contrato, pero si la agencia no es tal parte, el contratista enviará las nóminas al patrocinador solicitante o al propietario, según sea el caso, para que las transmita al HUD o su designado, al contratista o a la División de Horas y Salarios del Departamento de Trabajo de los EE. UU. para fines de una investigación o auditoría de cumplimiento de los requisitos salariales vigentes. No es una violación de este subpárrafo que un contratista principal requiera que un subcontratista proporcione direcciones y números de seguro social al contratista principal para sus propios registros, sin la presentación semanal al HUD o su designado. (Aprobado por la Oficina de Gerencia y Presupuesto bajo el Número de Control OMB 1235-0008).

**(B)** Cada nómina presentada deberá estar acompañada de una "Declaración de Cumplimiento", firmada por el contratista o subcontratista o su agente que paga o supervisa el pago de las personas empleadas bajo el contrato y deberá certificar lo siguiente:

- (1)** Que la nómina para el período de nómina contiene la información que debe proporcionarse según 29 CFR 5.5(a)(3)(ii), la información adecuada se mantiene según 29 CFR 5.5(a)(3)(i), y que dicha información es correcta y completa;
- (2)** Que a cada trabajador o mecánico (incluido cada ayudante, aprendiz y persona en entrenamiento) empleado bajo contrato durante el período de nómina se le haya pagado el salario semanal completo que haya ganado, sin descuento, ya sea directa o indirectamente, y que no se hayan hecho deducciones ya sea directa o indirectamente de los salarios completos ganados, que no sean las deducciones permitidas según lo establecido en 29 CFR Parte 3;
- (3)** Que a cada trabajador o mecánico se le haya pagado no menos de las tasas salariales aplicables y beneficios marginales o equivalentes en efectivo para la clasificación del trabajo realizado, como se especifica en la determinación salarial aplicable incorporada en el contrato; y

**(C)** La presentación semanal de una certificación debidamente ejecutada establecida en el reverso del formulario opcional WH-347 que cumpla con el requisito de presentación de la "Declaración de cumplimiento" requerida por el subpárrafo (a)(3)(ii)(b).

**(D)** La falsificación de cualquiera de las certificaciones anteriores puede someter al contratista o subcontratista a un proceso civil o penal conforme a la Sección 1001 del Título 18 y la Sección 3729 del Título 31 del Código de los Estados Unidos.

**(iii)** El contratista o subcontratista deberá hacer que los registros requeridos bajo el subpárrafo (a)(3)(i) estén disponibles para inspección, copia o transcripción por parte de representantes autorizados de HUD o su designado o del Departamento del Trabajo de los EE. UU., y permitirá a tales representantes entrevistar a los empleados durante las horas de trabajo estando en el trabajo. Si el contratista o subcontratista no presenta los registros requeridos o no los pone a disposición, HUD o su designado puede, después de notificar por escrito al contratista, patrocinador, solicitante o propietario, tomar las medidas que sean necesarias para provocar la suspensión de cualquier pago adicional, anticipo o garantía de fondos. Además, la falta de presentación de los registros requeridos a petición o de no poner dichos registros a disposición puede ser motivo de acción de inhabilitación de conformidad con 29 CFR 5.12.

**(4) Aprendices y Personas en entrenamiento.**

- (i) **Aprendices.** A los aprendices se les permitirá trabajar a una tarifa inferior a la predeterminada por el trabajo que realizaron cuando estén empleados de conformidad con un programa de aprendizaje de buena fe registrado individualmente en el Departamento del Trabajo de los EE. UU., Administración de Empleo y Capacitación, Oficina de Capacitación de Aprendices, Servicios Laborales y de Empleadores, o con una Agencia Estatal de Aprendizaje reconocida por la Oficina, o si una persona está empleada en sus primeros 90 días de empleo a prueba como aprendiz en dicho programa de aprendizaje, que no está registrado individualmente en el programa, pero que ha sido certificado por la Oficina de Capacitación de Aprendices, Servicios Laborales y de Empleadores, o una Agencia Estatal de Aprendices (cuando corresponda), para ser elegible para un empleo de prueba como aprendiz.

La proporción permitida de aprendices a jornaleros en el sitio de trabajo en cualquier clasificación de oficio no será mayor que la proporción permitida al contratista en cuanto a la fuerza de trabajo total bajo el programa registrado. Cualquier trabajador que figure en una nómina con una tasa de salario de aprendiz, que no esté registrado o empleado de otra manera como se indicó anteriormente, recibirá un pago no inferior a la tasa de salario aplicable en la determinación del salario para la clasificación del trabajo realmente realizado. Además, cualquier aprendiz que realice un trabajo en el sitio de trabajo que exceda la proporción permitida por el programa registrado deberá recibir un pago no inferior al salario aplicable en la determinación del salario por el trabajo realmente realizado. Cuando un contratista esté realizando la construcción de un proyecto en una localidad distinta a la que tiene registrado su programa, se observarán las proporciones y tarifas salariales (expresadas en porcentajes de la tarifa por hora del jornalero) especificadas en el programa registrado del contratista o subcontratista.

A cada aprendiz se le debe pagar a un nivel no menor a la tarifa especificada en el programa registrado para el nivel de progreso del aprendiz, expresada como un porcentaje de la tarifa por hora del jornalero especificada en la determinación salarial aplicable.

Los aprendices recibirán beneficios complementarios de acuerdo con las disposiciones del programa de aprendizaje.

Si el programa de aprendizaje no especifica los beneficios complementarios, los aprendices deben recibir el monto total de los beneficios complementarios que figuran en la determinación del salario para la clasificación aplicable. Si el Administrador determina que prevalece una práctica diferente para la clasificación de aprendiz aplicable, los beneficios complementarios se pagarán de acuerdo con esa determinación. En caso de que la Oficina de Capacitación de Aprendices, Servicios Laborales y de Empleadores, o una Agencia Estatal de Aprendices reconocida por la Oficina, retire la aprobación de un programa de aprendices, el contratista ya no podrá utilizar aprendices a una tarifa inferior a la predeterminada aplicable para el trabajo realizado hasta que se apruebe un programa aceptable.

- (ii) **Personas en entrenamiento.** Salvo lo dispuesto en 29 CFR 5.16, no se permitirá que las personas en entrenamiento trabajen a una tarifa inferior a la predeterminada por el trabajo realizado, a menos que estén empleados de conformidad con un programa que haya recibido aprobación previa, evidenciado por una certificación formal del Departamento de Trabajo, Administración de Empleo y Capacitación de EE. UU. La proporción de personas en entrenamiento a jornaleros en el lugar de trabajo no será mayor que lo permitido según el plan aprobado por la Administración de Empleo y Capacitación. A cada persona en entrenamiento se le debe pagar a no menos de la tarifa especificada en el programa aprobado para el nivel de progreso de la persona en entrenamiento, expresada como un porcentaje de la tarifa por hora especificada del jornalero en la determinación salarial aplicable. Las personas en entrenamiento recibirán beneficios complementarios de acuerdo con las disposiciones del programa de aprendices. Si el programa de entrenamiento no menciona los beneficios complementarios, a las personas en entrenamiento se les pagará el monto total de los beneficios complementarios enumerados en la determinación del salario, a menos que el Administrador de la División de Horas y Salarios determine que existe un programa de aprendizaje asociado con la tasa salarial del oficial correspondiente en la determinación del salario que prevé menos de los beneficios complementarios completos para los aprendices. Cualquier empleado que figure en la nómina con una tarifa de persona en entrenamiento que no esté registrado y que no participe en un plan de capacitación aprobado por la Administración de Empleo y Capacitación recibirá un pago no inferior al salario aplicable en la determinación del salario por el trabajo realmente realizado.

Además, a cualquier persona en entrenamiento que realice labores en el sitio de trabajo que exceda la proporción permitida por el programa registrado se le pagará no menos que la tarifa salarial aplicable en la determinación del salario por el trabajo realmente realizado. En caso de que la Administración de Empleo y Capacitación retire la aprobación de un programa de capacitación, el contratista ya no podrá utilizar personas en entrenamiento a una tarifa inferior a la predeterminada aplicable para el trabajo realizado hasta que se apruebe un programa aceptable.

- (iii) **Igualdad de oportunidades de empleo.** La utilización de aprendices, personas en entrenamiento y jornaleros bajo 29 CFR Parte 5 deberá estar en conformidad con los requisitos de igualdad de oportunidades de empleo de la Orden

Ejecutiva 11246, enmendada, y 29 CFR Parte 30.

- (5) **Cumplimiento de los requisitos de la Ley Copeland.** El contratista deberá cumplir con los requisitos de 29 CFR Parte 3, que se incorporan por referencia en este Contrato.
- (6) **Subcontratos.** El contratista o subcontratista insertará en cualquier subcontrato las cláusulas contenidas de los subpárrafos (1) al (11) en este párrafo (a) y cualquier otra cláusula que HUD o su designado pueda requerir, mediante las instrucciones apropiadas, y una copia de la correspondiente decisión sobre el salario prevaleciente, y también una cláusula que requiere que los subcontratistas incluyan estas cláusulas en cualquier subcontrato de nivel inferior. El contratista principal será responsable del cumplimiento por parte de cualquier subcontratista o subcontratista de nivel inferior de todas las cláusulas del contrato en este párrafo.
- (7) **Terminación del contrato; exclusión.** El incumplimiento de las cláusulas del contrato en 29 CFR 5.5 puede ser motivo de rescisión del contrato y de inhabilitación como contratista y subcontratista según lo dispuesto en 29 CFR 5.12.
- (8) **Cumplimiento con los Requisitos de la Ley Davis-Bacon y Leyes Relacionadas.** Todos los fallos e interpretaciones de Davis-Bacon y Actos Relacionados contenidos en 29 CFR Partes 1, 3 y 5 se incorporan aquí por referencia en este Contrato.
- (9) **Controversias relativas a las normas laborales.** Las disputas que surjan de las disposiciones sobre normas laborales de este Contrato no estarán sujetas a la cláusula general de disputas de este Contrato. Dichas disputas se resolverán de acuerdo con los procedimientos del Departamento de Trabajo de los EE. UU. establecidos en 29 CFR Partes 5, 6 y 7. Las disputas dentro del significado de esta cláusula incluyen disputas entre el contratista (o cualquiera de sus subcontratistas) y HUD o su designado, el Departamento de Trabajo de los Estados Unidos, o los empleados o sus representantes.
- (10) **Certificación de la elegibilidad.**
- (i) Al celebrar este Contrato, el contratista certifica que ni él (ni él o ella) ni ninguna persona o firma que tenga un interés en la firma del contratista es una persona o firma inelegible para adjudicarse contratos del Gobierno en virtud de la Sección 3 (a) de la Ley Davis-Bacon o 29 CFR 5.12(a)(1) o para recibir contratos de HUD o participar en programas de HUD de conformidad con 24 CFR Parte 24.
  - (ii) Ninguna parte de este Contrato se subcontratará a ninguna persona o firma que no sea elegible para la adjudicación de un contrato del Gobierno en virtud de la Sección 3(a) de la Ley Davis-Bacon o 29 CFR 5.12(a)(1) o para ser adjudicado contratos de HUD o participar en programas de HUD de conformidad con 24 CFR Parte 24.
  - (iii) Cualquier persona que a sabiendas haga, presente o envíe una declaración, representación o certificación falsa, ficticia o fraudulenta está sujeta a sanciones penales, civiles y/o administrativas, incluidas multas, sanciones y encarcelamiento (p. ej., 18 U.S.C. §§ 287, 1001, 1010, 1012, 31 USC §§ 3729, 3802.
- (11) **Quejas, Procedimientos o Testimonio de los Empleados.** Ningún trabajador o mecánico, a quien se apliquen las disposiciones sobre sueldos, salarios u otras normas laborales de este Contrato, será despedido o discriminado de ninguna otra manera por parte del contratista o cualquier subcontratista porque dicho empleado haya presentado una queja o instituido o causado a haber iniciado cualquier procedimiento o ha declarado o está a punto de declarar en cualquier procedimiento bajo o relacionado con las normas laborales aplicables en virtud de este Contrato a su empleador.

**B. LEY DE NORMAS DE SEGURIDAD Y HORAS DE TRABAJO POR CONTRATO**

Las disposiciones de este párrafo (b) se aplican cuando el monto del contrato principal excede los **\$100,000**. Tal como se usa en este párrafo, los términos "obreros" y "mecánicos" incluyen vigilantes y guardias.

- (1) **Requisitos de horas extras.** Ningún contratista o subcontratista que contrate para cualquier parte del trabajo del contrato, que pueda requerir o involucrar el empleo de trabajadores o mecánicos, requerirá o permitirá que dicho trabajador o mecánico en cualquier semana laboral en la que el individuo esté empleado en dicho trabajo trabaje en exceso de 40 horas en dicha semana laboral, a menos que dicho trabajador o mecánico reciba una compensación a una tasa no inferior a una vez y media la tasa básica de pago por todas las horas trabajadas en exceso de 40 horas en dicha semana laboral.
- (2) **Violación; responsabilidad por salarios no pagados; daños y perjuicios.** En caso de cualquier violación de la cláusula establecida en el inciso B (1) de este párrafo, el contratista, y cualquier subcontratista responsable por ello, será responsable por los salarios no pagados. Además, dicho contratista y subcontratista serán responsables ante los Estados Unidos (en el caso de trabajos realizados bajo contrato para el Distrito de Columbia o un territorio, ante dicho Distrito o territorio) por daños y perjuicios. Dichos daños y perjuicios se calcularán con respecto a cada trabajador o mecánico individual, incluidos los vigilantes y guardias, empleados en violación de la cláusula establecida en el subpárrafo B(1) de este párrafo, en la suma establecida por el Departamento de Trabajo de los EE. UU. en 29 CFR 5.5(b)(2) por cada día calendario en el que se requirió o permitió que dicha persona trabajara más de la semana laboral estándar de 40 horas sin

el pago de los salarios por horas extras requeridos por la cláusula establecida en el subpárrafo B(1) de este párrafo. De acuerdo con la Ley Federal de Ajuste de Sanciones Civiles por Inflación de 1990 (28 U.S.C. § 2461 Note), el DOL ajusta esta sanción monetaria civil por inflación a más tardar el 15 de enero de cada año.

- (3) **Retención por salarios no pagados y daños y perjuicios.** HUD o su designado deberá, por su propia acción o previa solicitud por escrito de un representante autorizado del Departamento de Trabajo de los EE. UU., retener o hacer que se retenga cualquier dinero pagadero a cuenta del trabajo realizado por el contratista o subcontratista en virtud de dicho contrato, o cualquier otro contrato federal con el mismo contrato principal, o cualquier otro contrato con asistencia federal sujeto a la Ley de estándares de seguridad y horas de trabajo por contrato que esté en manos del mismo contratista principal, las sumas que se determinen como necesarias para satisfacer cualquier responsabilidad de dicho contratista o subcontratista por salarios no pagados y daños y perjuicios, según lo dispuesto en la cláusula establecida en el subpárrafo B(2) de este párrafo.
- (4) **Subcontratos.** El contratista o subcontratista insertará en cualquier subcontrato las cláusulas establecidas en el subpárrafo B (1) a (4) de este párrafo y también una cláusula que requiera que los subcontratistas incluyan estas cláusulas en cualquier subcontrato de nivel inferior. El contratista principal será responsable del cumplimiento por parte de cualquier subcontratista o subcontratista de nivel inferior de las cláusulas establecidas en los subpárrafos B (1) a (4) de este párrafo.

### C. SALUD Y SEGURIDAD

Las disposiciones de este párrafo (c) se aplican cuando el monto del contrato principal excede los **\$100,000**.

- (1) No se le exigirá a ningún trabajador o mecánico que trabaje en un entorno o en condiciones de trabajo insalubres, riesgosas o peligrosas para su salud y seguridad, según lo determinen las normas de seguridad y salud en la construcción promulgadas por la Secretaría del Trabajo mediante reglamentos.
- (2) El contratista deberá cumplir con todos los reglamentos emitidos por el la Secretaria del Trabajo de conformidad con 29 CFR Parte 1926 y el incumplimiento puede resultar en la imposición de sanciones de conformidad con la Ley de Normas de Seguridad y Horas de Trabajo por Contrato, (Ley Pública 91-54, 83 Stat 96), 40 U.S.C. § 3701 y siguientes.
- (3) El contratista deberá incluir las disposiciones de este párrafo en cada subcontrato, de modo que dichas disposiciones sean vinculantes para cada subcontratista. El contratista tomará las medidas con respecto a cualquier subcontratista que la Secretaría de Vivienda y Desarrollo Urbano o la Secretaría del Trabajo indiquen como un medio para hacer cumplir dichas disposiciones.

WDRR  
WDRR

"General Decision Number: PR20220003 02/25/2022

Superseded General Decision Number: PR20210003

State: Puerto Rico

Construction Type: Residential

Counties: Puerto Rico Statewide.

RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories)

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026. Please note that this Executive Order applies to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

W

WOPR  
WOPR

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<p>. Executive Order 14026 generally applies to the contract.                  . The contractor must pay all covered workers at least \$15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.</p>
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The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Modification Number	Publication Date
0	01/07/2022
1	02/25/2022

\* SUPR1993-002 10/29/1993

	Rates	Fringes
CARPENTER.....	\$ 7.25 **	.65
CEMENT MASON/CONCRETE FINISHER...	\$ 7.25 **	
ELECTRICIAN.....	\$ 7.25 **	.64
IRONWORKER.....	\$ 7.25 **	.63

Laborer, Unskilled.....	\$ 7.25 **	.36
PAINTER.....	\$ 7.25 **	
PLUMBER.....	\$ 7.25 **	.56
Power equipment operators:		
Cranes.....	\$ 7.25 **	1.14
Diggers.....	\$ 7.25 **	
TRUCK DRIVER.....	\$ 7.25 **	

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$15.00). Please see the Note at the top of the wage determination for more information.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that

no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

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Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

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3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

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WARR

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

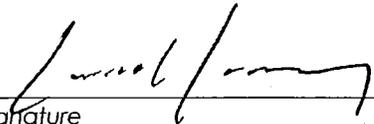


# ATTACHMENT K NON-CONFLICT OF INTEREST CERTIFICATION VENEGAS CONSTRUCTION CORP.

The CONTRACTOR certifies that:

1. No public servant of this executive agency has a pecuniary interest in this contract, subrecipient agreement, purchase, or commercial transaction.
2. No public servant of this executive agency has requested me or accepted from me, directly or indirectly, for him (her), for any member of his family unit or for any person, gifts, bonuses, favors, services, donations, loans or anything else of monetary value.
3. No public servant (s) requested or accepted any good of economic value, linked to this transaction, from any person of my entity as payment for performing the duties and responsibilities of their employment.
4. No public servant has requested from me, directly or indirectly, for him (her), for any member of his or her family unit, or for any other person, business, or entity, something of economic value, including gifts, loans, promises, favors or services in exchange for the performance of said public servant is influenced in my favor or of my entity.
5. I have no kinship relationship, within the fourth degree of consanguinity and second by affinity, with any public servant who has the power to influence and participate in the institutional decisions of this executive agency.

"I hereby certify under penalty of perjury that the foregoing is complete, true, and correct."

  
\_\_\_\_\_  
Signature

October 25, 2022  
\_\_\_\_\_  
Date

Emilio R. Venegas  
\_\_\_\_\_  
Printed Name

Vice-president  
\_\_\_\_\_  
Position

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WORR  
WORR

# Increase Capacity CEWRI Venegas Agreement part 1

Final Audit Report

2022-12-19

Created:	2022-12-16
By:	Radames Comas Segarra (rcomas@vivienda.pr.gov)
Status:	Signed
Transaction ID:	CBJCHBCAABAAs8tWn6HxjhZjs4QOvRXAKDlyj08Vvd38

## "Increase Capacity CEWRI Venegas Agreement part 1" History

-  Document created by Radames Comas Segarra (rcomas@vivienda.pr.gov)  
2022-12-16 - 1:32:02 PM GMT
-  Document emailed to Emilio R Venegas (erv@vccpr.com) for signature  
2022-12-16 - 1:35:09 PM GMT
-  Email sent to dramos@vivienda.pr.com bounced and could not be delivered  
2022-12-16 - 1:35:12 PM GMT
-  Email viewed by Emilio R Venegas (erv@vccpr.com)  
2022-12-16 - 5:08:29 PM GMT
-  Document e-signed by Emilio R Venegas (erv@vccpr.com)  
Signature Date: 2022-12-16 - 5:12:34 PM GMT - Time Source: server
-  Document emailed to w.rodriquez@vivienda.pr.gov for signature  
2022-12-16 - 5:12:35 PM GMT
-  Email viewed by w.rodriquez@vivienda.pr.gov  
2022-12-19 - 6:50:52 PM GMT
-  Signer w.rodriquez@vivienda.pr.gov entered name at signing as William O. Rodríguez Rodríguez  
2022-12-19 - 6:52:46 PM GMT
-  Document e-signed by William O. Rodríguez Rodríguez (w.rodriquez@vivienda.pr.gov)  
Signature Date: 2022-12-19 - 6:52:48 PM GMT - Time Source: server
-  Agreement completed.  
2022-12-19 - 6:52:48 PM GMT

# Increase Capacity CEWRI Venegas Agreement part 2

Final Audit Report

2022-12-19

Created:	2022-12-16
By:	Radames Comas Segarra (rcomas@vivienda.pr.gov)
Status:	Signed
Transaction ID:	CBJCHBCAABAk5JQwRxq0RawF4drlMW_Fce2oorPN-S6

## "Increase Capacity CEWRI Venegas Agreement part 2" History

-  Document created by Radames Comas Segarra (rcomas@vivienda.pr.gov)  
2022-12-16 - 1:37:01 PM GMT
-  Document emailed to Emilio R Venegas (erv@vccpr.com) for signature  
2022-12-16 - 1:38:28 PM GMT
-  Email sent to dramos@vivienda.pr.com bounced and could not be delivered  
2022-12-16 - 1:38:42 PM GMT
-  Email viewed by Emilio R Venegas (erv@vccpr.com)  
2022-12-16 - 5:12:51 PM GMT
-  Document e-signed by Emilio R Venegas (erv@vccpr.com)  
Signature Date: 2022-12-16 - 5:15:48 PM GMT - Time Source: server
-  Document emailed to w.rodriquez@vivienda.pr.gov for signature  
2022-12-16 - 5:15:52 PM GMT
-  Email viewed by w.rodriquez@vivienda.pr.gov  
2022-12-19 - 6:52:54 PM GMT
-  Signer w.rodriquez@vivienda.pr.gov entered name at signing as William O. Rodríguez Rodríguez  
2022-12-19 - 6:56:03 PM GMT
-  Document e-signed by William O. Rodríguez Rodríguez (w.rodriquez@vivienda.pr.gov)  
Signature Date: 2022-12-19 - 6:56:05 PM GMT - Time Source: server
-  Agreement completed.  
2022-12-19 - 6:56:05 PM GMT

# Increase Capacity CEWRI Venegas Agreement part 3

Final Audit Report

2022-12-19

Created:	2022-12-16
By:	Radames Comas Segarra (rcomas@vivienda.pr.gov)
Status:	Signed
Transaction ID:	CBJCHBCAABAAEhIXsXLQEaLWwAvUXGXITNHbGeseKdYb

## "Increase Capacity CEWRI Venegas Agreement part 3" History

-  Document created by Radames Comas Segarra (rcomas@vivienda.pr.gov)  
2022-12-16 - 1:40:13 PM GMT
-  Document emailed to Emilio R Venegas (erv@vccpr.com) for signature  
2022-12-16 - 1:42:03 PM GMT
-  Email sent to dramos@vivienda.pr.com bounced and could not be delivered  
2022-12-16 - 1:42:12 PM GMT
-  Email viewed by Emilio R Venegas (erv@vccpr.com)  
2022-12-16 - 5:16:00 PM GMT
-  Document e-signed by Emilio R Venegas (erv@vccpr.com)  
Signature Date: 2022-12-16 - 5:18:35 PM GMT - Time Source: server
-  Document emailed to w.rodriquez@vivienda.pr.gov for signature  
2022-12-16 - 5:18:38 PM GMT
-  Email viewed by w.rodriquez@vivienda.pr.gov  
2022-12-19 - 6:56:16 PM GMT
-  Signer w.rodriquez@vivienda.pr.gov entered name at signing as William O. Rodríguez Rodríguez  
2022-12-19 - 6:59:09 PM GMT
-  Document e-signed by William O. Rodríguez Rodríguez (w.rodriquez@vivienda.pr.gov)  
Signature Date: 2022-12-19 - 6:59:11 PM GMT - Time Source: server
-  Agreement completed.  
2022-12-19 - 6:59:11 PM GMT

# Increase Capacity CEWRI Venegas Agreement part 4

Final Audit Report

2022-12-19

Created:	2022-12-16
By:	Radames Comas Segarra (rcomas@vivienda.pr.gov)
Status:	Signed
Transaction ID:	CBJCHBCAABAAWLeoi02CUscT99G6dRnz0xXGri1BuOmv

## "Increase Capacity CEWRI Venegas Agreement part 4" History

-  Document created by Radames Comas Segarra (rcomas@vivienda.pr.gov)  
2022-12-16 - 1:45:56 PM GMT
-  Document emailed to Emilio R Venegas (erv@vccpr.com) for signature  
2022-12-16 - 1:48:07 PM GMT
-  Email sent to dramos@vivienda.pr.com bounced and could not be delivered  
2022-12-16 - 1:48:22 PM GMT
-  Email viewed by Emilio R Venegas (erv@vccpr.com)  
2022-12-16 - 5:18:46 PM GMT
-  Document e-signed by Emilio R Venegas (erv@vccpr.com)  
Signature Date: 2022-12-16 - 5:20:54 PM GMT - Time Source: server
-  Document emailed to w.rodriquez@vivienda.pr.gov for signature  
2022-12-16 - 5:20:57 PM GMT
-  Email viewed by w.rodriquez@vivienda.pr.gov  
2022-12-19 - 6:59:19 PM GMT
-  Signer w.rodriquez@vivienda.pr.gov entered name at signing as William O. Rodríguez Rodríguez  
2022-12-19 - 7:01:57 PM GMT
-  Document e-signed by William O. Rodríguez Rodríguez (w.rodriquez@vivienda.pr.gov)  
Signature Date: 2022-12-19 - 7:01:59 PM GMT - Time Source: server
-  Agreement completed.  
2022-12-19 - 7:01:59 PM GMT

# Increase Capacity CEWRI Venegas Agreement part 5

Final Audit Report

2022-12-19

Created:	2022-12-16
By:	Radames Comas Segarra (rcomas@vivienda.pr.gov)
Status:	Signed
Transaction ID:	CBJCHBCAABAABVGFYJZqWdPn1xm5ZC_bG4_1q6wNlcXK

## "Increase Capacity CEWRI Venegas Agreement part 5" History

-  Document created by Radames Comas Segarra (rcomas@vivienda.pr.gov)  
2022-12-16 - 1:50:22 PM GMT
-  Document emailed to Emilio R Venegas (erv@vccpr.com) for signature  
2022-12-16 - 1:52:21 PM GMT
-  Email sent to dramos@vivienda.pr.com bounced and could not be delivered  
2022-12-16 - 1:52:47 PM GMT
-  Email viewed by Emilio R Venegas (erv@vccpr.com)  
2022-12-16 - 5:21:10 PM GMT
-  Document e-signed by Emilio R Venegas (erv@vccpr.com)  
Signature Date: 2022-12-16 - 5:23:34 PM GMT - Time Source: server
-  Document emailed to w.rodriguez@vivienda.pr.gov for signature  
2022-12-16 - 5:23:36 PM GMT
-  Email viewed by w.rodriguez@vivienda.pr.gov  
2022-12-19 - 7:02:07 PM GMT
-  Signer w.rodriguez@vivienda.pr.gov entered name at signing as William O. Rodríguez Rodríguez  
2022-12-19 - 7:04:33 PM GMT
-  Document e-signed by William O. Rodríguez Rodríguez (w.rodriguez@vivienda.pr.gov)  
Signature Date: 2022-12-19 - 7:04:35 PM GMT - Time Source: server
-  Agreement completed.  
2022-12-19 - 7:04:35 PM GMT