

SECTION 11 85 03 – POTABLE WATER CABINET

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Aircraft Potable Water Cabinet
- B. The purpose of the potable water cabinet(s) is to provide a weatherproof enclosure for the equipment to permit the expeditious dispensing of potable water for the servicing of drinking water tanks on aircraft in commercial airline passenger service as indicated on the project aircraft parking plan.
- C. Work Includes: Designing, manufacturing, testing, furnishing, installing and commissioning potable water cabinets.

1.2 RELATED SECTIONS

- A. Drawings, General Provisions of the Contract, including General and Special Conditions, as well as General electrical and mechanical materials and methods of installation apply to work of this section.

1.3 REFERENCES

- A. The latest approved version or edition, by the authority having jurisdiction, of the following codes, references and standards shall apply where applicable. If the authority having jurisdiction has not approved or adopted a particular code, reference, or standard, the latest published edition shall be applicable.
 - 1. International Building Code - ICC (IBC)
 - 2. Society of Automotive Engineers (S.A.E.) standards.
 - 3. National Electrical Code - NFPA 70
 - 4. American Society of Mechanical Engineers (A.S.M.E.) standards.
 - 5. MG-1 Motors and Gears Motors Standards, IC-S Industrial Control and System Standards - National Electrical Manufacturers Association (N.E.M.A.).
 - 6. Williams - Steiger Occupational Safety and Health Act of 1970, Public Law 91-596.
 - 7. Standards of Sanitation for the Construction and Operation of Commercial Passenger Aircraft and Servicing and Catering Facilities. By the Public Health Service - U.S. Department of Health, Education and Welfare.
 - 8. Guidelines for Evaluation Aircraft Potable Water Servicing Vehicle Construction. Interstate Travel Sanitation Branch, Bureau of Foods, Pesticides and Product Safety - Food and Drug Administration.
 - 9. Code of Federal Regulations: Title 29, Part 1910 Occupational Safety and Health Standards
 - 10. Cross Connection Control Manual - Water Supply division, U.S. Environmental Protection Agency.
 - 11. American Welding Society - Applicable chapters/sections of welding standards.
 - 12. ATA Specification 101 - Ground Equipment Technical Manuals - Air Transport Association.

1.4 SUBMITTALS

- A. Pre-Manufacture: The following submittals shall be made as necessary to meet the project schedule and shall be submitted and approved prior to manufacturing the potable water cabinets.
 - 1. Product Data: Provide manufacturer's data indicating, as a minimum, physical characteristics, dimensions, and cabinet details.
 - 2. Shop Drawings: Provide schematics and interconnection diagrams, indicate front and side views of cabinet with overall dimensions and weights shown; conduit and piping entrance locations and requirements; and nameplate legends. Differentiate between manufacturer-installed wiring and field-installed connections.
 - 3. Certificates: Certify that products of this section meet or exceed the sanitation standards as established by the United States Department of Health. Manufacturer shall furnish a certificate of compliance for all units.
 - 4. Maintenance Data: Include routine preventive maintenance schedule, recommended spare parts list, and required tools.
 - 5. Spare Parts List: Provide manufacturer's recommended spare parts list along with current pricing. Current pricing shall remain valid Owner pricing for two (2) years from date of final completion.
 - 6. UL/ETL Certification per 1.05.E.
- B. Pre-Substantial Completion: The following submittals shall be submitted and approved prior to 14 days before Substantial Completion.
 - 1. Operation and Maintenance Manuals.
 - 2. Field Commissioning Report: Submit proposed field commissioning report for approval. This approved form will be utilized for the final field commissioning as specified in Section 3 herein.
- C. Pre-Final Completion: The following submittals shall be submitted and approved prior to 14 days before Final Completion.
 - 1. Field Commissioning Report: A completed field commissioning report as specified herein. Utilize approved form.
 - 2. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
 - 3. As-Built Drawings: Provide field edited redlined project drawings showing deviations from design drawings.

1.5 QUALITY CONTROL

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. High Standards of workmanship and methods shall be utilized in the manufacture of the unit. No workmanship, which for any reason is otherwise, will be accepted.
- C. Only standard components of highest commercial quality, currently available and conforming to the recommendations and standards established by the Society of Automotive Engineers (SAE) and the American Society of Mechanical Engineers (ASME) shall be used.
- D. All materials and components assembled or fabricated into the equipment are to be new, unused, of high quality, of current production and free from defects or imperfections which might affect the appearance or serviceability of the finished product.
- E. UL Compliance: Units shall be UL, or ETL listed and shall be labeled by a nationally recognized testing laboratory at the time of bid. Submit verification with bid submittals.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Lift and support units with the manufacturer's designated lifting or supporting points.
- B. Deliver equipment as a factory-assembled unit whenever practical for shipping purposes with protective crating and covering.
- C. Store equipment and material in suitable facilities until delivery, installation, and acceptance.
- D. Coordinate the delivery acceptance of this equipment at the job site. Receive, offload, store and protect this equipment until such time as it has been installed and accepted by the Owner.
- E. Properly dispose of all waste, including, but not limited to, packaging, crates, etcetera.

1.7 PROJECT CONDITIONS

- A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.8 WARRANTY

- A. Provide a full parts and labor warranty for the new unit. Labor warranty shall be performed by factory trained service technicians. Warranty shall run two (2) years from the Date of Substantial Completion. Date of Substantial Completion is defined as the date the system is turned over by the manufacturer and accepted by the Owner for normal operation, per Section 01 77 00.01 – Closeout Procedure - System Acceptance. All warranty services shall be at the site of the installation. Provider shall be responsible for all travel and sustenance expenses necessary for warranty services.
- B. Shipping and handling charges for warranty parts are the responsibility of the provider.
- C. Warranty Services shall be commenced with on-site representation, by qualified repair technicians, within 72 hours from the request of the Owner.

1.9 OPERATION AND MAINTENANCE MANUALS

- A. Provide six (6) bound copies and three (3) electronic copies (external hard drive) of the approved, comprehensive Operation and Maintenance Manual for each model 14 days prior to Final Acceptance date.
- B. The manuals shall fully describe each product, system, or subsystem numbered logically and separated into sections and contained in rigid plastic binders with identification inserted in clear plastic pockets on front and spine of each binder. Manuals shall be assembled in accordance with ATA 101.
- C. The content of the manuals shall be limited to information and data that specifically apply to products provided and shall include a general description theory of operation, routine normal and special operating instructions and sequences. Also included shall be routine maintenance procedures and guides for troubleshooting, disassembly and reassembly instructions, and recommended spare parts list consisting of current prices and sources.
- D. Wiring diagrams and schematics shall be incorporated into the manuals to clearly show features such as controls, switches, instruments, and indicators by name and location.
- E. Spare Parts List: Provide manufacturer's recommended spare parts list.

- F. Special Tools List: Provide a list of any special tools required to perform any field performable maintenance tasks.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Phoenix Metal Products
- B. JBT AEROTech (Jetway)
- C. Semler Industries
- D. Substitutions:

2.2 BRANDING

- A. The Owner, or Owner's tenant, reserves the right to provide branding on the exterior sides of the installed equipment and desires that this branding not be diminished by excessively large or aesthetically displeasing branding of individual pieces of equipment. All manufacturers branding, labeling, marking, etcetera, on their products shall be relatively small compared to the overall size of the piece of equipment. The Owner reserves the right to require any non-approved branding removed from finished products at no additional cost.

2.3 UNIT DESCRIPTION

- A. The principal components of the potable water cabinet are the cabinet with doors and latching hardware; the reel; rewind motor; hose and coupling; water pressure regulator; shut-off valve; piping; vacuum breaker; pressure gauge; back flow preventer, light fixture, heaters; and operating controls.

2.4 COMPONENTS

- A. All components of the cabinet shall be constructed in accordance with all codes and standards applicable to the design and construction of this type of equipment, which are generally accepted and used as good practice throughout the industry, i.e., NFPA, UL, OSHA, SAE, ANSI, Military Standards, etc. The design of all parts and subassemblies shall be in accordance with good commercial practice and is the responsibility of the manufacturer to assure safe, efficient and practical design in keeping with requirements peculiar to this type of system. All circuits shall be protected from short circuits and overload via circuit breakers.
- B. Stand Assembly:
 - 1. A primed and painted steel frame assembly shall be provided as necessary to stand mount and secure the unit on a suitable sub-surface. Nominal dimensions shall be 18"H x 44" L x 33" W.
- C. Cabinet:
 - 1. The cabinet shall be constructed entirely of Type 304 stainless steel, minimum 16 gauge. Construction shall be of the double wall type with suitable insulation and welded and ground joints.
 - 2. The cabinet shall be designed with mounting provisions and stiffeners to enable it to be mounted on the wall of a building or on a steel stand on the ramp or sidewalk. The

cabinet shall be sized to comfortably hold the equipment required but not be more than 45" high, 52" wide, or 32" deep and shall be equipped with a sloping bottom and a centrally located drain fitting sized 1" N.P.T.

3. In addition to the small openings for water and electrical service lines, the cabinet shall embody one large opening in the front of the cabinet sized a minimum of 40" wide and 36" high to be fitted with overlapping double doors hinged at the outside on full length stainless steel piano hinges. The doors shall be constructed of 14 gauge Type 304 stainless steel with double wall construction and suitable insulation and utilize a two point latch assembly and gravity operated hold-open rods.

D. Hose Reel:

1. The reel shall be manufactured by Hannay Reels, with 120 volt 60 Hz single phase rewind motor and auxiliary hand crank. The reel, steel discs and frame shall be stainless steel. The swing joint and internal piping shall be Bronze.
2. The size of the reel shall be sufficiently large to conveniently accommodate a maximum of 250 ft of one-inch (1") I.D. hose.
3. Reel shall be equipped with an adjustable rewind drag brake system.

E. Rewind Motor:

1. The rewind motor shall be of the flange mount type ½ horsepower single phase, 120 volt, 60 Hz. The motor speed and gearing shall produce an average hose rewind rate of between 5.5 and 6.3 ft per second.
2. Unit shall be equipped with an auxiliary hand rewind mechanism which allows rewinding the hose in the event of failure of the motor driven rewind system.

F. Hose:

1. The hose shall be NSF and FDA approved food-grade quality clear plastic tubing 1 in. I.D. x 1/8 in. wall. The hose is to be furnished in one unspliced length. The length of the hose to be supplied with each cabinet shall be 200ft or 250 ft., as indicated in the design documents.

G. Hose End Fittings:

1. The hose end fittings and ball valves shall be non-ferrous or stainless steel; shall be installed to allow connection to commercial aircraft water inlets; and so as to start and stop flow at the aircraft end of the hose.
2. Hose end ball valve shall be fitted with a suitable fitting to cap the discharge when not in use. Cap shall be permanently tethered to the end of the hose and shall be easily and quickly removable and insertable with gloved hands.
3. Hose end shall be fitted with a light weight, high wear device of adequate dimensions so as to maintain hose end fitting a minimum of 2" above the ground level when temporarily rested on the ground by the operator.

H. Hose Receptacles:

1. The cabinet shall incorporate a hanger or receptacle in which to store the hose end and protect it from contamination. The receptacle shall be of the open type so as not to collect dirt and contamination and shall be made of stainless steel.

I. Pressure Regulator:

1. The water pressure regulator shall be a "Cash-Acme" type E-24 size 1" with a range of 25 - 75 P.S.I. or equivalent.

J. Swivel Joint:

1. The reel shall have an OPW 3320-0101 or 3330-0101 swivel joint or equivalent.

K. Pressure Gauge:

1. The pressure gauge shall be a 2" diameter brass gauge with bronze internals and have a 1/4" N.P.T. inlet fitting and a range of 0 100 P.S.I.
- L. Shut-Off Valve:
 1. The plumbing in the cabinet shall incorporate a manual shut-off valve in the line just after the vacuum breaker. The shut-off valve shall be a 1" nonferrous ball valve equipped with Teflon seals. Worcester P/N 4211-T or Smith equivalent.
- M. Back Flow Preventer:
 1. Double check, RPZ style, or other as necessary to meet all federal state and local laws, codes, ordinances, standards for cross connected water systems.
 2. Provide all tests or certifications required by the authorities having jurisdiction.
- N. Heater:
 1. The unit shall be equipped with a heater for freeze protection. The heater shall consist of one or more electrical strip heaters with on/off switch and thermostat control with a capacity to maintain the equipment above freezing in ambient conditions as required at the location of the project.
 2. The heaters shall be mounted or shielded such that the hose is protected from damage or excessive heat from direct contact with the elements.
- O. Light Fixtures:
 1. Illumination shall be provided by a 100 watt incandescent lamp mounted in a guarded explosion proof fixture (Crouse-Hinds No. V2759) or Appleton Electric Co. A-51 series fixture or equivalent.
- P. Heat Tape System:
 1. All exposed piping shall be insulated and protected from freezing.
 2. Heating Cable: Mineral-insulated, copper-sheathed, series resistance heating cable in single conductor configuration with one cold end.
 3. Rating: 120V, 10W/lineal ft.
 4. Thermostat: Self-regulating.
 5. Glass Fiber:
 - a. Insulation: ASTM C 547 and ASTM C 795; rigid molded, noncombustible.
 - 1) 'K' value: ASTM C 177, 0.24 at 75 degrees F.
 - 2) Maximum service temperature: 850 degrees F.
 - 3) Maximum moisture absorption: 0.2 percent by volume.
 - b. Vapor Barrier Jacket: White Kraft paper with fiber yarn bonded to aluminized film moisture vapor transmission when tested in accordance with ASTM E 96 of 0.02 perm inches.
 - 1) .
 - c. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
 - d. Vapor Barrier Lap Adhesive: Compatible with insulation.
 - e. Insulating Cement/Mastic: ASTM C 195; hydraulic setting on mineral wool.
 - f. Fibrous Glass Fabric:
 - 1) Cloth: Untreated; 9 oz/sq yd weight.
 - 2) Blanket: 1.0 lb/cu ft density.
 - 3) Weave: 10 x 10 per inch.
 - g. Outdoor Breather Mastic: Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
 - h. Outdoor Vapor Barrier Mastic: Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

- i. Insulating Cement: ASTM C 449/C 449M.
- 6. Jackets:
 - a. Aluminum Jacket: ASTM B 209 (ASTM B 209M) formed aluminum sheet.
 - 1) Thickness: 0.016 inch sheet.
 - 2) Finish: Embossed.
 - 3) Joining: Longitudinal slip joints and 2 inch laps.
 - 4) Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.
 - 5) Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

2.5 DESIGN REQUIREMENTS

A. General:

- 1. Unit and piped supply shall enable a minimum flow capacity of 12 GPM with a maximum pressure drop of 10 psi from the building connection to hose reel.
- 2. It shall be the manufacturer's responsibility to recognize and comply with all codes and standards applicable to the design, construction, and installation of this type of equipment which are generally accepted and used as good practice in the industry, as well as all federal, state and local laws, codes, rules, ordinances and standards.
- 3. The unit shall be equipped with an automated flushing system designed to flush a specified quantity of water after a specified time interval has passed without operation of unit. Quantity of water and time interval shall be customizable to meet all federal, state, and local laws, codes, rules, ordinances and standards, as well as owner's requirements.
- 4. The unit shall be designed and constructed to prevent parts from working loose in service. It shall be built to withstand stresses, jars, vibrations, and other conditions incident to shipping storage, installation, and service. Suitable and durable vibration isolators shall be used between moving components and structural mounts and to include all other structural mountings to protect the operator, instruments, components, hydraulics, and structure from vibration transmission.
- 5. All parts and materials needed to fabricate, assemble, and finish the equipment shall be furnished by the manufacturer unless otherwise specified.
- 6. Fire resistant and non-moisture absorbing materials shall be used wherever possible.
- 7. All bolted, screwed, and threaded fastenings shall incorporate adequate locking devices.
- 8. Weldments requiring alignment with assemblies, interchangeability, fit, and flatness, shall be fabricated with the use of fixtures capable of maintaining dimensions in the finished part within design tolerance.
- 9. Specified sections and weld design and application shall be such that heat distortion of plates and members is minimized in the final weldment.
- 10. Sub-components must be installed per the manufacturers' recommendations.
- 11. All components shall be chosen to be within their manufacturer's published ratings under the most severe conditions of operation.
- 12. Fastener heads shall not be located on rub or wear surfaces unless recessed below the surfaces.

B. Mechanical Design

- 1. The stress levels for design shall be based on the total structural weight plus maximum carried load. Consideration will be made for anticipated dynamic loads.
- 2. Structural members manufactured of ductile material shall be designed with a minimum factor of safety of 3 relative to the yield strength.
- 3. Structural members manufactured of non-ductile materials shall be designed such that the maximum working stress does not exceed one-fourth of the ultimate strength of the material or manufacturer's published recommended allowable working stress, whichever is lower.

4. In determining the design factor of safety, weld efficiencies as designated by the American Welding Society or applicable design codes shall be included in determination of the factor of safety for welded joints.
5. Joint efficiencies shall be included in determination of the factor of safety for bolted connections.
6. The unit shall be designed with sufficient structural rigidity that deflections due to load, wind, and motions of working parts do not create interferences, cause malfunctioning of the equipment, or present safety hazards to personnel, aircraft, or the unit itself.
7. Shoulder bolts, bearings, or bushings shall be used when attaching parts having relative rotary or linear motion.

C. Electrical Design

1. The electrical controls shall include:
 - a. Heater control thermostat.
 - b. Light switch.
 - c. Rewind motor push button station.
 - d. One 120 volt single phase power circuit for the heater assembly.
 - e. One 120 volt single phase power circuit for the rewind motor and the light.
 - f. Overcurrent Protection:
 - 1) Overcurrent protection shall be a 600 volt, 30 amp, 3-pole, NEMA 3R, 20 amp fused disconnect, field installed adjacent to the unit as indicated on the project drawings.
 - g. A junction box shall be provided at a convenient location just inside the cabinet rear wall to make service connections.
 - h. Duplex 120V GFCI protected convenience outlet with weatherproof cover.
 - i. Self regulating heat tape system for exterior piping.
2. The cabinet shall interlock with the PBB to prevent PBB horizontal operation while the cabinet doors are open. Coordinate with the Passenger Boarding Bridge specification section 118504. Appropriate messages shall be displayed at the PBB operator's console to indicate cabinet's operation status is preventing PBB operations.
3. Electrical motors shall be single phase, 120 volt, 60 hertz.
4. Toggle switches shall be NEMA rated quality and rated for the loads which they control.
5. All circuits shall have suitable overload protection. Fuses and circuit breakers shall be grouped in convenient locations and suitably marked for size and function. Protection devices shall be sized to protect wiring and motors from damage due to overload.
6. All wiring shall be in conduit and shall be routed away from heat sources. Conduit and wiring systems shall be adequately supported to protect them from damage, snow and ice buildup, bumping, kinking, and flexing.
7. Common wire splices shall not be used. Connections shall be made using terminal strips and staked lugs or by patent connectors.
8. Each conductor shall be sized to have current carrying capacity as allowed by the National Electrical Code equal to or greater than the capacity of the fuse or circuit breaker provided in its circuit. Optional and add-on components shall be considered in sizing and in the number of conductors provided.
9. Grommets and suitable anti-chafe material shall be used where wires are required to pass through a relief or opening which exposes the wire to possible chafing.
10. Each wiring conductor shall be identified by a permanent marker in accordance with a wiring diagram accessibly displayed in the equipment and in the maintenance manual. Wrap around style adhesive markers will not be permitted.
11. Any concealed wiring running within walls or other inaccessible areas shall be contained in conduit for the length of the run and shall be terminated on a terminal strip at each end of the conduit.
12. All electrical connections, including terminal strips, shall be protected with suitable covers or enclosures to prevent accidental contact and short circuiting.
13. Electrical interlocks shall be fail-safe design.

14. Electrical devices including lights, switches, relays, wiring, and terminals, when located in an area exposed to weather, shall be of weatherproof design or protected by weatherproof enclosures.
15. Spark producing electrical components shall be located at least 18 in (457 mm) above ground level wherever possible. No electrical components shall be located below this level.
16. Lights, electrical apparatus, and wiring on units required to operate in hazardous locations shall comply with Article 500 of the National Electrical Code.
17. All lamps shall be heavy duty type.

D. Instruments and Controls

1. Controls and controlling circuits shall be designed such that any failure within a control or its circuitry will not introduce an unsafe operating condition.
2. Controls shall be grouped and located to be convenient to the operator when at their normal operating station but shall be located so as not to permit clothing to catch accidentally on them.
3. Controls shall be designed for satisfactory operation when the operator is wearing heavy arctic type gloves and overshoes.
4. Controls shall be identified with permanently affixed and non-fading placards.
5. Placards shall be provided for all controls which shall be in sharp color contrast in large enough letters or pictograms to be easily read from the operator's position indicating the function and direction of the motion of the control.
6. Control panels shall provide easy accessibility of controls and instruments and shall contain all items necessary for the safe operation and control of the equipment.
7. All instruments and control panels shall be lighted to a level of 5 ft-c (54 lx) of illumination and shall not produce a glare to the operator.
8. Instruments and controls exposed to the weather shall be of a rugged, weatherproof type and shall be protected from ice and snow accumulations.
9. No more than 20 lb. of force shall be required to actuate any hand control

E. Cabinet Design

1. The cabinet shall be constructed of 14 and 16 gauge #304 stainless steel.
2. The cabinet shall be designed with mounting provisions and stiffeners to enable it to be mounted on a wall or on a steel stand.
3. The cabinet will be sized to accommodate all components without interference of operation or maintenance but is to be no larger than 45" high, 52" wide, and 32" deep.
4. The cabinet shall have a minimum of 1" of insulation on all interior walls and doors.
5. The cabinet shall have a center drain in the bottom of the cabinet with a 1" NPT fitting.
6. The cabinet shall incorporate a hose receptacle to store the hose end inside the cabinet while not in use.
7. The cabinet shall incorporate a light fixture for illumination of the controls.

F. Environmental Requirements:

1. The unit shall operate satisfactorily under ambient temperature conditions of -20 to 125 degrees F. (-29 to 52 degrees C.) with heater, including a static soak of up to 48 hours within this range with or without wind of up to 50 MPH.
2. The equipment and all of its components shall be designed to operate satisfactorily after 6 hours of exposure to heavy rainfall (.30 in/hr) driven by a 25 mph wind in any horizontal direction.
3. Components shall be protected from mechanical, electrical, and corrosion damage and impairment of operation due to rain, snow, ice, sand, grit, and deicing fluids.

G. Service and Access

1. All components of the unit shall be fully accessible for maintenance personnel. If removal of one component is necessary, no other component should have to be removed first.

2. Equipment components and systems requiring frequent inspection or maintenance shall be readily accessible. Suitable access doors or removable enclosures shall be provided for this purpose.
3. Hinges shall be located on the forward edge of all vertically hung doors and on the lower edge of all horizontally hinged doors. Where possible, at least 8 inches of clearance above the ground shall exist when any door is open.
4. All hinged doors shall be provided with devices to secure them in either the open or closed position so that jet blast or ambient winds will not move them.
5. Fastener heads and nuts shall be provided with adequate clearance for wrenches or drivers. U.S. standard (inches) hardware shall be used.

2.6 IDENTIFICATION

A. Placards:

1. Each unit and its operating controls shall be placarded with permanent type metal or engraved phenolic type placards as follows:
 - a. Data Plate:
 - 1) Each unit shall bear a data plate on the inside of the cabinet containing the manufacturer's data as follows:
 - a) Manufacturer's name, address, phone number.
 - b) Model number.
 - c) Serial number.
 - d) Date of manufacture.
 - e) Electrical Information required by the NEC.
 - b. Electric Component Identification:
 - 1) All electrical components shall be identified by placards affixed adjacent to the component. Control switch placards shall also identify the function of the switch.
 - 2) All wire terminations shall be permanently identified in accordance with wiring diagrams and schematics on the "as built" drawings or in the manuals. Cloth wire markers are not acceptable.
 - c. Exterior Placards:
 - 1) The front of the cabinet shall bear a placard, utilizing letters a minimum of one inch (1") high that spell out "Potable Water" in contrasting and highly visible colors.
2. Adhesive type placards are not acceptable for this requirement.

2.7 SAFETY

- A. Health and safety of passengers, servicing personnel and the aircraft shall be of prime concern in the design of the unit.
- B. It shall be the responsibility of the manufacturer to ensure that the equipment contains all the safety features required to protect the equipment, the operator(s), the load, and the aircraft serviced, which are generally accepted and used as good practice in the industry, as well as all federal, state and local laws, codes, rules, ordinances and standards.
 1. Personnel Safety
 - a. Where required, heat shields or guards shall be installed to protect personnel operating the equipment or performing routine periodic maintenance on the equipment against accidental contact with exposed parts which are subject to high operating temperatures. Warning labels shall be added where applicable.

- b. Suitable Guards shall be provided for all moving parts located where operating personnel may make accidental contact with them. Warning labels shall be added where applicable.
- c. Exposure to operating and maintenance personnel to electric shock hazards shall be minimized by the provision of suitable interlocks, grounding means, or protective devices.
- d. Guards or enclosures shall be provided for all exposed portions of electrical equipment.
- e. All pinch and shear points, sharp edges and protruding objects must be eliminated wherever possible and practical. If elimination is not possible, adequate guarding must be achieved to prevent injury and/or damage exposure.
- f. Push/Pull forces required to move other than control handles and access doors shall be limited to 60 lb. (27.2 kg), when the operator is standing upright.

2.8 MAINTAINABILITY

- A. The cabinet and its controls shall be easily operated by personnel possessing no special skills and with minimum training. Maintenance requirements shall present no special problems to personnel knowledgeable in their respective fields of electrical, plumbing, and general assembly.
- B. The design shall stress simplicity, ruggedness and ease of maintenance. Specialty tools shall not be required in routine maintenance operations.
- C. All systems shall be designed to operate with a minimum of routine maintenance using long life components and sealed or self-lubricating mechanisms, etc.
- D. Components shall be installed with adequate access and types of fastenings to permit them to be changed by one man when the unit is in position bolted to an exterior wall of the building or the apron or sidewalk.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that site is ready to receive equipment.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Arrange installation of units to provide adequate clearance for service and maintenance. Ensure installation locations will not interfere with PBB related equipment operations in any manner and ensure unit does not present obstructions to sidewalk traffic flow. Verify prior to actual installation. Notify engineer if interferences exist, prior to installation.
- C. The units shall be properly aligned, adjusted, and lubricated before final acceptance.
- D. Install heat tape and insulation system as specified herein and as indicated on the contract drawings.
- E. Commission equipment. Provide complete functional testing to the satisfaction of the engineer. Complete all punch list items.

3.3 INTERFACE WITH OTHER WORK

- A. Installation of unit shall be coordinated with other trades associated with project.

3.4 FIELD QUALITY CONTROL

- A. Inspect for loose connections, proper grounding connections, and leaks.

3.5 STARTING EQUIPMENT AND SYSTEMS

- A. Do not activate water to unit until electrical service is activated and all circuits including the heat circuits are verified to be operational.
- B. Adjust for proper operation within manufacturer's published tolerances.
- C. Complete and submit approved Field Commissioning Report. Report shall include, but shall not be limited to, water pressure setting, thermostat setting, FLA for all incoming phases with heat activated.
 - 1. Owner reserves the right to witness such tests. Provide a minimum of 14 days' notice.
- D. Demonstrate proper operation of equipment to Owner's designated representative.

3.6 ADJUSTING

- A. Adjust hose reel for smooth operation.

3.7 CLEANING

- A. Clean unit from all construction dust and debris prior to start-up.
- B. Protect installed equipment from subsequent construction operations.
- C. Touch up scratched or marred surfaces to match original finish.

END OF SECTION 11 85 03