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WW-W-2845
April 15, 1994

FEDERAL SPECIFICATION

WATER PURIFICATION UNIT, FRAME MOUNTED DIATOMITE TYPE

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers a diesel-engine-driven, self-contained, frame mounted diatomaceous earth-type, water purification unit, with a capacity of 50 gallons per minute (gpm)/3000 gallons per hour (gph)(3.15 liters per second (L/s)/189 liters per hour).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Federal Specifications

FF-B-575 - Bolts, Hexagon and Square
FF-N-836 - Nut: Square, Hexagon, Cap, Slotted, Castle Knurled, Welding and Single Ball Seat
TT-P-664 - Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant

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Beneficial comments (recommendations, additions, deletions) and any pertinent
*data which may be of use in improving this document should be addressed to: *
*Commanding Officer (Code 156), Naval Construction Battalion Center, *
*1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the Standardization *
*Document Improvement Proposal (DD Form 1426) appearing at the end of this *
*document or by letter. *

AMSC N/A FSC 4610

PPP-B-601 - Boxes, Wood, Cleated-Plywood
PPP-B-636 - Boxes, Shipping, Fiberboard
PPP-P-40 - Preservation and Packing of Hand Tools; Tools and Tool Accessories for Power Driven, Metal and Woodworking Machinery

Federal Standards

FED-STD-H28 - Screw-Threads Standards for Federal Services
FED-STD-123 - Marking for Shipment (Civil Agencies)
FED-STD-595 - Colors Used in Government Procurement

Commercial Item Description

A-A-341 - Pigment, Aluminum, Powder and Paste

Military Specifications

MIL-P-116 - Preservation, Methods of
MIL-S-196 - Support Items, Accessories, and Kits, Mechanical; Packaging of
MIL-E-10062 - Engines: Preparation for Shipment and Storage of
MIL-T-22085 - Tapes, Pressure-Sensitive, Adhesive, Preservation and Sealing
MIL-C-27487 - Coupling Halves, Quick-Disconnect, Cam-Locking Type

Military Standards

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking for Shipment and Storage
MIL-STD-209 - Slinging and Tiedown Provisions for Lifting and Tying Down Military Equipment
MS27021 - Coupling Half, Quick Disconnect, Cam-Locking Type, Male, Hose Shank, Type II
MS27025 - Coupling Half, Quick Disconnect, Cam-Locking Type, Female, Hose Shank, Type VI

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

Code of Federal Regulations:

Title 21, Food and Drugs

(The Code of Federal Regulations (CFR) and the Federal Register are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

2.2 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation (see 6.2).

American National Standard Institute (ANSI)

ANSI B 40.1 - Gauges, Pressure Indicating Dial Type - Elastic Element

(Application for copies should be addressed to the American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036.)

American Public Health Association (APHA):

Standard Methods for Water and Wastewater

(Application for copies should be addressed to the American Public Health Association, 1015 15th Street, N.W., Washington, DC 20005.)

American Welding Society, Inc. (AWS):

AWS D1.2 - Structural Welding Code - Aluminum

(Application for copies should be addressed to the American Welding Society, Inc., 550 N.W. LeJeune Road, P.O. Box 351040, Miami, FL 33135.)

Environmental Protection Agency (EPA):

EPA - National Primary Drinking Water Regulations

(Application for copies shall be addressed to the Public Affairs Office, Environmental Protection Agency, Rockville, MD 20852.)

National Motor Freight Traffic Association (NMFTA):

National Motor Freight Classification

(Application for copies should be addressed to the National Motor Freight Traffic Association, 2200 Mill Road, Alexandria, VA 22314.)

National Railroad Freight Committee (NRFC):

Uniform Freight Classification

(Application for copies should be addressed to the National Railroad Freight Committee, 222 S. Riverside Plaza, Suite 1120, Chicago, IL 60606.)

Society of Automotive Engineers, Inc. (SAE):

SAE Handbook

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.)

Steel Structures Painting Council:

SSPC SP 1 - Solvent Cleaning

(Application for copies should be addressed to the Steel Structures Painting Council, 4516 Henry Street, Suite 301, Pittsburgh, PA 15213-3728.)

(Non-Government standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Description. The purification unit shall include a diesel engine, centrifugal pump, hoses (suction, discharge, and drain), filter aid (diatomaceous earth) feeder, hypochlorinator, panel-mounted instrumentation, and filtering apparatus. The purification units shall be able to produce 3,000 gph (189 liters per hour) minimum of treated water. All equipment, piping, and accessories specified shall be included.

3.2 First article. Unless otherwise specified (see 6.2), the contractor shall furnish one complete water purification unit for first article inspection and approval in accordance with section 4.

3.3 Standard commercial product. The water purification unit shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer’s standard commercial product. Additional or better features which are not specifically prohibited by this specification, but which are a part of the manufacturer’s standard commercial product, shall be included in the water purification unit being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer’s catalogs, or brochures, and represents the latest production model.

3.4 Material. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specified.

3.5 Interchangeability. All units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to insure interchangeability of component parts, assemblies,

accessories, and spare parts. Changes, upgrades or improvements of the system between contracts must be field retrofitable to all existing systems of the same national stock number (NSN).

3.6 Design and construction. The water purification unit shall be so constructed as to be divisible into three sections: a pump and engine section; a control section including a chemical/precoat tank, and a hypochlorinator and control; and a filter section. The assembled water purification unit shall consist of three sections mounted within one frame, with frame mounted on skid, and transportable by light motor vehicle. The assembled framework shall encompass the whole unit. Each section shall be removable for servicing or use as a separate unit. The uncrated weight of the unit shall not exceed 750 pounds (lb) (340 kilograms (kg)), excluding accessories. Overall dimensions of unit shall not exceed 73 inches (185.4 centimeters (cm)) in length, 36 inches (91.4 cm) in width, and 48 inches (121.9 cm) in height.

3.6.1 Lifting and tiedown attachments. The water purification unit shall be equipped with lifting and tying down attachments. Lifting and tiedown attachments shall conform to type II or type III of MIL-STD-209. A nonferrous transportation plate shall be provided and mechanically attached to the water purification unit. Transportation plates shall be inscribed with a diagram showing the lifting attachments and lifting slings, the capacity of each attachment, and the required length and size of each sling cable. A silhouette of the water purification unit showing the center of gravity shall be provided on the transportation plate. Tying down attachments may be identified by stenciling or other suitable marking. Tiedown marking shall clearly indicate that the attachments are intended for the tiedown of the water purification unit on the carrier when shipped.

3.7 Pump and engine section. The pump and engine section shall consist of the pump, diesel engine, necessary piping and valves, canvas coverall, and other accessory equipment specified herein. The tool box shall be mounted within the mainframe.

3.7.1 Pump. The pump shall be a single-stage, centrifugal, integral self-priming type, open coupler connected to a diesel engine. The engine and pump shall be mounted on a common aluminum frame or base. The pump shall be rated at 130 gpm (8.2 L/s) with a total dynamic head (TDH) of 90 feet (ft) (27.4 meters (m)). The pump housing, including the packing, shall not leak while the pump develops maximum shut-off pressure. The pump shall be constructed of bronze with a stainless steel shaft.

3.7.2 Engine. The engine shall be a single-cylinder 4-cycle, air-cooled diesel engine, capable of operating the pump continuously at the head and capacity specified without exceeding the net continuous brake horsepower rating of the engine. The engine shall be provided with a rope starter or handcrank and a fuel tank having a capacity of not less than 1 gal (3.785 L). The pump and engine base shall be provided with four shock mounts for effective isolation of vibration.

3.7.2.1 Engine shock mounts. The shock mounts shall consist of an oil-resistant rubber compound having a low compression set and a 55 +/-5 Shore A durometer hardness. A hole in the center of the mount shall provide access for a 3/8-inch (0.953 cm) bolt.

3.7.2.2 Bolts and nuts. Bolts shall be stainless steel, bronze or brass, except on engine, and shall conform to type 2 of FF-B-575. Nuts shall conform to type II, style I of FF-N-836. All screw threads shall conform to FED-STD-H28.

3.7.2.3 Attachment. The engine and the pump shall be securely attached to the common aluminum base by nuts and bolts.

3.7.2.4 Instrumentation. Pressure gages shall be constructed of corrosion-resistant materials. Pressure gages shall be provided for pump inlet and outlet pressure. The pressure gages shall be liquid-filled, 2-1/2-inch (6.4 cm) dial, 0-30 inches mercury (Hg) (0-106 kilopascals (kPa)), and 0-60 pound-force per square inch gage (psig) (0-414 kPa) ranges for pressure measurement of pump inlet and pump outlet respectively. Accuracy of all gages shall be in accordance with ANSI B 40.1 Grade B (3-2-3 percent).

3.7.2.5 Piping, fittings, and valves. All piping, fittings, and valves shall be capable of withstanding test pressure of 75 psig (517 kPa) and shall be compatible with water treatment requirements, operating pressures, and requirements of ease of assembly, disassembly, and reassembly of the unit in the field. All piping and fittings shall be made of a corrosion-resistant metal, such as copper (galvanized pipe is not acceptable), or polyglass material that meets corrosion-resistant and operating pressure requirements. Only lead-free solder shall be used throughout the plumbing system.

3.7.2.6 Strainer. A suitable suction strainer with a foot valve shall be constructed of corrosion-resistant steel and fitted with brass cam lock type connector for attaching the suction hose.

3.7.2.7 Diesel engine starting requirements. The diesel engine shall start in any temperature above 0 degrees Fahrenheit (-17.8 degrees Celsius). Starting aids shall not be required.

3.7.3 Hoses. The hoses shall be constructed of chemical- and oil-resistant material, suitable for potable water applications, shall withstand the 75 psig (517 kPa) test pressure of the unit, and shall conform to Title 21 of the Code of Federal Regulations. The suction hose shall be capable of withstanding vacuum up to 29.8 inches Hg (100.9 kPa). The suction hose shall be 2-inch (5.1 cm) inside diameter, 30 ft (9.14 m) total in three 10 ft (3.05 m) lengths, constructed of flexible PVC with a rigid PVC reinforcement. The waste hose shall be 2-inch (5.1 cm) inside diameter, 50 ft (15.2 m) one length collapsible material. Waste and discharge hoses shall be marked so as not to be interchanged. The discharge hose (treated water) shall be 1 1/2-inch (3.8 cm) inside diameter, 50 ft (15.2 m) one length collapsible material. The hose couplings shall conform to MIL-C-27487, type II or MS27021, class 2 brass; female coupling shall conform to type VI, MS27025, class 2 brass. Coupling made of polyglass material that meets the operating and corrosion resistance requirements of MIL-C-27487 is acceptable. All the hoses shall be within the frame in separate compartments or mounting bracket provided.

3.7.4 External hose connections. All external hose connections for pumps (suction) waste, and discharge (treated water) shall be male cam lock type, brass.

3.8 Chemical/precoat tank and hypochlorinator. This section shall consist of the hypochlorinator, chemical tank and precoat tank, with necessary valving.

3.8.1 Hypochlorinator. The hypochlorinator shall be constructed of bronze and plastic. The feed rates shall vary from 0 to 7.9 parts per million (ppm). The hypochlorinator shall be water actuated and provide feeds directly proportional to water flow.

3.8.2 Precoat tank. The precoat (slurry tank) shall be pressure type constructed of corrosion-resistant material. The precoat tank shall have a capacity of 5 gal (18.9 L) and shall be capable of providing a controlled precoat.

3.8.3 Chemical tank. The chemical tank (hopper) shall be constructed of fiberglass, 5 gal (18.9 L) capacity and shall be provided with a lid.

3.9 Filter. The filter shall be specifically designed to employ the filtration properties of diatomaceous earth. The filter shell shall be constructed of corrosion-resistant material and shall have a minimum surface area of 36 square feet (3.34 square meters). The filter shell shall be equipped with a Lexan sight port opening.

3.9.1 Test kit chlorination. Test kit chlorination shall be provided to test the ratio of chlorine/water for potable water requirements and conform to the latest technological method available in the market and in accordance with APHA, Standard Methods for Water and Wastewater.

3.10 Skid. The skid shall have forklift opening, handles for lifting and "D" type rings or hooks and attaching lifting sling.

3.11 Repair parts, tool box, and accessories. The following shall be furnished with the equipment, as a minimum:

1 - measure, 32-ounce (1 liter) chemical container, commercial plastic
1 - set of tools required for operation and field maintenance of the unit
1 - tool box securely fastened to the unit
1 - operating instructions
1 - water test kit conforming to latest model available
1 - removable container box constructed of corrosion-resistant material to store a 50 lb (22.7 kg) bag of diatomaceous earth and 7 lb (3.2 kg) of calcium hypochlorite
1 - measure, 2 liter dry chemical container, commercial plastic

3.12 Instruction plates or decals. The water purification unit shall be equipped with instruction plates or decals suitably located, describing any special or important procedures to be followed in operating and servicing the equipment. Plates or decals shall be of a material which will last and remain legible for the life of the equipment. Plates shall be securely affixed to the equipment with nonferrous screws, bolts or rivets of not less than 1/8-inch (0.32 cm) diameter.

3.13 Name plate. A name plate will be furnished by the Navy for each unit. The contractor shall stamp all necessary data in the blank spaces of the plate provided for that purpose, and securely affix a plate to each unit in a

conspicuous place with brass screws or bolts not less than 1/8-inch (0.32 cm) in diameter. The applicable nomenclature contained in the contract item description shall be placed in the top blank. Point of contact for obtaining Navy name plates is: Naval Construction Battalion Center, Civil Engineer Support Office, Attn: Code 15332, 1000 23rd Avenue, Port Hueneme, CA 93043-4301, (805) 982-3254.

3.14 Metal surfaces. Preparation of aluminum, other non-galvanized, and non-ferrous surfaces shall conform to SSPC SP 1. Clean the surface by solvent and wash with a mild, non-alkaline detergent to remove dirt and water soluble contaminates.

3.15 Cleaning, treatment, and painting. Surfaces normally painted in good commercial practice shall be cleaned, treated, and painted as specified in paragraph 3.14 and herein. Surfaces to be painted shall be cleaned and dried to insure that they are free from contaminants such as oil, grease, welding slag and spatter, loose mill scale, water, dirt, corrosion products, or any other interfering substances. As soon as practicable after cleaning, and before any corrosion product or other coating interfering material can result, the surfaces shall be prepared or treated to insure the adhesion of the powder coating system. Apply coating on the same day that surface is cleaned. Painting shall be with manufacturer's current materials according to manufacturer's current processes and the total dry film thickness shall be not less than 2 mils (0.05 mm) over the entire surface. The paint shall conform to A-A-341. The paint shall be free from runs, sags, orange peel, or other defects. Color of the finish coat shall be Green, Number 14064, conforming to FED-STD-595. Organic powder coating which has low Volatile Organic Compound (VOC) coatings and meets or exceeds all performance criteria of acrylic-based enamel shall be used.

3.16 Lubrication. Means for lubrication shall be in accordance with the manufacturer's standard practice. The lubrication points shall be easily visible and accessible. Hydraulic lubrication fittings shall be in accordance with SAE J534. Where use of high-pressure lubricating equipment, 1,000 pound-force per square inch (6895 kPa) or higher, will damage grease seals or other parts, a suitable warning shall be affixed to the equipment in a conspicuous location. The unit shall be lubricated prior to delivery with type of lubricant specified in the operator's manual and grade of lubricant recommended for ambient temperature at the delivery point. The unit shall be conspicuously tagged to identify the lubricants and their temperature range.

3.17 Workmanship.

3.17.1 Steel fabrication. The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to insure uniformity of size and shape.

3.17.2 Bolted connections. Bolt holes shall be accurately punched or drilled and shall have the burrs removed. Washers or lockwashers shall be provided in accordance with good commercial practice, and all bolts, nuts, and screws shall be tight. Wherever possible, self-locking nuts shall be utilized.

3.17.3 Riveted connections. Rivet holes shall be accurately punched or drilled and shall have the burrs removed. Rivets shall be driven with pressure tools and shall completely fill holes. Rivet heads, when not countersunk or flattened, shall be of approved shape and of uniform size for the same diameter of rivet. Rivet heads shall be full, neatly made, concentric with rivet holes, and in full contact with the surface of the member.

3.17.4 Welding. Welding procedures shall be in accordance with AWS D1.2. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be of sufficient size and shape to develop the full strength of the parts connected by the welds. Welds shall transmit stress without permanent deformation or failure when parts connected by the weld are subjected to proof and service loadings.

3.17.5 Castings. All castings shall be sound and free from patching, misplaced coring, warping, or any other defect which reduces the casting's ability to perform its intended function.

3.18 Water quality. When the filter system is tested in accordance with section 4.4.2.g, the effluent turbidity shall be 1 Nephelometric Turbidity Unit (NTU) or less in 95 percent of water tested. At no time may the turbidity exceed 5 NTU. In addition, the protozoan cyst removal capability of the filter shall be a minimum of 99.9 percent when tested in accordance with Federal Register, volume 54 number 124, dated 29 June 1989, Environmental Protection Agency, 40 CFR, Parts 141 and 142.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this document where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this document shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.2.1).
b. Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. The first article inspection shall be performed on one water purification unit (see 3.2). This inspection shall include the examination of 4.3 and tests of 4.4. The first article may be either a first production item or a standard production item from the supplier's current inventory provided the item meets the requirements of the specification and is representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.3 and the tests of 4.6. Samples shall be selected in accordance with 4.2.3 and 4.2.4. Quality conformance inspection shall also include the testing of all production units in accordance with 4.4.1 through 4.4.3. Sample testing is not acceptable.

4.2.3 Lot. For the purpose of quality conformance inspections, a lot shall consist of all the production units of the same water purification units offered for delivery at one time.

4.2.4 Sampling. Sampling for quality conformance inspections, examinations and tests, shall be in accordance with MIL-STD-105, special inspection level S-2, or other sampling plan acceptable to the responsible government representative. Sample size shall be determined by using MIL-STD-105, table I and table IIa. A lot shall be rejected when one or more defects are found.

4.3 Examination. Each water purification unit shall be examined for compliance with the requirements specified in section 3 of this document. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirement or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.4 Tests. Units identified in accordance with 4.2.1 and 4.2.2 shall be subjected to the following tests. Failure to pass any phase of these tests shall be cause for rejection.

4.4.1 Test conditions. Prior to test, the water purification unit shall be lubricated with oils and greases. Oils shall be those designated for use in the ambient temperature at the place of test.

4.4.2 Assembled unit test. The water purification unit shall be set up and operated in accordance with the manufacturer's operating manual. Operation shall be for a period of not less than 2 hours and shall include at least four complete filtering and backwashing cycles. The unit shall filter from a source having a turbidity range from 1 to 200 NTU. The hypochlorite reservoir shall be filled with a hypochlorite solution of approximately 0.5 percent strength and

the slurry hopper shall be filled with slurry made up of 5 lb (2.3 kg) of diatomaceous earth and 4 gal (15.1 L) of water. In order to insure compliance with the various specification requirements, the following observations and tests shall be made:

a. Periodic checks shall be made on the turbidity of both the unfiltered and filtered water.
b. The units shall be checked for leaks. Leakage shall not be evident and is cause for rejection.
c. Chlorine residue tests on the filtered water shall be made with at least two different settings on the hypochlorite feeder. The tests shall be in accordance with APHA.
d. At least two measurements shall be made of filtered water discharge rate, one immediately after precoating and one after the unit has been filtering for at least 30 minutes.
e. Operation of the slurry feeder shall be visually checked.
f. At the end of the test the filter unit shall be backwashed and opened. The septums shall be visually inspected for thoroughness of backwashing. To determine if the backwashing has been in compliance with the specification, there should be no residue remaining. The bottom of the filter shell shall be inspected to determine thoroughness of wash-down.
g. The finished water shall be in accordance with paragraph 3.18.
h. Finally, the unit shall be thoroughly cleaned and dried before preservation for shipment.

4.5 Production sample. Upon acceptance of the first article, the first article shall remain at the manufacturing facility as a production sample, and shall be the last water purification unit delivered on the contract. The first article shall be reconditioned prior to delivery, including replacement of abnormally worn parts and paint touch-up or repainting, to enable it to be accepted as a contract item. The contractor shall maintain the first article in a serviceable condition for the duration of the contract.

4.6 Production unit operational tests. Each water purification unit produced in fulfillment of a contract or order shall be completely assembled, adjusted, lubricated, and otherwise serviced for operation. The diesel engine shall be started and subjected to a warmup period as recommended by the manufacturer. The water purification unit shall be given a run-in test and all controls operated a sufficient number of times to ascertain that all components and mechanisms actuated by the controls operate promptly, fully, and without restriction or malfunction. Failure to pass any phase of this test shall be cause for rejection.

4.6.1 Pressure test. Each water purification unit shall be subjected to a hydrostatic pressure of 75 pound-force per square inch gage (517 kPa) for not less than 30 seconds and then carefully inspected for leaks.

4.6.2 Pump test. Prior to assembly in the pump and engine section into the mainframe, each pumping section shall be tested to demonstrate conformance to the requirements of 3.7.1.

4.7 Preparation for delivery inspection. An examination shall be made to determine compliance with the requirements of section 5. The sample unit shall

be one unit prepared for shipment. Sampling shall be in accordance with MIL-STD-105. The inspection level shall be S-2.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or Commercial as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Methods of preservation. Cleaning processes, drying procedures, preservatives, and methods of preservation specified in the following paragraphs are listed in MIL-P-116 and shall conform to the requirements of MIL-P-116 and any applicable specifications.

5.1.1.2 Pump and engine. Any parts projecting beyond the framework shall be removed. If the hypochlorite and slurry feed hose lines extend beyond the framework, the hose lines shall have one end removed. The hose shall be coiled and securely fastened to the equipment within the framework. All unpainted exterior ferrous metal surfaces, including threaded surfaces and surfaces exposed by disassembly shall be coated with P-1 preservative. Unpainted pulley faces and grooves shall be coated with primer conforming to TT-P-664. Drive belts shall remain in place on the equipment and shall have tension relieved. All openings into the interior of the equipment shall be sealed with tape conforming to MIL-T-22085, type II. The top of the slurry hopper shall be sealed with pressure-sensitive tape as specified above. The diesel engine shall be preserved in accordance with MIL-E-10062, level A, type II. The canvas coverall shall be placed over the machinery section.

5.1.1.3 Filter section. All valve handles shall be secured inside the protective framework. All unpainted exterior ferrous metal surfaces, including threaded surfaces and surfaces exposed by disassembly shall be coated with P-1 preservative. All openings into the interior of the equipment shall be sealed with tape conforming to MIL-T-22085, type II. The precoat tank shall be located over the top of the filter unit and shall be held in place with clamps.

5.1.1.4 Indicator solutions. The bottles of indicator solution shall have their caps held in place by a shrink-type plastic seal. The bottles shall be individually packaged and cushioned in telescoping fiberboard tubes.

5.1.1.5 Comparator. The comparator and accessories shall be placed in the carrying case. Cushioning shall be provided. The complete comparator shall be packaged in a fiberboard box conforming to PPP-B-636, grade W5c.

5.1.1.6 Technical publications. Technical publications shall be preserved in accordance with MIL-P-116, method IC-3.

5.1.1.7 Repair parts, tools, and accessories. Repair parts, tools, and accessories shall be preserved and unit packaged in accordance with MIL-S-196 and PPP-P-40.

5.1.1.8 Consolidation packaging. The measuring cups, bottles of indicator solution, comparator, technical publications, and machinery section repair parts shall be placed in the tool box and cushioned or blocked to prevent movement.

The tool box cover shall be secured. The O-rings, wrench, hose cap, and repair parts shall be placed in one or more fiberboard boxes conforming to PPP-B-636, grade W5c. Boxes shall be secured within the framework of the filter section.

5.1.2 Commercial. The complete equipment shall be preserved and packaged in accordance with the supplier's standard practice.

5.2 Packing. Packing shall be level A or Commercial as specified (see 6.2).

5.2.1 Level A. The machinery section, packaged parts, filter section and accessories shall be packed in a box conforming to PPP-B-601, overseas type. The contents shall be cushioned, blocked, and braced to prevent movement.

5.2.2 Commercial The complete equipment shall be packed in a manner which will insure arrival at destination in satisfactory condition and be acceptable to the carrier at lowest rates. Containers and packing shall comply with National Railroad Freight Committee rules and with National Motor Freight Traffic Association rules.

5.3 Marking.

5.3.1 Military agencies. Shipments to military agencies shall be marked in accordance with MIL-STD-129.

5.3.2 Civil agencies. Shipments to civil agencies shall be marked in accordance with FED-STD-123.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The water purification unit is intended as a readily transportable apparatus for use in the filtration and chemical treatment of water to produce potable water.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification
b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2)
c. When first article is required for inspection and approval (see 3.2 and 4.2.1)
d. Level of preservation-packaging and level of packing required (see 5.1 and 5.2)

MILITARY INTERESTS:

Custodians

Army - ME
Navy - YD1

Review Activities

Navy - MC
DLA - CS

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

PREPARING ACTIVITY:

Navy - YD1

(Project 4610-0133)