

INCH-POUND

MIL-PRF-52109G

13 August 1998

SUPERSEDING

(See 6.3)

PERFORMANCE SPECIFICATION
PUMPING ASSEMBLIES, PORTABLE, BULK TRANSFER,
FUEL AND WATER PUMPING SERVICE

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Abstract. This specification covers portable, self-priming, centrifugal pumping assemblies for fuel and water service.

1.2 Classification. The pumping assemblies will be of the following types, sizes and classes as specified (see 6.2 and 6.5).

Type I - Pumping Assembly, Fuel

Size 1 - 50 GPM capacity at 100 feet total head

Size 2 - 100 GPM capacity at 100 feet total head

Type II - Pumping Assembly, Water

Size 1 - 65 GPM capacity at 50 Feet total head

Class 1 - Electric-motor driven (EMD)

Class 2 - Diesel engine-driven (DED)

Size 2 - 125 GPM capacity at 50 feet total head

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S.Army Tank-Automotive and Armaments Command, ATTN: AMSTA-TR-D/210, Warren, MI 48397-5000 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 4320

Distribution Statement A. Approved for public release, distribution is unlimited.

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2.2 Government documents.

(This paragraph is applicable only to the appendix of this specification.)

2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARD INSTITUTE (ANSI)

ANSI Z 535.2 – Environmental and Facility Safety Signs

(Applications for copies should be addressed to the American National Standard Institute, 11 W. 42nd Street, New York, NY 10036.)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B 1.1 – Pipe Threads, General Purpose (Inch).

ASME B 1.20.3 – Unified Inch Screw Threads (UN and UNR Thread Form).

(Applications for copies should be addressed to the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM F 1122 – Quick Disconnect Couplings

(Application for copies of ASTM publications may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

HYDRAULIC INSTITUTE

ANSI/H1.1-1.5 – Centrifugal Pumps.

ANSI/H1.6 – Centrifugal Pump Tests.

(Application for copies should be addressed to the Hydraulic Institute, 9 Sylvan Way, Parsippany, NJ 07054-3802.)

NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION (NEMA)

NEMA MG 1 – Motors and Generators

(Application for copies should be addressed to the National Electrical Manufacturers Association, 1300 N. 17th Street, Suite 1847, Rosslyn, VA 22209.)

SOCIETY OF AUTOMOTIVE ENGINEERS, INC (SAE)

SAE-J513 – Refrigeration Tube Fittings

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

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2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Materials. The materials selected for construction are the responsibility of the contractor. The materials shall be of sufficient durability to meet all the performance requirements as specified herein. Type I pumping assemblies may be constructed of any materials suitable for fuel pumping service, except, that copper or copper alloy materials shall not be used. Type II pumping assemblies may be constructed of any materials suitable for drinking water pumping service. Lead shall not be used. The finished type II pumping assembly shall contain no materials or substances that might leak or disintegrate and cause the pumped water to become non-potable. The material shall have no adverse effect on the health of personnel when used for its intended purpose. The lines and all surfaces that contact potable water shall conform to the applicable Federal regulations for use with potable water.

3.2.1 Deterioration, prevention, and control. The pumping assemblies shall be fabricated from compatible materials, inherently corrosion resistant or treated to provide protection against the various forms of corrosion and deterioration to which the material is susceptible.

3.2.1.1 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion.

3.2.2 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.3 Environmental conditions.

3.3.1 Operating temperature. Type I pumping assemblies shall perform as specified herein in any ambient temperature from -25 °F to 125 °F. Type II pumping assemblies shall perform as specified herein in any ambient temperature from 32 °F to 125 °F (see 4.5.2 and 4.5.3).

3.3.2 Storage temperature. Pumping assemblies shall not be damaged by storage in any ambient temperature from -65 °F to 160 °F, except type II, size 1 that is -50 °F to 160 °F (see 4.5.2 and 4.5.3).

3.3.3 Vibration. The pumping assemblies shall be capable of withstanding vibration stresses induced by the various modes of transportation without permanent damage, deformation, or performance degradation.

3.3.4 Shock. The pump assemblies in transit condition shall be capable of withstanding the shocks normally induced by loading and unloading, and stops and starts during transportation.

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3.4 Maintainability.

3.4.1 Maintenance ratio. The pumping assemblies shall have maintenance ratios of not greater than 0.06, except type II, size 1, DED that shall be not greater than 0.10, and type II, size 1, EMD that shall not be greater than 0.05. Maintenance ratio is defined as the ratio of the total active maintenance man-hours required (scheduled and unscheduled) to the total operating time. Man-hours for repair of replaced components, and scheduled before-and-after-operation checks are excluded. A maintenance schedule shall be established prior to start of any testing.

3.4.2 Ease of maintenance. All major assemblies shall be accessible for repair, replacement, and adjustment without the removal of other major assemblies. Covers, plates, and mounting brackets that must be removed for component adjustment, repair, or replacement shall be equipped with quick-disconnect fasteners. Drain outlets shall be located for accessibility. Corrosion resistance preventive maintenance shall be limited to routine washing, periodic inspection and repair of accidental damage.

3.4.3 Reliability. The specified mean-time-between-failures shall be not less than 140 hours; except type II, size 1, EMD that shall be not less than 320 hours; when the pumping assemblies are tested in accordance with 4.5.7.

3.5 Performance.

3.5.1 Hydrostatic pressure. The pumps shall withstand an internal hydrostatic pressure of 80 PSI for type I, size 1 and type II, size 1, and 100 PSI for type I, size 2 and type II, size 2, at rated capacity without leaking or becoming deformed.

3.5.2 Capability. The pumps shall meet the following capacities, using water, at standard conditions as specified by the Hydraulic Institute Standards ANSI/H1.1-1.6:

- a. Type I, size 1 - 50 gallons per minute (GPM) with a total dynamic head of 100 feet.
- b. Type I, size 2 - 100 GPM with a total dynamic head of 100 feet.
- c. Type II, size 1 - 65 GPM with a total dynamic head of 50 feet.
- d. Type II, size 2 - 125 GPM with a total dynamic head of 50 feet.

3.5.3 Pump priming. The pumps shall prime themselves automatically, after initial filling of the case, and deliver not less than their rated flows in not greater than 2 minutes when operating at a static suction lift equivalent to 10 feet; except type II, size 2 that shall be not greater than 5 minutes at a static suction lift equivalent to 25 feet, at sea level and atmospheric conditions of 29.92 inches of mercury; using water with a specific weight of 62.3 pounds per cubic foot at 68 °F.

3.5.4 Pump Characteristics. All pumps shall contain drain plugs. All threaded parts shall conform to ASME B 1.1 or ASME B 1.20.3, as applicable. All pump intake openings shall have a removable screen to prevent foreign objects from entering the pump. Mechanical seals and wear rings shall be suitable to intended service (see 1.2). The type I, size 1 pumping assembly shall be provided with the accessories specified in the appendix to this specification; and the pumps shall have the following type and size connections.

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3.5.4.1 Type I, size 1 connections. Suction and discharge connections shall be on opposite sides of the pumping assembly, with the suction connection in the horizontal position and the discharge connection in the vertical position.

- a. Suction opening: 1½-inch, female, coupling half with gasket and dust plug in accordance with ASTM F 1122, standard class (see 6.2).
- b. Discharge opening: 1½-inch, male, adapter half with dust cap in accordance with ASTM F 1122, standard class (see 6.2).

3.5.4.2 Type I, size 2 connections. Suction and discharge connections shall be on opposite sides of the pumping assembly, with both in the horizontal position.

- a. Suction opening: 2-inch, female, coupling half with gasket and dust plug in accordance with ASTM F 1122, standard class (see 6.2).
- b. Discharge opening: 2-inch, male, adapter half with dust cap in accordance with ASTM F 1122, standard class (see 6.2).

3.5.4.3 Type II, size 1 pump connections. Suction and discharge connections shall be on opposite sides of the pumping assembly; except the EMD that shall have both connections on the same side, with both in the horizontal position.

- a. Suction opening: 1½-inch, National Pipe Thread (NPT), female.
- b. Discharge opening: 1½-inch, National Pipe Thread (NPT), male.

3.5.4.4 Type II, size 2 pump connections. Suction and discharge connections shall be on opposite sides of the pumping assembly, with both in the horizontal position.

- a. Suction opening: 2-inch, National Pipe Thread (NPT), female.
- b. Discharge opening: 2-inch, National Pipe Thread (NPT), male.

3.5.5 Class.

3.5.5.1 Diesel Engine. All pumping assemblies, except type II, size 1, class 1, shall be provided with an industrial diesel engine capable of operating on a wide range of military fuels to include JP8, JP5, motor gasolines and diesel fuels. The engine shall be furnished with, but not limited to, the following accessories:

- a. Throttle control assembly to permit manual adjustment and locking at any speed up to the manufacturer's maximum recommended speed. The control shall be labeled to indicate the start and stop positions with a directional arrow to indicate increased speed.
- b. A fuel tank shall be furnished with sufficient capacity for at least 2.5 hours of continuous operation at the rated load. The tank shall include a hand-operated fuel shutoff valve attached directly to the tank. Type I, size 1 shall have a fuel gage. The shutoff valve shall be provided with an arrow showing the directions of valve operation. The fuel tank outlet shall be 0.50 inch to 1.00 inch above the bottom of the tank. The fuel line shall be non-plastic and be provided with a 3-way selector valve,

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with a 0.50 inch SAE-J513 flared fitting, for connection to an auxiliary fuel supply. A corrosion-resistant, circular, face-plate shall be mounted on the fuel selector valve and shall be marked "OFF", "UNIT TANK" and "AUXILIARY". All fuel system components shall be capable of withstanding temperatures of up to 150 °F.

- c. The starting system shall be by either hand crank or recoil start. Secure storage for the hand crank shall be provided. A low temperature assist starting system may be provided if necessary for cold weather starting (see 4.5.3).
- d. All diesel engines shall be furnished with a spark arresting muffler located away from the fuel system and any other flammable pumping assembly components.

The engine shall start within five minutes and develop full power within 15 minutes at all temperatures specified herein. The engine shall deliver power at its continuous duty rating to meet the pump performance requirements of 3.5.2.

3.5.5.2 Electric Motor. Type II, size 1, class 1, pumping assemblies shall be provided with an electric motor of 208 VAC, 60 hertz, 3 phase, 4-wire, NEMA MG 1, Design B. A 220 VAC, 60 cycle, single phase, 3-wire design will be acceptable at the discretion of the contracting officer (see 6.2). It shall have a continuous duty power rating sufficient to meet the pump performance requirements of 3.5.2. The motor shall be a squirrel-cage, solid-shaft, induction type; totally enclosed, fan cooled, and horizontally mounted. All electrical connections shall be watertight. A heavy duty power cord, 12 feet minimum, with a plug in accordance with figure 1 shall be provided. A means to store the power cord shall be provided.

3.5.6 Identification marking. Each pumping assembly shall have data plates permanently attached in a place where the data will be visible and legible but not interfere with the operation and maintenance. The pumping assembly shall be identified by national stock number and manufacturer's name and part number. The plates shall be constructed of a durable, weather resistant material.

3.5.7 Cleaning, treatment and painting. All external surfaces of the pumping assembly, except those that reach a temperature of 400 °F, shall have a durable chemical agent resistant coating that withstands the use of common cleaners. Any external surface that reaches a temperature of 400 °F during operation shall be coated with a high temperature resistant paint. Unless otherwise specified (see 6.2), color shall be tan, color no. 33446 of FED-STD-595, except type II, size 1 that shall be camouflage green, color no. 34094 of FED-STD-595. All informational marking and lettering shall be flat black and caution marking in accordance with ANSI Z 535.2. The internal components may be finished with the manufacturer's standard commercial paint and color, plating or treatment.

3.5.8 Rollover. The pumping assemblies, except Type 1, size 1, and Type II, size 2, shall be capable of being rolled over in any direction without sustaining cracks or permanent deformation (see 4.5.11).

3.5.9 Grounding assembly. The type II, size 1, class 1 and each type I pumping assembly shall be provided with a ground terminal and ground cable of adequate length to reach earth ground.

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3.6 Human Factors.

3.6.1 Safety. All shafts or rotating parts shall be guarded when such parts are exposed to contact with personnel or otherwise create a hazard. All hot surfaces of the equipment, including exhaust components exposed to contact with personnel or that create a fire hazard, shall be fully guarded or insulated. Hot surfaces shall not be positioned near material that is flammable or that could be melted. The fuel fill port shall be located to allow refueling without the need to open any panels or doors. Fuel tanks shall be positioned to prevent spills or overflows from running onto the engine, exhaust, or electrical components. Exhaust or discharges from the equipment shall be directed away from the operator's position. Electrical equipment shall be effectively guarded and grounded to prevent electrical hazards.

3.6.2 Noise limits. Steady-state noise produced by the pumping assemblies shall not exceed 90 dB(A) as measured in accordance with 4.5.10. If noise levels are between 85 and 90 dB(A), or if procedures for noise suppression have been pursued and documented to the satisfaction of the procuring activity and written permission to exceed the 90 dB(A) limit is obtained, hazard signs as specified by the procuring activity (see 6.2) shall be prominently displayed on the equipment.

3.6.2.1 Noise suppression methods. Any method of noise suppression may be used as long as all components used by the operator are easily accessible without the use of tools. The throttle control assembly shall be accessible and the pump assembly shall not exceed the required noise level while operating at any set position. An enclosure shall be used as a last resort to noise suppression; it shall be easily removable, for required field maintenance, and shall include external provisions for carrying the pumping assembly. If the pumping assembly is enclosed, adequate ventilation shall be provided so that the temperature inside the enclosure does not exceed 150 °F. Any noise reducing insulation used shall be non-flammable, non-combustible, vermin proof, and shall not absorb fuel and oil.

3.6.3 Maintenance and handling. The pumping assemblies shall be designed to permit easy accessibility for maintenance and service in the field. The design shall prevent conditions hazardous to personnel or deleterious to equipment. If the total weight of the pumping assembly is less than or equal to 140 pounds, the assembly shall be labeled or stenciled "4 PERSON CARRY" and be provided with handles for ease of lifting. If the total weight of the pumping assembly exceeds 140 pounds, the assembly shall be labeled or stenciled "MECHANICAL LIFT ONLY". If a noise enclosure is used, any access panels or doors shall be labeled or stenciled to indicate the items accessed through them.

3.7 Pumping assembly interface.

3.7.1 Type I, size 1. The pumping assembly, in its stored configuration, shall not exceed 29.00 x 26.00 x 25.00 inches high.

3.7.2 Type I, size 2. The pumping assembly, in its stored configuration, shall not exceed 33.00 x 21.00 x 33.00 inches high.

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3.7.3 Type II, size 1, DED. The pumping assembly, in its stored configuration, shall not exceed 30.00 x 25.00 x 30.00 inches high.

3.7.4 Type II, size 1, EMD. The pumping assembly, in its stored configuration, shall not exceed 21.00 x 13.00 x 22.00 inches high.

3.7.5 Type II, size 2. The pumping assembly, in its stored configuration, shall not exceed 37.00 x 27.00 x 31.00 inches high.

4. VERIFICATION

4.1 Classification of inspections. Inspections shall be classified as follows:

- a. First article inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 First article inspection. When a first article inspection is required, it shall be performed on one complete pumping assembly. The inspection shall include the examination of 4.4 and the testing of 4.5.

4.3 Conformance inspection. Conformance inspection shall include the examination of 4.4.

4.4 Examination. Each pumping assembly shall be physically examined for compliance with the requirements specified in 3.2 through 3.7. Any redesign or modification to comply with specified requirements, shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all examinations of performance, safety, human engineering, and dimensional requirements. Non-compliance with any specified requirement, or the presence of one or more defects lessening maximum efficiency shall constitute cause for rejection.

4.5 Testing.

4.5.1 Test conditions. Unless otherwise specified herein, tests shall be performed in accordance with the applicable provisions of the test code for centrifugal pumps, in the standards of the Hydraulic Institute. All performance data shall be corrected to standard sea level atmospheric conditions of 29.92 inches of mercury and water with a specific weight of 62.3 pounds per cubic foot at 68 °F. Water at a temperature of between 60 and 80 °F shall be used as the test fluid.

4.5.2 High temperature. The pumping assembly shall be stored at a temperature of 160 °F for not less than 24 hours and then the temperature lowered to 125 °F. After unit temperature stabilization at 125 °F, the pumping assembly shall be started and operated at rated capacity for not less than 3 hours. Nonconformance to 3.3.1 and 3.3.2 shall constitute failure of this test.

4.5.3 Low temperature. The pumping assembly shall be stored at -65 °F, except type II, size 1 that shall be stored at -50 °F, for 24 hours. For a type I pumping assembly, raise the temperature to -25 °F and stabilize at that temperature, then start and operate the pumping assembly at rated capacity for not less than 3 hours. For a type II pumping assembly, raise the temperature to 32 °F and stabilize, then start and operate the pumping assembly at rated capacity for not less than 3 hours. Nonconformance to 3.3.1 and 3.3.2 shall constitute failure of this test.

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4.5.4 Vibration. The pumping assembly and any accessory boxes containing all the accessories, if applicable, shall be subjected to a vibration test that simulates unrestrained, loose cargo transport. The vibration test shall be conducted in a commercial package tester with a one inch diameter orbital path at five hertz, for a period of 45 minutes. Inspect the assembly for breakage, permanent deformation, or other damage to the pump assembly or accessory boxes. Any breakage, permanent deformation or failure of the pumping assembly to operate as specified shall constitute failure of this test.

4.5.5 Shock. The pumping assembly and any accessory boxes, if applicable, shall be subjected to a test to determine their capability to withstand the shocks normally induced by loading and unloading in the field. The pumping assembly and accessory boxes shall be dropped from a distance of 24 inches onto a concrete floor. The pumping assembly shall be dropped on each bottom corner only for a total of four drops. Failure of the pumping assembly to operate as specified shall constitute failure of this test.

4.5.6 Maintenance ratio. The maintenance ratio shall be computed during first article testing. Man-hours for repair of replaced components and scheduled before-and-after operation checks are excluded. A maintenance schedule shall be furnished prior to the start of any testing. Nonconformance to 3.4.1 shall constitute failure of this test.

4.5.7 Reliability. The first article pump assembly shall be operated at its rated capacity under the standard conditions specified in 4.5.1. The pump assembly shall be continuously operated for not less than 9 hours out of every 24 hours. The test shall continue for a sufficient length of time to reach an "accept" or "reject" decision. Total test hours shall be at least 2x and not greater than 5x the specified MTBF. A failure is defined as any malfunction that:

- a. Cannot be corrected within 30 minutes by adjustment, repair or replacement using only the maintenance tools and repair parts furnished with the equipment; or
- b. May cause failure to commence operation, cessation of operation, or degradation of performance below specified level; or
- c. May damage pump assembly by continued operation; or
- d. May cause a safety hazard to operating personnel.

Scheduled maintenance shall be performed in accordance with the manufacturer's operation and maintenance schedule. Nonconformance to 3.4.3 shall constitute failure of this test.

4.5.8 Hydrostatic pressure. The non-operating pump shall be subjected to the hydrostatic pressure listed in 3.5.1 for not less than 5 minutes. Nonconformance to 3.5.1 shall constitute failure of this test.

4.5.9 Pumping assembly (operational). Test the pumping assembly to the requirements specified in 3.5.2 and in accordance with Hydraulic Institute ANSI/H1.6 Centrifugal Pump Tests. Data relative to head and capacity of the pump and speed (rpm) of the engine shall be measured at a minimum of six points on the pump performance curve and recorded. The measured points shall include the rated capacities (see 3.5.2), wide-open discharge, and shutoff. The pump assembly shall run for a minimum of 5 minutes at each measured point. Delivery of less than the capacities specified in 3.5.2 or failure of the engine to meet any of the operational requirements or conditions specified in 3.3 shall constitute failure of this test.

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4.5.9.1 Priming. Fill the pump case with water as specified in 4.5.1 and conduct the priming test with a static suction lift equivalent to 10 feet of water, except Type II, size 2 that shall be 25 feet of water. Inability of the pump to prime and deliver full capacity in 2 minutes, except type II, size 2, which shall be 5 minutes, shall constitute failure of this test.

4.5.9.2 Continuity. The type I, size 1 pumping assembly, complete with hoses and fittings, shall be tested for continuity using an ohmmeter to determine compliance with 3.5.9. A lack of continuity shall constitute failure of this test.

4.5.10 Noise level test. Noise levels shall be measured when the pumping assembly is operating under full load. Noise levels shall be measured at not fewer than 12 equidistant points around the equipment including the operator's position and occasionally occupied positions. The operator's position is defined as 24 inches horizontally from the throttle control and 12 inches vertically above the throttle control. Occasionally occupied positions are defined as 39 inches from the equipment and 55 inches above the ground. Noise levels shall be provided as a dB(A) level. Failure to comply with 3.6.2 provisions shall constitute failure of this test.

4.5.11 Rollover. The pumping assemblies, except Type I, size 1, and Type II, size 2, shall be balanced on each longitudinal edge and allowed to fall over. The assembly shall then be inspected for damage or broken components, then started and operated at rated capacity for 3 hours. Nonconformance to 3.5.8 shall constitute failure of this test. Nicks, scrapes, and marred finish shall not be considered defects.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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 pumping assemblies are intended for use as specified in 6.1.1 and 6.1.2. Because these items must operate under extreme environmental conditions (see 3.3), they are military unique.

6.1.1 Type I. Type I pumping assemblies are intended for use in transferring hydrocarbon fuels to and from bulk storage facilities and dispensing into containers, vehicles, and aircraft.

6.1.2 Type II. Type II pumping assemblies are intended for general purpose use in drinking water pumping service.

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6.2 Acquisition requirements. Acquisition documents will specify the following:

- a. Title, number, and date of this publication
- b. Type, size, and class of pump required (see 1.2)
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.3, A.2.2.1 and A.2.3)
- d. When a first article inspection is required, the number of units required, and the time frame for submission (see 3.1)
- e. When a 220V, single phase motor is acceptable (see 3.5.5.2)
- f. The classification “aluminum” for ASTM F 1122 ordering data, when applicable to IPDS procurements (see 3.5.4.1, 3.5.4.2, and A.2—A.9).
- g. Color when other than as specified (see 3.5.7).
- h. Type of hazard signs required (see 3.6.2)
- i. Packaging required (see 5.1).

6.3 Supersession data. This specification supersedes MIL-P-3230H, dated 8 March 1994, MIL-P-14514G, dated 18 August 1987, MIL-P-52109F, dated 9 December 1992, and MIL-P-52746C, dated 20 June 1994, in their entireties.

6.4 Data Requirements. The contracting officer should include requirements for such data as technical publications, instructional materials, illustrated parts lists, and contractors maintenance and operation manuals to be furnished with each pumping assembly.

6.5 Part Identification Number (PIN). The following part identification numbering procedure is for government purposes and does not constitute a requirement for the contractor.

This example describes a part numbering system for specification MIL-PRF-52109.

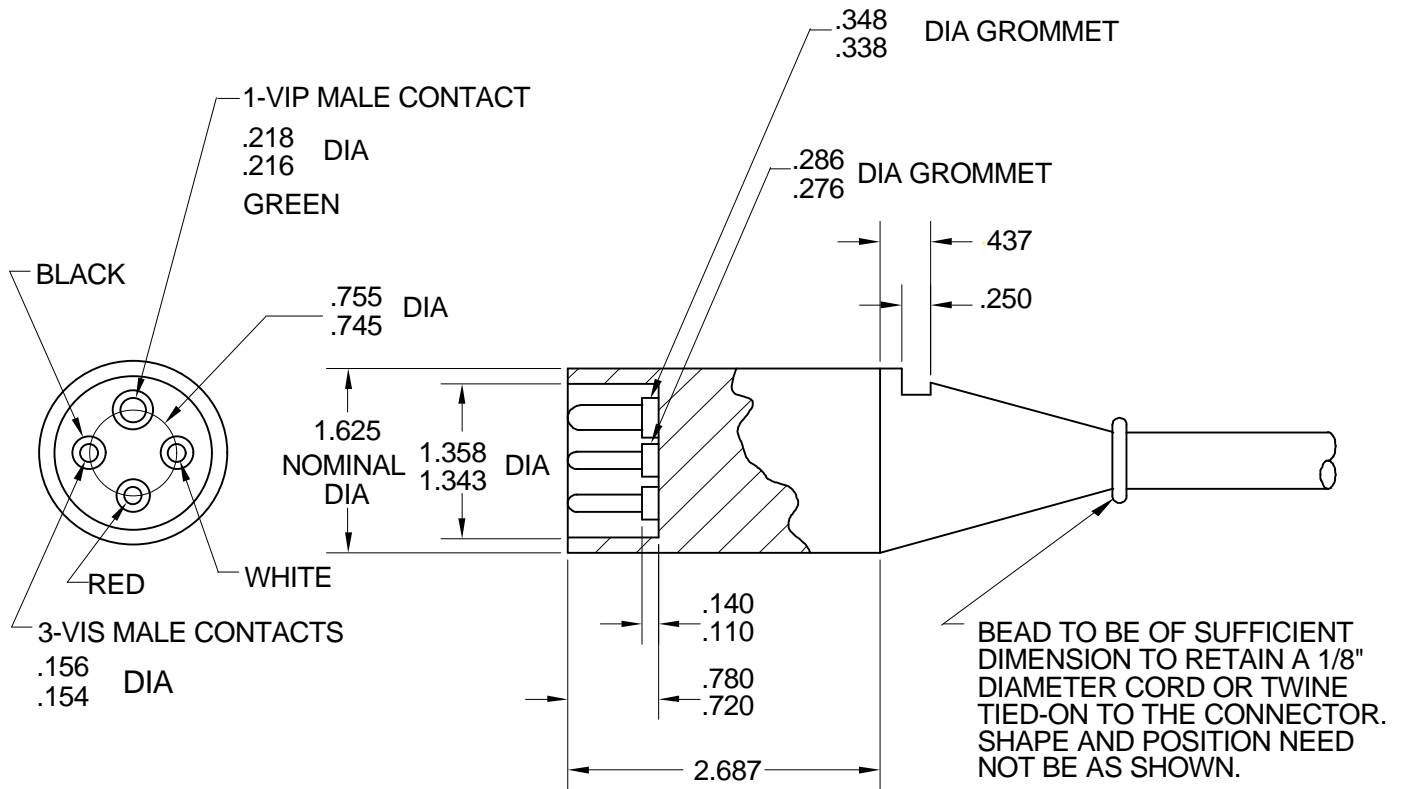
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- └─ 1 - Electric motor driven (EMD) (class 1)
- └─ 1 - 65 GPM capacity at 100 feet total head (size 1)
- └─ 2 - Pumping assembly , water (type II)

6.6 Subject term (key word) listing.

Pump, centrifugal, self-priming
 Pump, diesel-engine driven
 Pump, electric-motor driven
 Pump, 50 GPM, centrifugal
 Pump, 65 GPM, centrifugal
 Pump, 100 GPM, centrifugal
 Pump, 125 GPM, centrifugal

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NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. RATING: 20 AMPERE, 600 VOLTS.
3. CONNECTING AND DISCONNECTING FORCE 10-35 POUNDS.

FIGURE 1. Type II, size 1, EMD, electrical plug.

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APPENDIX

ACCESSORIES FOR TYPE I, SIZE 1 PUMPING ASSEMBLY

A.1 SCOPE

A.1.1 Abstract. This appendix defines accessories for use with the type I, size 1 pumping assembly. The information contained herein is intended for compliance, as a mandatory part of the specification.

A.2 APPLICABLE DOCUMENTS

A.2.1 General. The documents listed in this section are specified in section 3 of this appendix. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in section 3 of this appendix, whether or not they are listed.

A.2.2 Government documents.

A.2.2.1 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

A-A-52030 – Nozzles, Fuel And Oil Servicing, Non-automatic Shutoff And Nozzles,
Fuel Servicing, Automatic Shutoff

A-A-52506 – Clamps, Hose

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

A.2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1149 Ozone Resistance

ASTM F 1122 Quick Disconnect Couplings

(Application for copies of ASTM publications may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

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APPENDIX

A.2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

A.3 REQUIREMENTS

A.3.1 Nozzle assembly. The pumping assembly shall be equipped with two nozzle assemblies. The nozzle assemblies shall consist of a nozzle in accordance with A-A-52030, type I, size 2, class A, style 2, attached to a 1.50 inch, female, coupling half with gasket, chain, and dust plug in accordance with ASTM F 1122, standard class (see 6.2).

A.3.2 Suction Hose. The pumping assembly shall be equipped with three of the following suction hoses. The suction hose assembly shall be 25 feet x 1.50 inches ID. and constructed of a fuel resistant elastomer, with a compound inner tube, reinforcement, static wires, and a compound cover. They shall have a crush resistance of 225 pounds, withstand a hydrostatic test pressure of 150 PSI, and have a minimum burst pressure of 500 PSI. The suction hose assembly shall exhibit no evidence of cracking, under 7x magnification, after testing for ozone resistance in accordance with ASTM D 1149. Hose assembly end fittings shall be hose shank by:

- a. 1½-inch, female, coupling half with gasket and dust plug, in accordance with ASTM F 1122, standard class (see 6.2).
- b. 1½-inch, male, adapter half with gasket and dust cap, in accordance with ASTM F 1122, standard class (see 6.2).

The ends of all static wires within the hose assembly shall be securely bonded to each coupling half such that there shall be no break in electrical continuity when tested as specified in 4.5.9.2. Couplings shall be attached securely by a minimum of two hose clamps in accordance with A-A-52506.

A.3.3 Discharge hose. The pumping assembly shall be equipped with three of the following discharge hoses. The discharge hose assembly shall be 25 feet x 1.50 inches ID. and constructed of a fuel resistant elastomer; with a compound inner tube, reinforcement, static wires, and a compound cover. It shall be capable of withstanding a hydrostatic test pressure of 200 PSI and have a minimum burst pressure of 500 PSI. Hose assembly end fittings shall be hose shank by:

- a. 1½-inch, female, coupling half with gasket and dust plug, in accordance with ASTM F 1122, standard class (see 6.2).
- b. 1½-inch, male, adapter half with gasket and dust cap, in accordance with ASTM F 1122, standard class (see 6.2).

The ends of all static wires within the hose assembly shall be securely bonded to each coupling half such that there shall be no break in electrical continuity, when tested as specified in 4.5.9.2. Couplings shall be attached securely by a minimum of two hose clamps in accordance with A-A-52506.

A.3.4 Y connector, double male. The pumping assembly shall be equipped with a Y connector, single female 1½-inch by two male 1½-inch quick disconnect coupling in accordance

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with ASTM F 1122, standard class (see 6.2). The distance from the ends of the male couplings to the center of the connector shall be 4.00 inches.

A.3.5 Y connector, double female. The pumping assembly shall be equipped with a Y connector, single male 1½-inch by two female 1½-inch quick disconnect coupling in accordance with ASTM F 1122, standard class (see 6.2). The distance from the ends of the female couplings to the center of the connector shall be 5.00 inches. The distance from the end of the male coupling to the center of the connector shall be 3.00 inches.

A.3.6 Coupling half, quick disconnect, female. The pumping assembly shall be equipped with a 1½-inch, male NPT, by 1½-inch, female, quick disconnect coupling with gasket in accordance with ASTM F 1122, standard class (see 6.2).

A.3.7 Coupling half, quick disconnect, male. The pumping assembly shall be equipped with a 1½-inch, female NPT, by 1½-inch, male, quick disconnect coupling in accordance with ASTM F 1122, standard class (see 6.2).

A.3.8 Drum unloader assembly. The pumping assembly shall be equipped with one drum unloader assembly that consists of the following equipment.

A.3.8.1 Hose assembly. The pumping assembly shall be equipped with two of the following hoses for use with the drum unloader. The hoses shall be 10 feet x 1.5 inches ID and constructed of fuel resistant elastomer, non-wire reinforcement, static wires, and a compound cover. It shall have a minimum burst pressure of 500 PSI. Hose assembly end fittings shall be hose shank by:

- a. 1½-inch, female, coupling half with gasket and dust plug, in accordance with ASTM F 1122, standard class (see 6.2).
- b. 1½-inch, male, adapter half with dust cap, in accordance with ASTM F 1122, standard class (see 6.2).

The ends of all static wires within the hose assembly shall be securely bonded to each coupling half such that there shall be no break in electrical continuity, when tested as specified in 4.5.9.2. Couplings shall be attached securely by a minimum of two hose clamps.

A.3.8.2 Adapter, 1½ to 2 inch. The pumping assembly shall be equipped with a 2 inch, female, by 1½-inch, male, quick disconnect coupling in accordance with ASTM F 1122, standard class (see 6.2).

A.3.8.3 Drum suction stub. The pumping assembly shall be equipped with one drum suction stub consisting of a 1½-inch, female NPT by 1½-inch, 90°, male adapter half with dust cap, in accordance with ASTM F 1122, standard class (see 6.2). It shall be attached to a 36.50 inch x 1.50 inch pipe, of the same material, with a 1½ male NPT thread. The opposite pipe end shall be cut off at a 30° angle.

A.3.9 Ground rod assembly. The pumping assembly shall be equipped with one ground rod assembly; consisting of a ground rod 30 inches long, a ground cable 72.00 inches long, and means for connecting the cable ends to the ground rod and to the pumping assembly frame.

A.3.10 Storage chest. The pumping assembly shall be equipped with two storage chests. All listed Type I, size 1 accessories shall fit within the two storage chests. The storage chests shall

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be composed of no cardboard or wood. Each storage chest shall be not greater than 43 inches long, 19 inches wide, and 17 inches high. Each storage chest shall have four carrying handles, and when loaded, weigh not greater than 140 pounds.

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Air Force - 99
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Army - AT

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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-PRF-52109G	2. DOCUMENT DATE (YYMMDD) 980813
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3. DOCUMENT TITLE
Pumping Assemblies, Portable, Bulk Transfer, Fuel and Water Pumping Service

4. NATURE OF CHANGE (*Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed*)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
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