

INCH-POUND

MIL-PRF-53015B

7 October 2011

SUPERSEDING

MIL-PRF-53015A

01 February 1999

## PERFORMANCE SPECIFICATION

## DISPLACEMENT AND EVACUATION KIT, COLLAPSIBLE HOSELINE

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

## 1. SCOPE

1.1 Scope. This specification covers a displacement and evacuation kit containing items necessary to remove liquid and air from sections of 6-inch or 4-inch collapsible hose.

1.2 Classification. The collapsible hose displacement and evacuation kits will conform to the following types and styles (see 6.2).

1.2.1 Types. The types of displacement and evacuation kits are as follows:

- Type I - Displacement and evacuation kit for 6-inch collapsible hose.
- Type II - Displacement and evacuation kit for 4-inch collapsible hose.

1.2.2 Styles. The styles of displacement and evacuation kits are as follows:

- Style A - Double groove and cam-locking end connections.
- Style B - Cam-locking end connections only.
- Style C - Double groove, cam-locking, and MIL-C-24356 end connections.

Comments, suggestions, or questions on this document should be addressed to U.S. Army RDECOM, Tank Automotive Research, Development and Engineering Center, ATTN: RDTA-EN/STND/TRANS MS #268, 6501 E. 11 Mile Road, Warren, MI 48397-5000 or emailed to [DAMI\\_STANDARDIZATION@conus.army.mil](mailto:DAMI_STANDARDIZATION@conus.army.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.daps.dla.mil>.

AMSC N/A

FSC 4610

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## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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 of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

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 cited in the solicitation or contract (see 6.2).

## COMMERCIAL ITEM DESCRIPTIONS

A-A-52592 - Pipe Fittings: One or More Ends Grooved

## DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-370 - Hose and Hose Assemblies, Nonmetallic: Elastomeric,  
Liquid Fuel  
MIL-PRF-53013 - Repair Kit, 6-Inch Hose-Line  
MIL-PRF-52343 - Repair Kit, Hoseline

(Copies of these documents are available from Document Automation and Production Service, Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094 or website: <https://assist.daps.dla.mil/quicksearch/>.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

## DRAWINGS

## ARMY

57K6071 – Displacement and Evacuation Kit

(Copies of these drawings are available from [DAMI\\_STANDARDIZATION@conus.army.mil](mailto:DAMI_STANDARDIZATION@conus.army.mil) or U.S. Army RDECOM, Tank Automotive Research, Development and Engineering Center, ATTN: RDTA-EN/STND/TRANS MS #268, 6501 E. 11 Mile Road, Warren, MI 48397-5000.)

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2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

### AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

#### ASME B1.20.1 - Pipe Threads, General Purpose (inch)

(Copies of these documents are available online at <http://www.asme.org> or from American Society of Mechanical Engineers, Orders/Inquiries, P.O. Box 2300, Fairfield, NJ 07007-2300.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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 Description. The displacement and evacuation kit shall provide the components necessary to use air pressure to displace liquid from sections of 4-inch or 6-inch hoseline, and to evacuate and collapse the empty hoseline sections.

3.1.1 Construction. The kit furnished under this specification shall be in accordance with the applicable drawing (57K6071) or as specified by the contracting authority. The drawings forming a part of this specification are end product drawings.

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

#### 3.3 Operating requirements.

3.3.1 Kit components. Kit components and quantities shall be in accordance with drawing 57K6071.

3.3.2 Ejector. The ejector (also known as a jet pump, eductor, or siphon) shall have the capability of creating a minimum vacuum of 20 inches of mercury, when propelled by compressed air at 80 pounds per square inch (psi), at 110 cubic feet per minute (cfm). The ejector shall have universal, twist-lock, claw, hose couplings installed on the suction and air inlet connections.

3.3.3 Displacement ball. The displacement ball shall be a solid sphere. The ball material shall have a density of not less than 5 lb./cu ft, and be capable of reducing to approximately 80% of its original size under a pressure of 80 psi with a volume of 110 cfm. Unless another equally effective material is available, the ball shall be made from open cell isocyanate-terminated polyester polyurethane foam, and be coated with a polyurethane elastomeric filament,

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0.0312±0.0156 inches thick, in a crisscross pattern, leaving approximately 15% of the cellular material exposed.

3.3.3.1 Size and weight. The displacement ball shall conform to the following size and weight requirements:

	<u>Type I</u>	<u>Type II</u>
Bare foam size (in.)	6.29 nominal	4.46 nominal
Finished size (in.)	6.43±0.11	4.60±0.11
Weight (lb.)	0.37	0.14

3.3.4 Ball inlet assembly. The type I ball inlet assembly shall consist of a quick disconnect, grooved-end pipe connecting clamp, grooved-end pipe cap, and pneumatic hose coupling. The type II ball inlet assembly shall consist of a 4-inch pipe coupling in accordance with A-A-52592, and a universal, twist-lock, claw hose coupling.

3.3.4.1 Quick make and break, grooved-end pipe, connecting clamp. The type I pipe connecting clamp component shall require no tools for closure and shall allow the quick make or break of a joint. The clamp shall ensure the proper closure, sealing, and secure attachment of a 6-inch pipe with a grooved-end in accordance with A-A-52592. The clamp shall secure the grooved-end pipe cap to the pipe, to withstand a minimum pressure of 300 psi.

3.3.4.2 Grooved-end pipe cap / pneumatic hose coupling. For type I kits, a 6-inch pipe cap, in accordance with A-A-52592, shall be modified to accept a 1-inch, universal, twist-lock, claw hose coupling. The hose coupling shall be installed so that the claw portion faces outward when the ball inlet assembly is connected to the hoseline.

3.3.4.3 Pipe coupling. The type II pipe coupling shall consist of a section of 4-inch pipe approximately 6.00 inches in length, with one end grooved in accordance with A-A-52592. The other end of the coupling shall be sealed, or capped, to withstand a pressure of 300 psi. The seal or cap shall be modified to accept a 0.75-inch, universal, twist-lock, claw hose coupling. The hose coupling shall be installed so the claw portion faces outward when the ball inlet assembly is connected to the hoseline.

3.3.5 Ball receiver assembly. The ball receiver assembly shall consist of two pipe fitting reducers, in accordance with A-A-52592; 8-inch to 6-inch for type I, and 6-inch to 4-inch for type II. One reducer of each pair shall be modified to stop the displacement ball when it reaches the receiver, without restricting fluid or air flow. The modification shall be sufficient to withstand repeated strikes by the ball, without deformation or fracture over the life of the ball receiver assembly. The larger diameters of the reducer pair shall be permanently joined together.

3.3.6 Pipe connecting clamp. Eight boltless, pipe connecting clamps, with gaskets, shall be provided for joining grooved-end pipe in accordance with A-A-52592. The clamps shall provide a secure, tamper-resistant, low profile joint. The pipe connecting clamp shall be 6-inch for type I and 4-inch for type II.

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3.3.7 Grooved-end pipe cap. The grooved-end pipe caps in accordance with A-A-52592 shall be a 6-inch size for the type I kit, and 4-inch for the type II kit.

3.3.8 Performance requirements. When properly installed and operating from a compressed air source of 80 psi at 110 cfm, the displacement of liquid in a 1000 foot section of hoseline shall be completed within 30 minutes for a type I kit, and 15 minutes for a type II kit (see 4.5.1.1). The evacuation and collapse of a 1000 foot section of hoseline shall be completed within 30 minutes for a type I kit and 15 minutes for a type II kit (see 4.5.1.2). The displacement and evacuation of the hoseline shall be completed without damage or degradation of hoseline components.

### 3.4 Environmental.

3.4.1 Storage. The components of the kit shall withstand storage at temperature extremes of -45 °F to 165 °F, at any relative humidity (see 4.5.2).

3.4.2 Operation. The components of the kit shall be capable of operating, as specified herein, at any temperature between 25 °F and 120 °F, at any relative humidity (see 4.5.2).

3.5 Interface. The kits shall be capable of interfacing and functioning with hoselines in accordance with MIL-PRF-370 (see 3.6.3).

### 3.6 Sustainment.

3.6.1 Chest. A rugged, lightweight chest capable of containing all kit components shall be provided. The chest shall not exceed 22.00 inches in height and have a cover, cover securing devices, and handles capable of supporting the chest with all components. The placement and quantity of handles shall be consistent with an individual lift capability of 40 pounds. The chest shall have bins, cradles, or blocking for the kit components, to prevent uncontrolled movement or damage, and a reasonably balanced weight distribution for handling.

3.6.1.1 Chest color. The external finish color shall be as specified (see 6.2).

3.6.1.2 Identification marking. Kit identification markings shall be applied to the external surface of the chest as specified (see 6.2). A plan indicating component placement within the chest shall be secured to the inside of the chest cover, visible to the operator.

3.6.2 Materials. The contractor shall select materials capable of meeting all the operational requirements, in any of the environmental conditions, specified herein. Pipe and pipe fittings shall be of a single durable, rigid, lightweight, corrosion resistant, non-magnetic material, with a minimum tensile strength of 30,000 psi, suitable to the application and compatible with aluminum. The components incorporated into the kit may be newly fabricated from recovered materials to the maximum extent practicable, provided they meet all other requirements of this specification. Used, rebuilt, or remanufactured components shall not be incorporated into the kit.

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3.6.2.1 Dissimilar metals. Dissimilar metals shall not be used in intimate contact without suitable protection to prevent galvanic corrosion.

3.6.3 Government loaned property. Unless otherwise specified (see 6.2), the following property, in the quantities indicated, will be loaned or made available by the Government at a location specified by the contracting officer (see 6.4).

<u>Government loaned property for type I kit test</u>	<u>Quantity</u>
a. Hoseline, collapsible, high pressure, 6-inch by 500 feet, (MIL-PRF-370)	3
b. Hose clamps, (part of MIL-PRF-53013)	3
<u>Government loaned property for type II kit test</u>	<u>Quantity</u>
a. Hoseline, collapsible, high pressure, 4-inch by 500 feet, (MIL-PRF-370)	3
b. Hose clamps, (part of MIL-PRF-52343)	3

## 4. VERIFICATION

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

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

4.2 First article inspection. The first article inspection shall be performed on a minimum of one complete kit (see 3.2 and 6.2). This inspection shall include the examinations of 4.4 and the tests of 4.5. Nonconformance to any specified requirement, the failure of any test, or the presence of one or more defects shall be cause for rejection.

4.3 Conformance inspection. The conformance inspection, performed on all production kits, shall include the identified examinations of 4.4. Nonconformance to any specified requirement or the presence of one or more defects shall be cause for rejection.

4.4 Examination. The type I and type II hoseline displacement and evacuation kits shall be examined for defects as specified in table II. Presence of one or more defects shall be cause for rejection.

4.5 Tests.

4.5.1 Functional test. For testing, a government furnished 1500-foot hoseline assembly (three 500 foot sections with hose clamps) shall be laid out with the discharge end at a slightly higher elevation than the inlet. The layout shall provide a hydrostatic head of two feet, minimum, for the displacement procedure. The inlet of the hoseline assembly shall be sealed with a pipe cap, and filled with water from the discharge end. Three hose clamps shall be installed and tightened at the following positions:

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- a. At a point two feet downstream from the inlet cap.
- b. At a point 1000 feet downstream, before the hoseline joint.
- c. At a point 1000 feet downstream, after the hoseline joint.

TABLE II. Examination.

Exam	First article	Conf.	Defect	Ref. para.	Method of examination
101	X	X	Kit components not as specified	3.3.1	Visual / Doc
102	X		Ejector not as specified.	3.3.2	Visual / SIE
103	X		Displacement ball not as specified.	3.3.3	Visual / SIE
104	X		Ball inlet assembly not as specified.	3.3.4	Visual / SIE
105	X		Ball receiver assembly not as specified.	3.3.5	Visual / SIE
106	X		Connecting clamps not as specified.	3.3.6	Visual / SIE
107	X		Grooved-end pipe caps not as specified.	3.3.7	Visual / SIE
108	X	X	Chest not as specified.	3.6.1	Visual / SIE
109	X	X	Materials not as specified.	3.6.2	Visual / Doc

Doc = Documentation

SIE = Standard Inspection Equipment

4.5.1.1 Displacement test. To determine conformance to 3.3.8, remove the inlet cap and insert the displacement ball and ball inlet assembly. At the pipe joint between the two hose clamps (1000 feet downstream) install the ball receiver assembly. When the connections are completed, the hose clamp upstream and downstream of the ball receiver assembly shall be loosened so as not to restrict flow. An air line, from an 80 psi at 110 cfm compressed air source, having a twist-lock, claw hose connection shall be connected to the ball inlet assembly. The hose clamp adjacent to the ball inlet assembly shall be loosened so as not to restrict flow. Compressed air shall be applied at the ball inlet assembly. The elapsed time, from application of air pressure until the displacement ball is caught at the ball receiver assembly, shall be not be greater than 30 minutes. When the ball arrives at the receiver, the hose clamp downstream from the connection shall be closed and the compressor stopped. Inability of the ball to displace the liquid as specified, or damage to hoseline components shall constitute failure of this test.

4.5.1.2 Evacuation test. To determine conformance to 3.3.8, upon completion of liquid displacement test, the ball receiver assembly and displacement ball shall be removed from the hoseline. The suction side of the ejector shall be connected to the claw coupling on the ball inlet assembly. The inlet side of the ejector shall be connected to the claw coupling on the air line and air pressure, at 80 psi and 100 to 110 cfm, shall be applied to the ejector. The hoseline evacuation and collapse shall be timed from the application of air to the ejector until the hoseline assumes a ribbon form. The two hose clamps on the evacuated segment shall be tightened and the evacuation process stopped. The ball inlet assembly shall be removed and a pipe cap installed. Inability to evacuate and collapse the 1,000 foot section as specified within 30 minutes, or damage to hoseline components shall constitute failure of this test.

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4.5.2 Environmental tests.

4.5.2.1 Low temperature. To determine conformance to 3.4.1 and 3.4.2, place a complete displacement and evacuation kit in a controlled temperature chamber. Lower the temperature to  $-45\pm 2$  °F and maintain for 24 hours. Then, while still at the  $-45$  °F temperature, conduct a visual examination of the kit for damage and deformation. Raise the chamber temperature to  $25\pm 2$  °F and maintain for 12 hours. Then, while still at the  $25$  °F temperature, perform the displacement and evacuation test (see 4.5.1). Damage, deformation, or failure to perform as specified herein shall constitute failure of this test.

4.5.2.2 High temperature. To determine conformance to 3.4.1 and 3.4.2, place a complete displacement and evacuation kit in a controlled temperature chamber. Raise the temperature to  $165\pm 2$  °F and maintain for 24 hours. Then, while still at the  $165$  °F temperature, conduct a visual examination of the kit for damage and deformation. Lower the chamber temperature to  $120\pm 2$  °F and maintain for 12 hours. Then, while still at the  $120$  °F temperature, perform the displacement and evacuation test (see 4.5.1). Damage, deformation, or failure to perform as specified herein shall constitute failure of this test.

## 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 materiel 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 displacement and evacuation kit is intended for use in displacing liquid from sections of collapsible hoseline, then evacuating the resulting vapors (including air) in the hoseline, and the hoseline segment collapsed for storage. The system is military unique in that no requirement for commercial equivalent, for the type and size of hoseline, exists and adaptation of commercial products to meet the military requirements will have no market at large.



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6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type of kit required (see 1.2).
- c. If required, the specific issue of individual documents referenced (see 2.2 and 2.3).
- d. When a first article is required for examination and approval, time frame for submission, and the number of units required (see 3.2, 4.2 and 6.3).
- e. Chest color and identification markings required (see 3.6.1.1 and 3.6.1.2).
- f. If Government loan property is other than specified (see 3.6.3)
- g. Packaging requirements (see 5.1).

6.3 First article. When a first article inspection is required, the sample should be a first article production unit(s). The first article should consist of one or more complete type I or type II kits, as specified (See 6.2). The contracting office should include specific instructions in acquisition documents regarding arrangements for examination, test, approval, and disposition of the first article.

6.4 Government-loaned property. The contracting officer should arrange to loan the property listed in 3.6.3.

6.5 Data requirements. The requirement for technical manuals should be considered when this specification is applied on a contract. If technical manuals are required, military specifications and standards that have been cleared and listed in DoD 5010.12, Acquisition Management Systems and Data Requirements Control List (AMSDL) should be listed on a separate Contract Data Requirements List (DD Form 1423), which is included as an exhibit to the contract. The technical manuals should be acquired under a separate line item in the contract.

6.6 Provisioning. The contracting officer should include provisioning requirements for repair parts and maintenance tools (including special tools) as necessary, and instructions on shipment of the displacement and evacuation kit.

6.7 Subject term (key word) listing.

Drain  
Eductor  
Ejector  
Jet pump  
Siphon

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

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Custodians:

Army - AT  
Air Force - 99

Preparing activity:

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