

INCH-POUND

A-A-50455A

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SUPERSEDING

A-A-50455

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## COMMERCIAL ITEM DESCRIPTION

## PORTABLE FILTRATION CART

The General Services Administration has authorized the use of this commercial item description, for all federal agencies.

1. SCOPE. This commercial item description covers the requirements for 10, 16, and 25 gallons per minute (gpm) (37.8, 60.48, and 94.5 liters per minute (lpm)) rated flow capacity filtration carts used in transferring petroleum based, synthetic hydrocarbon, triaryl phosphate ester and polyglycol solution or aqueous hydraulic fluids into ship hydraulic systems, as well as cleaning the ships hydraulic systems that are contaminated with particulate, water, or both. It shall recirculate fluid in a contaminated system until cleanliness levels are attained which provide satisfactory component performance.

## 2. SALIENT CHARACTERISTICS

2.1 Physical.2.1.1 Maximum weight.

- a. 140 pounds (dry) for 10 gpm flow cart.  
(63.42 kg (dry) for 37.8 lpm flow cart)
- b. 155 pounds (dry) for 16 gpm flow cart.  
(70.215 kg (dry) for 60.48 lpm flow cart)
- c. 170 pounds (dry) for 25 gpm flow cart.  
(77.01 kg (dry) for 94.5 lpm flow cart)

2.1.2 Maximum dimensions.

- a. Height - 48 inches (1.22 m)
- b. Width and Length - Width and length dimensions of the cart shall be such that it passes through a 24-inch (0.61 m) diameter hatch

2.2 Fabrication.

2.2.1 All components shall be rigidly secured to a frame. The frame shall be equipped with rubber-tired wheels, 10 inches (25.4 cm) minimum in diameter and 2.75 inches (6.99 cm) minimum in width, and be designed for mobility and handling ease, especially in way of industrial marine grade gratings, diamond tread plating, and temporary shipboard electrical system cabling and fluid system hose obstructions. Tires can be solid or semi-pneumatic. The frame, wheels, axle(s) and related components shall be designed to survive the impact of dropping a fully loaded cart (wet weight) in the upright position at least 12 inches (30.48 cm), and the incremental (step-by-step) movement down a ladder way without functional damage.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data that may improve this document should be sent to: Commander, Naval Sea Systems Command, ATTN: SEA 05Q, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard DC 20376-5160 or emailed to [commandstandards@navsea.navy.mil](mailto:commandstandards@navsea.navy.mil), with the subject line "Document Comment". Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

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2.2.2 The electric motor, coupling, and pump shall be accurately aligned and designed to accommodate the residual misalignment found under typical service conditions.

2.2.3 The unit shall operate in either the vertical plane or the horizontal plane. Vertical orientation shall be assumed as the primary orientation.

2.2.4 The unit shall be constructed of the materials that are compatible with petroleum based, synthetic hydrocarbon, triaryl phosphate ester and polyglycol solution or aqueous hydraulic fluids as referenced in SAE J1778.

2.2.5 The unit shall be equipped with a drip pan below potential sources of fluid external leakage (filter assemblies and inlet/outlet ports) to provide adequate fluid containment that keeps the working area safe and clean while the unit is being operated in the vertical orientation.

2.2.6 Provision shall be made for attachment of a chain hoist, multi-point sling, or equivalent rigging device for rigging a fully loaded unit (wet weight) vertically through a hatch or horizontally through a doorway. Where a wide handle assembly also serves as the lifting point, provision shall be made to limit shifting of the cart weight when lifting with a single chain hoist hook. Handles or similar devices shall be provided for use by personnel during the vertical transit through a hatch or horizontal transit through a doorway. Any equipment handles provided on the unit shall be sufficiently rugged to withstand lifting use.

### 2.3 Electrical.

2.3.1 Electrical controls shall be in accordance with NEMA standard MG1 and IEEE standard 45. Electrical enclosures shall meet the requirements of NEMA standard 250, Type 4X.

2.3.2 Electrical power requirements for the cart rated flow shall be as follows:

TABLE I. Power requirement.

Rated flow	Motor hp	Electrical power
10 gpm (37.8 lpm)	1.00 hp Max (0.746 kW Max)	115 volts, 60 Hz 16 amp draw (max) under full load, single phase
16 gpm (60.48 lpm)	1.50 hp (1.119 kW)	
25 gpm (94.5 lpm)	3.00 hp (2.238 kW)	440 volts, 60 Hz 10 amp draw (max) under full load, triple phase

2.3.3 Electrical motor shall be a totally enclosed fan cooled (TEFC) type and shall be rated for continuous duty.

2.3.4 An oil-tight, permanently mounted, on/off switch shall be provided.

2.3.5 A hard service cord of 24 inches (0.61 m) minimum length, conforming to National Electrical Code (NFPA 70) type SO or equivalent (heavy duty, oil-resistant) cord, with a ground cable capable of conducting the full load motor current shall be provided. One end of the cord shall be permanently attached to the filter unit with strain relief. The other end shall be fitted with a National Electrical Code Article 410 type, three-prong (single phase) or four-prong (triple phase), dead front plug.

### 2.4 Hydraulic fluid delivery.

2.4.1 An integral part of the unit shall be a positive displacement pump capable of delivering rated flow of hydraulic fluid at 215 centistokes (cSt) viscosity and 100 pounds per square inch (psi) [689.5 kilopascals (Kpa)] minimum pump discharge pressure continuously. The rated flow of the unit shall be 10, 16, or 25 gpm (37.8, 60.48, and 94.5 lpm) as specified by the contracting activity. A tolerance of  $\pm 7$  percent of rated flow shall be allowed to accommodate for variation in pump efficiencies.

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2.4.2 The pump shall be self-priming and shall operate with a minimum vacuum of 15 inches (38.10 cm) of mercury at the inlet.

2.4.3 Piping connections shall be assembled to minimize the potential for leakage. Connection requirements for inlet/outlet ports are listed in 2.7. SAE J514 connections are preferred for other fittings.

## 2.5 Filtration.

2.5.1 The 10 and 16 gpm (37.8 and 60.68 lpm) carts shall have two filter housings, connected in series, to provide dual filtration for both particulate and water contaminant removal. The 25 gpm (94.5 lpm) cart shall have only one filter housing to provide filtration for particulate removal. All filter housings for the 10, 16 and 25 gpm (37.8, 60.48, and 94.5 lpm) carts shall each be sized for dual filter elements (see 2.5.7). The filter housing and filter element operating pressure rating shall be not less than 250 psi [1.723 megapascals (Mpa)] The filter housing burst pressure rating shall be not less than 1000 psi (6.895 Mpa) or 4 times the housing rating, whichever is greater.

2.5.2 The filter bowls shall be attached to the filter heads in a manner to permit removal and cleaning of the bowls and servicing of the elements without breaking pipelines. The servicing requirements of the filters shall be simple and shall not require the use of special tools for removing, cleaning, replacing elements, and remounting filter bowls.

2.5.3 A bypass valve shall be contained within each filter housing. The bypass valve shall be fast-acting, single stage, and of high capacity design to protect the filter elements from excessive differential pressure under all transient and steady flows found in service.

2.5.4 The bypass valve shall have a cracking pressure of 35 to 40 psid (241.33 to 275.80 kPa) and a full flow pressure drop of 60 psid (413.70 kPa) maximum at rated flow with 215 cSt viscosity hydraulic fluid.

2.5.5 Maximum internal leakage of the bypass valve at 30 psid (206.85 kPa) differential pressure shall not exceed 3.66 cubic inches per minute ( $\text{in}^3/\text{min}$ ) (60 milliliters per minute (ml/min)) with 46 cSt viscosity hydraulic fluid.

2.5.6 The fluid flow through the filter elements shall be from the outside to the inside.

### 2.5.7 Filter elements.

2.5.7.1 For particulate removal, each filter housing shall accept two filter elements that are in accordance with SAE J2321/1.

2.5.7.2 For water removal, each filter housing shall accept two filter elements that conform to the dimensions specified in SAE J2321/1. See 6.5.4 for guidance on water removal filter element selection.

2.5.7.3 The two elements installed in each housing shall be connected by the use of reusable element-connector that is in accordance with SAE J2321/1.

## 2.6 Differential pressure indicator (dirt alarm).

2.6.1 The filters shall be provided with a clearly visible mechanical differential pressure indicator. The indicator shall actuate either by direct mechanical linkage to the bypass valve or by the differential pressure across the filter elements.

2.6.2 The indicator shall reflect contaminate (particulate or water, as appropriate) buildup (pressure differential) in the elements and shall register against a three-color scale.

2.6.3 The three colors shall read:

- |           |  |
|-----------|--|
| a. GREEN  | OK (indicating full flow filtration).  |
| b. YELLOW | CHANGE (indicating full flow filtration, but element approaching by-pass condition). |
| c. RED    | BYPASS (indicating hydraulic fluid bypassing the filter elements).                   |

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2.7 Unit ports.

2.7.1 The unit shall be equipped with steel, interchangeable quick disconnect couplings conforming to Series B of ISO 7241-1 with SAE J1926/1 threaded O-ring seal ports for the coupler or nipple to hose connection according to the following schedule:

		Coupling Body Size	Hose Conn. Port
25 gpm	Suction: Discharge:	ISO 7241-1 Size 40 (1½ in.) ISO 7241-1 Size 40	SAE J1926/1:1-7/8-12 SAE J1926/1:1-7/8-12
16 gpm	Suction: Discharge:	ISO 7241-1 Size 40 ISO 7241-1 Size 25 (1 in.)	SAE J1926/1:1-7/8-12 SAE J1926/1:1-5/16-12
10 gpm	Suction: Discharge:	ISO 7241-1 Size 25 ISO 7241-1 Size 25	SAE J1926/1:1-5/16-12 SAE J1926/1:1-5/16-12

2.7.2 Coupling components shall be coated for general corrosion resistance; components shall not be cadmium plated. Discharge coupling halves shall be valved. The mating or hose ends of all quick disconnect couplings shall have boss porting (straight threads with grooving for O-ring seal) in accordance with SAE J1926/1. Location/orientation of unit ports shall comply with human engineering requirements of 2.17.2.

2.7.3 The suction port of the filter cart shall have a male/nipple type fitting. The mating female/coupler hose fitting shall be provided. Both coupling halves shall be provided with semi-restrained (lanyard or equal) dust plugs and dust caps.

2.7.4 The discharge port of the filter cart shall have a female/coupler type fitting. The mating male/nipple type hose fitting shall be provided. Both coupling halves shall be provided with semi-restrained (lanyard or equal) dust plugs and dust caps.

2.8 Gages. Two gages meeting or exceeding the requirements of ASME B40.100, grade B, 2 to 2-1/2 inches (5.08 to 6.35 cm) in diameter shall be provided on the unit. The gages shall be commercial marine grade, direct drive, helical, multi-wound, Bourdon tube type with minimum 1% accuracy at mid-range and all components corrosion resistant. Both gages shall be securely mounted to the unit and shall be visible to the operator while the unit is in use. The gage line to each gage shall be equipped with a gage isolation/vent valve. The gages shall be connected to the unit piping with SAE J514 straight or pipe thread fittings as follows.

2.8.1 One gage shall have a range of 0 to 200 psi (0 to 1.379 MPa) and shall be connected to the pump discharge piping or filter inlet so that pump discharge pressure can be monitored.

2.8.2 The other gage shall have a range of 0 to 30 inches (0 to 76.20 cm) of mercury and shall be connected to the pump inlet piping or the suction inline strainer or separator outlet connection so that pump suction (vacuum) condition can be monitored.

2.9 Fluid vent/test valves and sampling valve.

2.9.1 Fluid vent/test valves. Vent/test valves shall be provided as necessary to support validation of pressure drop across the pump and to support fluid sampling. Valves shall satisfy MIL-V-24695/1, but allow use of carbon steel as an alternative material. Location of fitting that supports fluid sampling shall comply with human engineering requirements of 2.17.2, permit attachment of fluid sampling valve, and support fluid sampling downstream of filter assembly that is downstream of pump.

2.9.2 Fluid sampling valve. A minimum of one fluid sampling valve shall be provided per MIL-V-81940/4.

2.10 Seals. O-ring seals shall be fluorocarbon rubber and shall conform to SAE AS3581 (for seals that are subject to twisting or abrasion, such as boss seals) or SAE AS3209 (for other seals).

2.11 Fasteners. Fasteners shall be identified and selected in accordance with the requirements of SAE J2280.

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2.12 Protective devices.

2.12.1 Pump suction shall be protected with a 100 mesh inline strainer or separator that can be serviced without breaking lines and draining fluid from the unit.

2.12.2 Guards shall be provided for powered moving parts to prevent contact by operators.

2.12.3 The unit shall be equipped with an electric motor overload protection feature, which will automatically stop the motor under an overload condition.

2.12.4 The unit shall be equipped with an overpressure protection feature to limit maximum system pressure so as not to damage components or piping. The maximum system pressure is the maximum pressure that the unit can experience under any abnormal condition, to include inadvertent closure of downstream valves; but shall not exceed 250 psi (1.724 Mpa).

2.13 Identification and markings.

2.13.1 The direction of flow through the filter shall be clearly marked on filter housing.

2.13.2 The following acquisition information shall be permanently identified on the unit:

- a. CID based part number (see 6.2).
- b. Manufacturer's name.
- c. Manufacturer's part number.
- d. Manufacturer's CAGE code.

2.13.3 Appropriate warning plates shall be conspicuously located where hazards exist.

2.13.3.1 A warning plate providing caution against the use of water removal filter elements in water-glycol systems shall be provided as follows:

“WARNING: DO NOT USE WATER REMOVAL FILTER ELEMENTS FOR FILTRATION OF POLYGLYCOL SOLUTION OR AQUEOUS HYDRAULIC FLUID.”

2.13.3.2 When specified by the purchaser in the ordering data, a warning plate providing caution against use of filter cart(s) in Class I, Division 1 hazardous spaces shall be provided as follows:

“WARNING: THIS CART IS NOT INTENDED FOR USE IN OPERATIONAL CLASS I, DIVISION 1 HAZARDOUS SPACES AS DEFINED BY THE NATIONAL ELECTRICAL CODE (NFPA 70), ARTICLE 500.”

2.13.4 Instruction plates shall be installed showing the assembly of the filter elements, using the element connectors within the filter bowl.

2.14 Identification of standard parts. O-ring seals shall be identified by SAE standard part numbers, which reflect the required material and limit sizes to standard sizes. All fasteners shall be identified by SAE standard part numbers, which identify both size and material.

2.15 Paint. The unit shall be painted with an epoxy paint.

2.16 Manuals. Standard commercial manuals including operating, service, maintenance instruction, and a parts list shall be furnished with each unit.

2.17 Human engineering. The cart shall be designed and arranged for efficient use; human engineering principles described in ASTM F1166 shall be considered. The cart shall be designed for operation by a 5th percentile female through a 95th percentile male. In particular, controls shall be arranged for normal operation of a vertical cart by standing personnel, and for occasional operation of a horizontal cart by squatting personnel.

2.17.1 Pushbuttons and switches shall be protected from inadvertent operation, and damage during transit, by raised bezels or equivalent protection devices.

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2.17.2 Sufficient space and clearances shall be provided for common maintenance procedures, such as filter change-out and fluid sampling, with minimal effort and without breaking pipelines. Location of sampling valves and unit ports shall minimize damage to these valves during transit of cart and provide access for fluid sample containers.

3. **REGULATORY REQUIREMENTS.** The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

4. **PRODUCT CONFORMANCE.** The products provided shall meet the salient characteristics of this Commercial Item Description, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial marketplace. The government reserves the right to require proof of such conformance.

5. **PACKAGING.** Preservation, packing, and marking shall be as specified in the contract or order.

6. **NOTES.**

6.1 **Ordering data.** The contract or order should specify the following:

- a. CID document number, revision, and PIN.
- b. Product conformance provisions.
- c. Flow rate required (see 2.4).
- d. Electrical power required (see 2.3.2).
- e. Warning plate for use in Class I, Division 1, hazardous spaces is optional (see 2.13.3.2).

6.2 **Part or identification number.** The following part identification numbering procedure is for government purposes and does not constitute a requirement for the contractor. The part number consists of the basic number of this commercial item description plus applicable flow rate and power requirement numbers selected from Table I.

EXAMPLE: AA50455-10-115 is a filtration cart with 10 gpm (37.8 lpm) flow rate, 115 volts power.

6.3 **Acceptable units.** The brand names and manufacturer's part numbers of filtration carts which are known to be acceptable and of current manufacture are available from: Commander, Naval Sea Systems Command, Attn: SEA 05Z6, 1333 Isaac Hull Ave SE Stop 5125, Washington Navy Yard, DC 20376-5125. Manufacturers desiring listing of their products should submit drawings and test data that demonstrate compliance with this specification.

6.4 **Source of documents.**

6.4.1 **ASME.** ASME standards are available from American Society of Mechanical Engineers, 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300 or online at <http://www.asme.org>.

6.4.2 **ASTM.** ASTM standards are available from ASTM International, 100 Barr Harbor Dr., West Conshohocken, PA 19428, or online at [www.astm.org](http://www.astm.org).

6.4.3 **FAR.** The Federal Acquisition Regulation may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 or online at <http://www.arnet.gov/far>.

6.4.4 **IEEE.** IEEE standards are available from Institute of Electrical and Electronic Engineers, Inc., 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331 or online at <http://standards.ieee.org/>.

6.4.5 **ISO.** ISO standards are available from International Organization for Standardization (ISO), 1, rue de Varembe, Case postale 56 CH-1211 Geneva 20, Switzerland or online at <http://www.iso.org>.

6.4.6 **MIL-SPECS.** Military specifications are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://assist.daps.dla.mil>) or from the Standardization Document Order Desk, 700 Robbins Avenue, Bldg. 4D, Philadelphia, PA 19111-5094.)

6.4.7 **NEMA.** NEMA standards are available from National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1847, Rosslyn, VA 22209, or online at [www.nema.org](http://www.nema.org).

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6.4.8 NFPA. National Fire Protection Association (NFPA) standards and National Electrical Code articles are available from NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471 or online at [www.nfpa.org](http://www.nfpa.org).

6.4.9 SAE. SAE standards are available from SAE World Headquarters, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or online at [www.sae.org](http://www.sae.org).

6.5 Explanatory and guidance information.

6.5.1 To minimize filter element replacement during system fluid cleaning or transfer and to support filter element replacement using the National Stock System sources, SAE J2321/1 filter elements having a higher capacity [30 gpm (115 lpm) as compared to 25 gpm (95 lpm)] have been specified.

6.5.2 The carts described by this document are not intended for use in Class I, Division 1 hazardous spaces, as defined in National Electrical Code Article 500, except when the potentially hazardous systems are out of service and subject compartments are certified as being free of volatile vapors.

6.5.3 MIL-V-24695 compatible vent/test valves and MIL-V-81940 sampling valve(s) have been specified for interchangeability, standardization and parts support with similar applications on USN and USCG ships.

6.5.4 The following suggested minimum requirements provide guidance in the selection of water removal elements to be used with the portable filtration cart:

Rated flow with 68 cSt petroleum based fluid:	10 gpm (37.8 lpm)
Water retention capacity:	24.41 cu.in. (400 mL)
Terminal pressure drop:	25 psid (172.38 KPad) at rated flow
Clean element pressure drop:	10 psid (68.95 KPad) at rated flow
Collapse burst pressure:	150 psid (1.034 MPad) psid
Reverse flow pressure:	15 psid (103.43 KPad)
Bubble point:	2 inches (5.08 cm) of water
Initial dryness level of hydraulic fluid:	300 ppm of water (0.03% by volume)

6.6 Key words.

Filter bowl

Filter element

Filtration

Preparing Activity:

Navy – SH

(Project 4330-0188-000)