

MIL-E-24127(SHIPS)
19 February 1965

MILITARY SPECIFICATION

EDUCTORS; GASOLINE, OIL, OR WATER

1. SCOPE

1.1 Scope.- This specification covers eductors for gasoline, oil, or water service on board Naval ships.

1.2 Classification.- Eductors shall be of the following types as specified (see 6.1):

- Type A - Stationary.
- Type B - Portable.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

QQ-N-288 - Nickel-Copper Alloy and Nickel-Copper-Silicon Alloy Castings.

MILITARY

MIL-P-116 - Preservation, Methods Of.
 MIL-D-983 - Drawings, Electrical, Hull and Mechanical Equipment for Naval Shipboard Use.
 MIL-F-1183 - Fittings, Tube, Cast Bronze, Silver-Brazing.
 MIL-A-8625 - Anodic Coatings, for Aluminum and Aluminum Alloys.
 MIL-S-5059 - Steel, Corrosion-Resistant (18-8), Plate Sheet and Strip.
 MIL-P-15024 - Plates, Identification, Information and Marking for Identification of Electrical, Electronic and Mechanical Equipment.
 MIL-C-15726 - Copper-Nickel Alloy Rod, and Flat Products (Flat Wire, Strip, Sheet, Bar, and Plate).
 MIL-B-16541 - Bronze, Valve, Castings.
 MIL-F-19488 - Fittings, Hose, Water, and Steam (Other than Flexible, Metallic).
 MIL-F-20042 - Flanges, Pipe, Bronze (Silver Brazing).

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
 MIL-STD-129 - Marking for Shipment and Storage.

DRAWINGS

BUREAU OF SHIPS

5000-S4823-2501 - Eductor, portable aluminum peripheral jet.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications.- The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

NATIONAL BUREAU OF STANDARDS

Handbook H28 - Screw-Thread Standards for Federal Services.

FSC 4420

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(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D. C. 20401.)

OFFICIAL CLASSIFICATION COMMITTEE
Uniform Freight Classification Rules.

(Application for copies should be addressed to the Official Classification Committee, 1 Park Avenue at 33rd Street, New York 16, N. Y.)

3. REQUIREMENTS

3.1 Component parts.- The eductor shall consist of a body (suction chamber), discharge tail (diffuser) with separate or integral throat, internal removable pressure nozzle, and pressure, suction and discharge connections.

3.2 The eductors shall be of a nonclogging design, effecting as near as practicable a smooth streamline design of the passage from the suction through to discharge. Projection of the throat into the mixing chamber, with consequent dead spaces and eddies where solids may accumulate, shall be avoided.

3.3 The design of the nozzle tip and the throat of the tail or discharge shall be such that the flow of fluid at the specified capacity will not produce excessive erosion of the parts under service operating conditions as specified in the contract or order.

3.4 The eductor design shall be such as to permit easy access to the nozzle for inspection and replacement, without removing the eductor from the service line in which it is installed, (actuating medium line excepted).

3.5 When specified (see 6.1) the eductor shall be provided with a foot (check) valve and strainer on the suction connection.

3.5.1 The strainer shall be either of a flat plate or cylindrical design as specified (see 6.1).

3.5.2 Cylindrical strainers shall have approximately the same length as the diameter and shall be either of cast or fabricated construction. The diameter of the strainer holes shall be not less than 1/8 inch nor more than 1/2 the diameter of the base of the diffuser throat. The total area of the holes shall be not less than four times the area of the suction inlet.

3.5.3 Flat plate strainers shall be designed to withstand a test of 20 pounds per square inch (p.s.i.) differential pressure, without showing any signs of permanent distortion as checked by use of a straight edge, or other convenient method. The total free area of the strainer holes shall be as specified in 3.5.2.

3.6 End connections (type, sizes and so forth) shall be as specified (see 6.1) and as follows:

- (a) Pipe thread connections or threaded parts shall conform to the requirements of Handbook H28.
- (b) Hose fittings shall conform to the requirements of MIL-F-19488.
- (c) Union ends shall be threaded and machined as the thread piece, and shall be furnished with ring and tail piece assembled in place, in accordance with MIL-F-1183.
- (d) Flanges shall be in accordance with MIL-F-20042.

3.7 Marking for identification.- Each eductor shall have the following data stamped or cast on the body, or contained on a permanently attached nameplate:

- (a) Manufacturer's name.
- (b) Manufacturer's serial number, model number and size.
- (c) Suction lift in feet of water and suction capacity.
- (d) Discharge head.
- (e) Driving fluid pressure in p.s.i. and volume (gallons per minute (g.p.m.)).
- (f) Federal standard stock number of the assembly.
- (g) Federal standard stock number or part number of the nozzle or nozzle tip.

3.7.1 Nameplates, if provided, shall be in accordance with types A, B or C of MIL-P-15024.

3.8 Type A.-

3.8.1 Material for type A eductors, except the pressure nozzle, shall be bronze in accordance with MIL-B-16541. Strainers and foot valves shall be of the same material as the eductor. The nozzle may be made in one piece, or may have a threaded removable tip. The inner surface of the tip shall form a smooth continuous surface with the inner surface of the nozzle. The one-piece nozzle, or the nozzle with tip shall be made of nickel-copper-silicon alloy conforming to the requirements of QQ-N-288.

3.8.2 Each eductor shall be provided with lugs or a bracket cast integrally with the body for bolting the eductor to the ship's structure.

3.8.3 Unless otherwise specified in the contract or order, 2 inch connections and smaller shall be union end, and connections 2-1/2 inches and larger shall be flanged.

3.9 Type B.-

3.9.1 Unless otherwise specified in the contract or order, type B eductors shall be in accordance with Drawing 5000-S4823-2501. Where bronze is specified for the eductor, materials of the eductor, strainer and foot valve shall be the same as for type A eductors (see 3.8).

3.9.2 Foot valves for aluminum eductors shall be of copper-nickel or corrosion-resistant steel in accordance with MIL-C-15726 and MIL-S-5059, respectively. Strainers may be of similar material as furnished for the foot valve, or of good commercial quality sheet steel, zinc coated after fabrication.

3.9.3 Aluminum parts shall be anodized in accordance with MIL-A-8625 after machining and before assembly.

3.10 Onboard repair parts.- Onboard repair parts shall consist of one spare nozzle (or nozzle tip, if removable) for each eductor furnished, and one set of gaskets.

3.11 Drawings.- Drawings shall be class A in accordance with MIL-D-963.

3.12 Workmanship.- Eductors shall be free of porosity or other casting defects. Threads shall be smooth, properly formed and free of burrs, nicks and tears.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection.- Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Quality conformance inspection.-

4.2.1 Lot.- All eductors of the same type and size offered for delivery at one time shall be considered a lot for purposes of quality conformance inspection.

4.2.2 Sampling for examination.- A random sample of eductors shall be selected from each lot in accordance with MIL-STD-105 at inspection level II for the examination of 4.2.4. The Acceptable Quality Level (AQL) shall be 2.5 percent defective.

4.2.3 Sampling for hydrostatic test.- A random sample of eductors shall be selected from each lot at inspection level II in accordance with MIL-STD-105 for the test of 4.2.5. If the number of defective eductors in any sample exceeds the acceptance number specified in MIL-STD-105 for the sample, the entire lot shall be tested, and all eductors failing the test shall not be offered for delivery.

4.2.4 Examination.-

4.2.4.1 An examination shall be made of the sample eductors selected in accordance with 4.2.2 to verify conformance with the requirements of this specification not involving tests.

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4.2.4.2 *A dimensional examination shall be made on the sample eductors selected in accordance with 4.2.2 to verify conformance with the approved drawings.*

4.2.5 **Hydrostatic test.**- Each of the sample eductors selected in accordance with 4.2.3, including the foot valve, when applicable, shall be hydrostatically tested at 150 percent of the driving fluid pressure for porosity and strength of casting. The pressure shall be applied for a period of 5 minutes during which time there shall be no leaking or sweating through the joints or casting. A slight leakage around the foot valve seat will be acceptable.

5. PREPARATION FOR DELIVERY**5.1 Domestic shipment and early equipment installation and for storage of onboard repair parts.****5.1.1 Eductors.**

5.1.1.1 **Preservation and packaging.**- Preservation and packaging shall be sufficient to afford adequate protection against corrosion, deterioration and physical damage during shipment from the supply source to the using activity and until early installation and may conform to the suppliers commercial practice when such meets these requirements.

5.1.1.2 **Packing.**- Packing shall be accomplished in a manner which will insure acceptance by common carrier at the lowest rate and will afford protection against physical or mechanical damage during direct shipment from the supply source to the using activity for early installation. The shipping containers or method of packing shall conform to the Uniform Freight Classification Rules and Regulations or other carrier regulations as applicable to the mode of transportation and may conform to the suppliers commercial practice when such meets these requirements.

5.1.1.3 **Marking.**- Shipment marking information shall be provided on interior packages and exterior shipping containers in accordance with the supplier's commercial practice. The information shall include nomenclature, Federal stock number or manufacturer's part number, contract or order number, supplier's name and destination.

5.1.2 Onboard repair parts.

5.1.2.1 **Packaging.**- The gaskets shall be packaged in accordance with method IC of MIL-P-116. The nozzle shall be packaged in accordance with method III of MIL-P-116.

5.1.2.2 **Packing.**- The repair parts shall be packed in accordance with 5.1.1.2.

5.1.2.3 **Marking.**- Onboard repair parts shall be marked in accordance with MIL-STD-129.

5.2 **Domestic shipment and storage or overseas shipment.**- The requirements, and levels of packaging, packing and marking for shipment shall be specified by the procuring activity (see 6.1).

5.2.1 (The following provides various levels for protection during domestic shipment and storage or overseas shipment, which may be required when procurement is made.)

5.2.1.1 Packaging.**5.2.1.1.1 Level A.**

5.2.1.1.1.1 Eductors shall be individually packaged in accordance with method III of MIL-P-116.

5.2.1.2 Packing.**5.2.1.2.1 Level A.**

5.2.1.2.1.1 Eductors shall be packed in boxes conforming to any of the following specifications at the option of the supplier:

PPP-B-636 - Type CF or SF, weather resistant class.

PPP-B-591 - Class II.

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5.2.1.2.2 Level B.-

5.2.1.2.2.1 Eductors shall be packed separately in boxes conforming to any of the following specifications at the option of the supplier:

- PPP-B-636 - Type CF or SF, domestic class.
- PPP-B-591 - Class I.

5.2.1.2.3 Level A or B.-

5.2.1.2.3.1 Cushioning, anchoring, blocking and bracing shall be in accordance with MIL-STD-1186. Box closure and stripping shall be in accordance with the applicable box specification or appendix thereto.

5.2.1.3 Marking.- In addition to any special marking required by the contract or order, or herein, interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129.

5.2.1.4 Drawings.- Drawings (see 3.11) shall be packaged, packed and marked for the level of shipment specified, in accordance with MIL-D-963.

6. NOTES

6.1 Ordering data.- Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type required (see 1.2).
- (c) When foot valve and strainer are required (see 3.5).
- (d) Whether cylindrical or flat plate strainer is required (see 3.5.1).
- (e) Types, sizes and pertinent details of end connections (see 3.6).
- (f) Eductor size (determined as being the same as the size of the discharge connection).
- (g) Operating requirements:
 - (1) Fluid or mixture to be handled.
 - (2) Driving fluid and driving fluid pressure.
 - (3) Rated suction lift (self priming).
 - (4) Rated discharge head.
 - (5) Rated suction capacity.
 - (6) Maximum permissible consumption of driving fluid.
- (h) Packaging, packing and marking requirements if other than those required by 5.1 (see 5.2).

6.2 Bid data.-

6.2.1 Drawings showing overall dimensions, material, performance data, and weight are to accompany bids.

Preparing activity:
Navy - SH
(Project 4420-N081SH)

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BUREAU OF SHIPS
WASHINGTON, D. C. 20360**

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SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-11004
INSTRUCTIONS		
This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).		
SPECIFICATION		
ORGANIZATION (of submitter)		CITY AND STATE
CONTRACT NO.	QUANTITY OF ITEM PROCURED	DOLLAR AMOUNT \$
MATERIAL PROCURED UNDER A		
<input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT		
1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?		
A. GIVE PARAGRAPH NUMBER AND WORDING.		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID		
3. IS THE SPECIFICATION RESTRICTIVE?		
<input type="checkbox"/> YES <input type="checkbox"/> NO IF "YES", IN WHAT WAY?		
4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)		
SUBMITTED BY (Printed or typed name and activity)		DATE