

MIL-V-3155C(SHIPS)  
 19 August 1964  
 SUPERSEDING  
 MIL-V-3155B(SHIPS)  
 19 February 1963  
 (see 6.4)

**MILITARY SPECIFICATION**  
**VALVE, TEMPERATURE REGULATING**  
**VENTILATION HEATER, STEAM CONTROL,**  
**NAVAL SHIPBOARD USE**

**1. SCOPE**

1.1 This specification covers thermostatic controlled steam valves for shipboard ventilation heaters. These valves are of the self-operated type, requiring no separate power source such as electricity or compressed air.

1.2 Classification. - Temperature regulating valves with combination of thermostat types shall be of the following models as specified (see 6.1).

Model G with weather (type W) thermostat  
                   with duct (type L) thermostat  
                   with room (type R) thermostat  
 Model E with type W thermostat  
                   with type L thermostat  
                   with type R thermostat  
 Model D with types W and L thermostat  
                   with types W and R thermostat

**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**

**MILITARY**

MIL-P-116 - Preservation, Methods of  
 MIL-R-196 - Repair Parts for Internal Combustion Engines, Packaging of  
 MIL-S-901 - Shock Tests, H. I. (High-Impact); Shipboard Machinery, Equipment  
                   and Systems, Requirements For.  
 MIL-D-963 - Drawings, Electrical, Hull and Mechanical Equipment for Naval Shipboard Use  
 MIL-F-1183 - Fittings, Tube, Cast Bronze, Silver-Brazing  
 MIL-Q-9858 - Quality Program Requirements

**STANDARDS**

**MILITARY**

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes

(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.

FSC 4820

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**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)**

- A276 - Hot Rolled and Cold Finished Corrosion Resisting Steel Bars
- B61 - Steam or Valve Bronze Castings
- B143 - Tin-Bronze and Leaded Tin-Bronze Sand Castings
- B260 - Brazing Filler Metal

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia 3, Pennsylvania.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

**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, New York.)

**3. REQUIREMENTS**

**3.1 Qualification.** - The temperature regulating valve furnished under this specification shall be a product which has been tested, and passed the qualification tests specified herein and has been listed on or approved for listing on the applicable qualified products list.

**3.2 Description.** -

**3.2.1 Temperature regulating valve.** - The temperature regulating valve consists of the basic valve body model, valve seat(s) and valve poppet(s) and the thermostat type(s) necessary to accomplish designated function.

**3.2.2 Thermostat.** - A thermostat consists of steam actuated bellows, union nut, armored capillary tubing and bulb.

**3.3 Materials.** -

**3.3.1 Materials used in the temperature regulating valve** shall be high grade, free from defects and suitable for the purpose intended.

**3.3.2 Silver brazing alloy or phosphorous copper brazing alloy** conforming to ASTM-B-260 shall be used for joints subjected to the temperature of live steam.

**3.3.3 Dissimilar metals.** - Associated materials shall be compatible under intended service conditions.

**3.4 Design.** -

**3.4.1 Temperature regulating valves** shall be designed so all interior parts of the valve can be removed for servicing without removing the valve body from the line including replacement of the thermostat.

**3.4.2 The valves** shall be intended for operation under shipboard shock (see 4.2.1).

**3.4.3 The physical dimensions and tolerances of the temperature regulating valve** shall conform to figure 1 for the models and sizes specified in tables I and II (see 6.1).

**3.4.4 Capacity of each model and size valve** based on a 35 pound per square inch gage (psig) inlet pressure and a 25 psi outlet pressure with the valve fully open shall be in accordance with tables I and II (see 6.1).

**3.4.5 The valves, except model D valve,** shall be operative by any of the thermostats specified in 3.4.7. The model D valve shall be operative by a combination of the W thermostat and the L or R thermostat (see 6.1).

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Table I - Models E and G valves sizes and capacities

Valves - Model and size number	Nominal pipe size (I. P. S.)	Capacity in pounds steam per hour	
		Minimum	Maximum
E-1/2	1/2	5	6.5
E-1	1/2	10	13
E-2	1/2	15	19
E-3	1/2	22	27.5
E-4	3/4	30	37.5
E-5	3/4	40	50
E-6	3/4	60	75
E-7	1	90	112.5
E-8	1	120	144
E-9	1-1/4	160	192
E-10	1-1/4	200	240
E-11	1-1/2	260	312
E-12	1-1/2	325	390
G-32	1-1/2	450	495
G-33	1-1/2	600	660
G-34	1-1/2	900	990

Table II - Model D valve sizes and capacities

Valve - Model and size	Nominal pipe size (I. P. S.)	Capacity in pounds steam per hour			
		Type W - Thermo		Type L or R Thermo	
		Minimum	Maximum	Minimum	Maximum
D-21	3/4	10	13	30	37.5
D-22	3/4	15	19	40	50
D-23	3/4	22	27.5	60	75
D-24	1	30	37.5	90	112.5
D-25	1	40	50	120	144
D-26	1-1/4	60	75	160	192
D-27	1-1/4	90	112.5	200	240
D-28	1-1/2	90	112.5	260	312
D-29	1-1/2	120	144	325	390

**3.4.6 Valve unit. -**

3.4.6.1 Valves shall be of the packless type. The use of stuffing boxes or packing glands on valve stems will not be permitted.

3.4.6.2 Valve bodies shall be made of bronze conforming to ASTM B 61 or Alloy 2A of ASTM B-143. Valves shall have union ends in accordance with MIL-F-1183 with pre-inserted rings.

3.4.6.3 Valve seats and poppets shall be of corrosion-resisting steel equal to that of type 303 of ASTM A-276 and shall be removable and replaceable. The poppets for types R and L thermostats shall have an orifice having throttling characteristics. The throttling characteristics shall be such that greater increments of valve poppet movement are required per pound of steam near the closed position than are required near the open position.

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**3.4.7 Thermostat.** - The steam flow of the valves shall be controlled by a bulb thermally responsive and connected to the steam operating bellows of the valve by a capillary tubing of the lengths specified in 3.4.9.1.

**3.4.7.1** The thermostat shall be connected to the basic valve body by a ring nut and shall be interchangeable as specified in table III.

Table III - Interchangeability of thermostats

Model of valves	Sizes
E	1/2 through 1
E	2 through 7
E	8 through 12
D	21 through 24
D	25 through 29
G	32 through 34

**3.4.7.2** Each thermostat shall be subjected to an air temperature of not less than 180°F. for not less than 72 continuous hours without detrimental effect to any part of the element.

**3.4.7.3 Type W thermostat.** - The thermostat shall be non-adjustable and shall be set at the factory to be fully open in a 35°F. ambient temperature.

**3.4.7.4 Types L and R thermostat.** - The thermostats shall be provided with a dial adjustment graduated in degrees F. and means shall be provided for locking the dial at any set point within the operating ranges specified in table IV.

Table IV - Thermostat ranges

Type	Range °F
L	40 to 100
R	60 to 80

**3.4.7.4.1** A one-degree change in either direction of the thermostat set point of the ambient air temperature shall be sufficient to start the valve poppet through its operating stroke and the operating stroke shall be sufficient to insure complete throttling or modulating operation. The throttling range between fully open and fully closed shall not exceed 6°F.

**3.4.7.4.2** The thermostats shall be capable of operating the valve controlled from fully open to fully closed with a change in air temperature at the thermostat bulb of not more than plus or minus 3°F from the thermostat set point.

**3.4.8 Bellows.** - Bellows shall be of the seamless type. The operating bellows of the steam valve shall be made of nickel-copper or of phosphor-bronze and shall be protected from direct steam impingement by a shield.

**3.4.9 Capillary tubing.** - The capillary tubing shall be covered throughout the entire length with an armor to provide physical protection. Armor shall be brass, bronze or corrosion-resisting steel so constructed that the flexibility of the tubing will not be excessively reduced.

**3.4.9.1** The length of the capillary tubing between the bulb and operating bellows shall be 10 feet for type L and type W thermostats and 25 feet for type R thermostat.

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**3.4.10 Bulbs. -**

**3.4.10.1 Thermostat bulbs** shall be constructed of brass or copper and the bulb lengths shall not exceed that shown on figure 2.

**3.4.10.2 Bulbs** shall have means for mounting similar to that shown on figure 2 and the mounting frame or flange shall be drilled for mounting fasteners.

**3.5 Manually operable element. -** When specified (see 6.1) a manually operable control element capable of being inserted in the valve body instead of a thermostat shall be furnished. The element shall be capable of manually controlling the flow of steam from closed position to fully open, and shall have an index marking when practicable to show the relative position of the valve poppet with respect to its seat.

**3.6 Bulkhead stuffing box. -** When specified (see 6.1), a bulkhead stuffing box for passing the capillary tubing through watertight bulkheads or decks shall be provided. The stuffing box shall be constructed of brass and shall be in accordance with figure 3.

**3.7 Onboard repair parts. -** When specified (see 6.1) onboard repair parts shall be furnished in accordance with table V.

Table V - Onboard repair parts

Repair parts	Quantity					
	Total number of identical parts installed per ship					
	1-10	11-20	21-30	31-40	41-50	Over 50
Thermostats	1	2	3	4	5	6
Seats and poppets	1	3	5	7	9	11
Manual shut-off elements and operating wrenches if required	1	1	2	2	3	3

**3.8 Identification and marking. -**

**3.8.1 Identification plate. -** Each valve shall be provided with a metal identification plate, attached to an exposed position that normally will not be covered by insulation. The identification plate shall contain the following information:

- (a) Item name (thermostat type)
- (b) Valve size and number
- (c) Federal stock number
- (d) Component identification number (CID)
- (e) Manufacturer's name
- (f) Manufacturer's address

**3.8.2 Body marking. -** The valve size, manufacturer's name and the direction of flow indicated by an arrow or similar means shall be cast or otherwise permanently marked on the valve body.

**3.9 Drawings. -** Drawings delineating the equipment shall be furnished in accordance with class B and class C of MIL-D-963 and as specified herein. Class C drawings are not to be titled to show application to particular ships or purchase orders.

**3.9.1 Assembly drawings. -** Assembly drawings shall be provided and shall indicate overall dimensions and dimension tolerances plus supplemental data as necessary to permit shipyard installation without the

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supplier's assistance. The drawings shall illustrate the detail of design and construction, identify each part and its location and the total weight of the assembled temperature regulating valve. Where necessary to show compliance with specification detail drawings shall be added to the assembly drawing.

**3.9.2 Certification data.** - Certification data shall be furnished for approval by the purchasing activity.

**3.10 Workmanship.** - Temperature regulating valves shall be free from defects that affect their appearance or their operation. Castings shall be clean, sound and free from blow holes, hard spots, porosity, cracks and other injurious defects. They shall be smooth and well cleaned, both inside and outside, and all fins and roughness shall be removed. Castings shall not be repaired, plugged, impregnated, brazed or burned. The workmanship shall be first class in every respect.

#### **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.

**4.1.1 Quality program requirements.** - The supplier shall provide and maintain a quality program acceptable to the Government for the equipment covered by this specification. The program shall be in accordance with MIL-Q-9858 supplemented as specified in 4.1.1.1.

**4.1.1.1 Initial quality planning.** - Procedures shall be assembled in manual form and shall indicate organization and responsibility for control of quality.

**4.2 Qualification tests<sup>1/</sup>.** - Qualification tests shall be conducted on each model temperature regulating valve at a laboratory satisfactory to the Bureau of Ships. These tests shall consist of the tests specified in 4.2.1, 4.2.2 and 4.6.

**4.2.1 High impact shock test.** - Each type of thermostat and the largest size of each model temperature regulating valve shall be shock tested as specified for type A, class I of MIL-S-901. The test shall be conducted prior to the performance tests (see 4.2.2) and the quality conformance tests (see 4.6). Evidence of fragmentation or missile effect of parts and deformation of parts that will cause active interference between parts shall be cause for rejection.

**4.2.2 Performance tests.** - Performance tests shall be conducted on one temperature regulating valve of each model, size and type of thermostat(s) as specified in 4.2.2.1 through 4.2.2.4, inclusive and shall be made with dry saturated steam at a pressure of not less than 34 psig nor more than 36 psig at the valve inlet.

**4.2.2.1 Valve capacity** shall be determined with a 25 psig back pressure at the valve outlet and with the valve fully open.

**4.2.2.2 Valve opening point temperature** shall be determined with the thermostats set at any setting within the adjustment range and then the temperature at the thermostats shall be lowered to 1°F. below the opening point to determine that there is a definite increase in the flow of steam.

**4.2.2.3 Valve closing point temperature** shall be determined with the thermostats set at any setting within the adjustable range and then the temperature at the thermostats shall be increased 1°F. above the closing point to determine that valve will close fully and is steamtight.

**4.2.2.4** With a 25 psig back pressure at the valve outlet the rate of condensate shall be measured when the temperature at the thermostat is 1°F., 2°F., and 3°F. below the opening point of the control valve.

<sup>1/</sup> Application for Qualification Tests shall be made in accordance with "Provisions Governing Qualification" (see 6.2 and 6.3).

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**4.3 Design change check test.** - When design changes are approved by the Bureau of Ships for a particular size and model of valve or type of thermostat which has been qualified which may alter the performance of the temperature regulating valve, tests specified in 4.2.2 shall be conducted on that size and model valve on the first item produced under the contract or order.

**4.4 Sampling for quality conformance inspection.** -

**4.4.1 Lot.** - All temperature regulating valves of the same size and model and with the same type of thermostat(s) offered for delivery at one time shall be considered a lot.

**4.4.2 Sampling for examination.** - A random sample of valves shall be selected from each lot for the examination specified in 4.5 with quality conformance based on the sampling requirements of MIL-STD-105, at inspection level III. The acceptable quality level is 1.0 percent defective.

**4.5 Examination.** - Each of the sample temperature regulating valves selected in accordance with 4.4.2 shall be examined and measured to verify compliance with the requirements of this specification not requiring tests. The classification of possible defects in table VI is the minimum that is to be considered in the examination.

Table VI - Classification of possible defects in accordance with MIL-STD-105

Categories	Defects
<b>Critical:</b> 1	None defined.
<b>Major:</b> 101 102 103 104 105  106 107 108 109 110	Model and size of valve not as specified, or not packless type. Thermostat damaged or not the specified model. Materials defective or not as specified. Operating bellows damaged or not protected as specified. Failure to provide for easy removal of thermostat and replacement by manually operable element. Union connections (inlet and outlet) damaged or not as specified. Thermostat capillary tubing kinked or not protected by armor. Thermostat mounting facilities or not as specified. Thermostat dial adjustment damaged or not provided with a means of locking at any setting in the operating range (types L and R thermostats only). Valve incomplete, parts missing or damaged.
<b>Minor:</b> 201	Marking, manufacturer's name or trademark missing, not permanent, illegible or not as specified.

**4.6 Quality conformance tests.** - Quality conformance tests shall consist of the tests specified in 4.6.1 through 4.6.3.

**4.6.1 Pressure test (valves).** - Each valve body shall be tested with 150 psig air pressure while immersed in water or 150 psig hydrostatic pressure with the valve open, to test the strength of the body and detect porosity. Visible deformation or porosity or other signs of weakness shall be cause for rejection.

**4.6.2 Thermostat control point test.** - Each type L and each type R thermostat shall be tested to determine whether the fully open and fully closed points are within specified limits when thermostats are set at the mid-position of their adjustable temperature range.

**4.6.2.1** Each type W thermostat shall be tested to determine whether the fully open point is as specified.



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**4.6.3 Leakage test.** - The valve seats and poppets of each temperature regulating valve shall be tested to determine the tightness and resistance to leakage at a minimum steam pressure of 50 psig on the inlet side of the valve and the outlet side open to the atmosphere. The test for valves with L or R thermostat shall be made with the thermostat set the mid-position of the adjustable range in an ambient temperature from 30° to 60°F. above the set point.

**5. PREPARATION FOR DELIVERY****5.1 Domestic shipment and early equipment installation and for storage of onboard repair parts. -****5.1.1 Temperature regulating valves and thermostats. -**

**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. Preservation and packaging may conform to the supplier's 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 contractor's commercial practice. The information shall include nomenclature, contract or order number, contractor's name and destination.

**5.1.2 Onboard repair parts.** - Onboard repair parts shall be preserved and packaged level A and packed level C in accordance with MIL-R-196, as applicable. Items not covered therein shall be unit protected or packaged in accordance with the guidelines of MIL-P-116. Items shall be individually packaged, except when used in sets.

**5.1.2.1** The following information shall be shown on outside of the container of each repair part(s) packaged as a unit: name of part(s) stock number, CID number, model and size of valves on which the part may be used and manufacturer's name.

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

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

**5.2.1.1 Preservation and packaging. -****5.2.1.1.1 Temperature regulating valves and thermostats. -**

**5.2.1.1.1.1 Level A.** - Temperature regulating valves shall be unit protected and packaged in accordance with method III of MIL-P-116. All openings in the valve shall be sealed with metal or plastic plugs. Thermostats shall be cushioned to prevent damage during handling, shipment and storage. Cushioning material shall conform to PPP-P-291 or PPP-C-843 and secured in place with gummed paper tape conforming to VV-T-116 or equivalent. Each valve shall be provided with a waterproof cover fabricated from barrier-material conforming to UU-P-271 or minimum 0.003 inch thick polyethylene. Covers shall be sealed with tape as specified herein.

**5.2.1.1.1.2 Level C.** - Preservation and packaging shall be sufficient to afford adequate protection against corrosion, deterioration and physical damage during shipment from the supply source to the first receiving activity for immediate use. This level may conform to the supplier's commercial practice when such meets the requirements of this level.



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**5.2.1.2 Packing. -**

**5.2.1.2.1 Level A. -** Each temperature regulating valve, packaged as specified in the contract or order, shall be packed for overseas shipment in containers conforming to any one of the following specifications at the option of the supplier:

<u>Specification</u>	<u>Type or Class</u>
PPP-B-591	Class II
PPP-B-601	Overseas type
PPP-B-621	Class 2
PPP-B-636	Class 2

When required by the applicable container specification, shipping containers shall have caseliners conforming to MIL-L-10547. Caseliners shall be closed and sealed in accordance with the appendix to MIL-L-10547. Caseliners for fiberboard boxes, PPP-B-636 may be omitted provided all center and edge seams and manufacturer's joints are sealed and waterproofed with pressure sensitive tape in accordance with PPP-B-636. Shipping containers shall be closed, strapped or banded in accordance with the applicable box specification or appendix thereto. The gross weight of wood or wood-cleated boxes, shall not exceed 200 pounds; fiberboard boxes shall not exceed the weight limitations of the applicable fiberboard box specification. Fiberboard boxes conforming to class 2 of PPP-B-636 closed, sealed and banded as specified herein may be used as the shipping container.

**5.2.1.2.2 Level B. -** Each temperature regulating valve packaged as specified in the contract or order, shall be packed for domestic shipment and storage in containers conforming to any one of the following specifications at the option of the supplier:

<u>Specification</u>	<u>Type or Class</u>
PPP-B-591	Class I
PPP-B-601	Domestic
PPP-B-621	Class 1
PPP-B-636	Class 1

Shipping containers shall be closed in accordance with the applicable box specification or appendix thereto. The gross weight of wood or wood-cleated boxes shall not exceed 200 pounds; fiberboard boxes shall not exceed the weight limitations of the applicable fiberboard box specification. Fiberboard boxes conforming to PPP-B-636 closed as specified herein may be used as the shipping container.

**5.2.1.2.3 Level C. -** Each temperature regulating valve packaged as specified in the contract or order, shall be packed in containers, at the lowest rates, in a manner which will insure acceptance by the common carrier and will afford protection against physical or mechanical damage during direct shipment from the supply source to the first receiving activity for immediate use. This level in general shall conform to the Uniform Freight Classification Rules and Regulations or other carrier regulations as applicable to the mode of transportation and may be the supplier's commercial practice when such meets the requirements of this level.

**5.2.1.3 Repair parts. -** Repair parts shall be packed level A or B as specified in accordance with MIL-R-196, as applicable.

**5.2.1.4 Marking. -** In addition to any special marking required, interior packages and exterior shipping containers shall be marked for shipment in accordance with MIL-STD-129 and the applicable packaging specification.)

**6. NOTES**

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

- (a) Title, number and date of this specification.

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- (b) Model of valves and types of thermostats required (see 1. 2).
- (c) Valve model and size and type of thermostat required (see 3. 4. 3, 3. 4. 4 and 3. 4. 5).
- (d) Manually control element required (see 3. 5).
- (e) When bulkhead stuffing box is required (see 3. 6).
- (f) Onboard repair parts required (see 3. 7).
- (g) Preservation, packaging, packing and marking requirements other than those required by 5. 1 (see 5. 2).

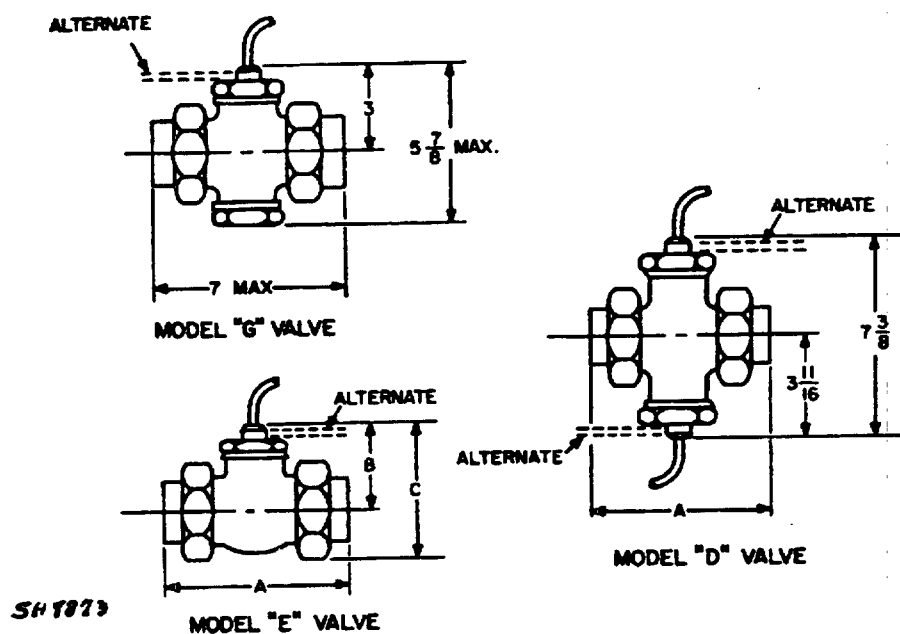
6. 2 With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved for inclusion in Qualified Products List QPL 3155, whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification, in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the qualified products list is the Bureau of Ships, Department of the Navy, Washington, D. C. 20360 and information pertaining to qualification of products may be obtained from that activity. Application for Qualification Tests shall be made in accordance with "Provisions Governing Qualification" (see 6. 3).

6. 3 Copies of "Provisions Governing Qualification" may be obtained upon application to Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania.

6. 4 **CHANGES FROM PREVIOUS ISSUE.** THE EXTENT OF CHANGES (DELETIONS, ADDITIONS, ETC.) PRECLUDE THE ANNOTATION OF THE INDIVIDUAL CHANGES FROM THE PREVIOUS ISSUE OF THIS DOCUMENT.

° Preparing activity:  
Navy - Ships  
(Project 4820-N134Sh)

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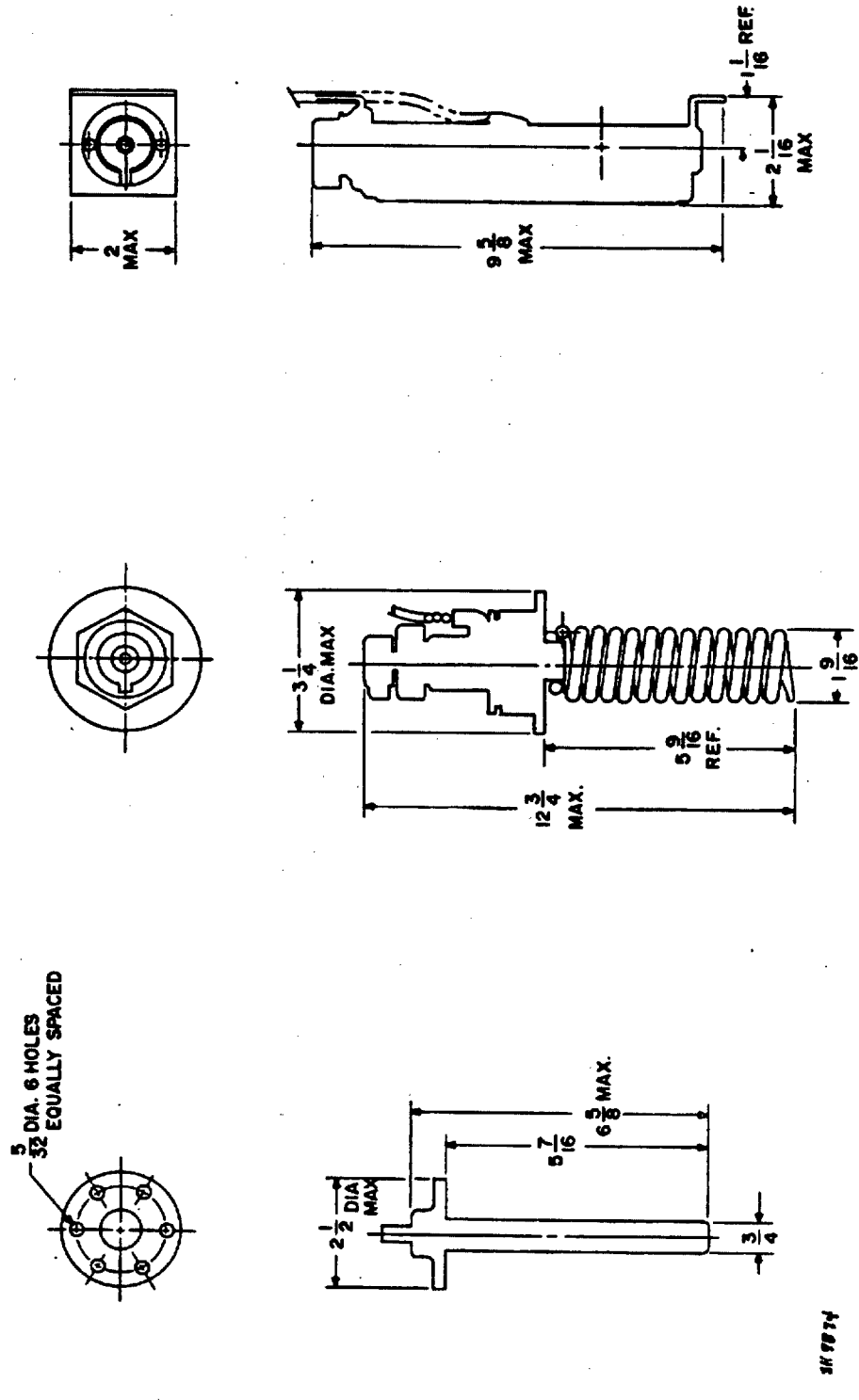


Valves-Model and Size Number	Dimensions in Inches (Maximum)		
	A	B	C
E 1/2	4 7/8	2 5/8	3 5/8
E 1	4 7/8	2 5/8	3 5/8
E 2	6	3 1/4	4 1/4
E 3	6	3 1/4	4 1/4
E 4	6 3/8	3 1/4	4 7/16
E 5	6 3/8	3 1/4	4 7/16
E 6	6 3/8	3 1/4	4 7/16
E 7	6 1/16	3 1/4	4 5/8
E 8	6 1/16	3 1/4	4 5/8
E 9	6 1/2	3 1/8	4 13/16
E 10	6 1/2	3 1/8	4 13/16
E 11	7	3 1/8	5
E 12	7	3 1/8	5

Valves-Model and Size Number	Dimensions in Inches (Maximum)
	A
D-21	6 1/2
D-22	6 1/2
D-23	6 1/2
D-24	6 1/8
D-25	6 1/8
D-26	7
D-27	7
D-28	7 1/2
D-29	7 1/2

Figure 1 - Valve Dimensions

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"R" THERMOSTAT

"L" THERMOSTAT

"W" THERMOSTAT

FIGURE 2- THERMOSTAT DIMENSIONS

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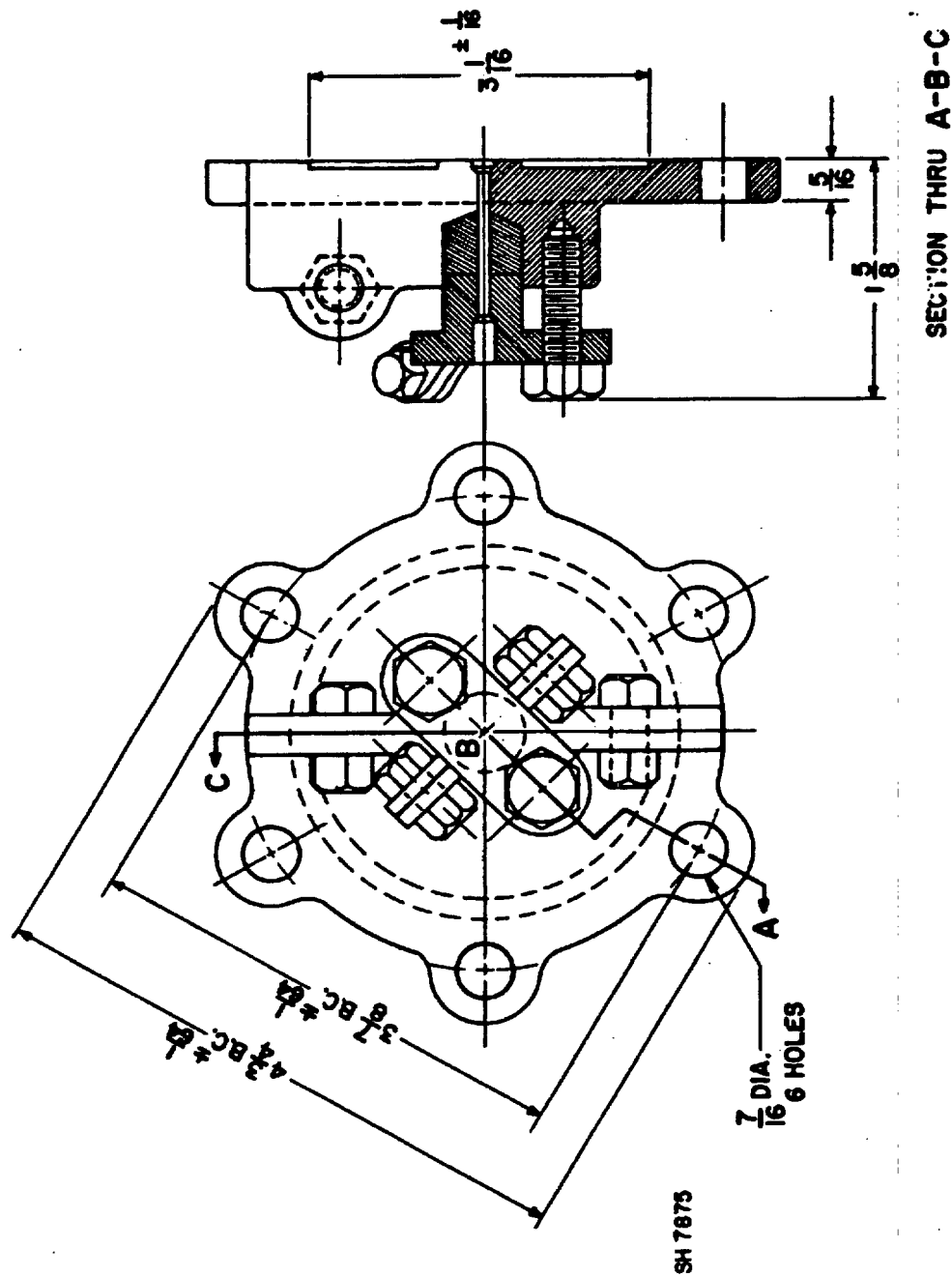


FIGURE 3 BULKHEAD STUFFING BOX