

MIL-V-18499E
4 October 1985
SUPERSEDING
MIL-V-18499D
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MILITARY SPECIFICATION

VALVES, AIR VENTING, STEAM

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

1. SCOPE

1.1 Scope. This specification covers valves for automatically venting air from mains in steam heating systems.

1.2 Classification. Valves shall be one of the following types and classes, as specified (see 6.2):

Type I - Without vacuum holding device.

Type II - With vacuum holding device.

Class 1 - Low pressure (up to 15 pound-force per square inch gage (psig)).

Class 2 - Medium pressure (16 to 65 psig).

Class 3 - High pressure (66 to 125 psig).

* 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specification and standards. The following specification and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer (Code 156), Naval Construction Battalion Center, Port Hueneme, CA 93043, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
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SPECIFICATION

MILITARY

MIL-V-3 - Valves, Fittings, and Flanges (Except for Systems Indicated Herein), Packaging of.

STANDARDS

FEDERAL

FED-STD-H28 - Screw-Thread Standards for Federal Services.

MILITARY

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

* (Copies of specifications, standards, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

* 2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

MANUFACTURERS STANDARD SOCIETY OF THE VALVE AND FITTINGS INDUSTRY, INC.
(MSS)

SP-25 - Standard Marking System for Valves, Fittings, Flanges and Unions.

(Application for copies should be addressed to the Manufacturers Standardization Society of the Valve and Fittings Industry, Inc., 1815 North Fort Myer Drive, Arlington, VA 22209.)

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

* 2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets, or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

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3. REQUIREMENTS

3.1 Description. The type I air venting valve shall consist of a body, float, thermostatic element, vent, valve needle, and seat. The type II air venting valve shall consist of a body, float-thermostatic element or thermostatic element, vent, valve needle, seat, and a vacuum holding device.

3.2 First article. When specified (see 6.2), the contractor shall furnish a valve for first article inspection and approval (see 4.2.1 and 6.5).

3.3 Standard commercial product. The valve shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer's standard commercial product, shall be included in the valve being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model.

3.4 Interchangeability. All valves of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to insure interchangeability of component parts, assemblies, accessories, and spare parts.

3.5 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this specification unless otherwise specified.

3.6 Design. The air venting valves shall be designed for use on steam systems where both steam and condensate may be present. The valves shall be designed to vent air from the steam mains and return lines and to close automatically against steam or condensate. (Class 2 and 3 valves will close against condensate if it is above 10 degrees Fahrenheit (°F) below saturation temperature for a respective pressure.) Type II valves shall also be designed to prevent the return of air through the valve to the system when under vacuum. The design of the valves shall be such as to prevent conditions hazardous to personnel. Threads shall be in accordance with FED-STD-H28. The drop-away pressure (valve operating pressure), as specified herein, shall be

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interpreted as the maximum pressure at which the valve will function (open and close) to relieve air. For class 1 valves, the drop-away pressure shall be at least 2 psig. Unless otherwise specified (see 6.2), for class 2 and class 3 valves, the maximum pressure at which the valve will function (open) to relieve air, shall be in accordance with the manufacturer's standard practice. In addition, valves shall be designed to withstand the maximum system steam pressure of 15, 65, or 125 psig, as applicable, without affect on the operation of the valve when the system pressure falls to the specified drop-away pressure.

3.7 Performance. The valves shall be capable of eliminating air from steam systems up to the applicable drop-away pressure specified in 3.6 without leakage or chattering. Valves shall close against the surges of condensate into the valve to prevent escape of condensate. When the condensate recedes, the valve port shall open. When displacement of air with steam occurs, the thermostatic element of the valve shall respond to close the port and prevent escape of the steam or condensate. The valve operating cycle, for type I valves, shall repeat whenever the pressure in the system falls to the specified drop-away pressure and air has been inducted into the system.

3.7.1 Capacity. The air discharge capacity of the valves furnished under this specification shall be established in accordance with one of the following options, as exercised by the acquiring activity in the contract or order (see 6.2):

- a. Capacity, in volume of air per minute at the specified pressure differential, and at standard conditions (14.7 pound-force per square inch atmospheric pressure absolute, 60°F) as stipulated by the acquiring activity.
- b. Capacity to be the manufacturer's standard published rating for valves having the connection size specified in 3.8.1.

3.8 Construction.

3.8.1 Body. The body shall be of cast iron (class 1 only), cast steel, cast brass, steel or brass forging, drawn steel or drawn brass at the option of the contractor unless a particular body material is specified (see 6.2). The body shall be of the vertical pattern. Unless smaller sizes are specified (see 6.2), class 1 and class 2 valves shall be furnished with either 3/4-inch male connections or 3/4-inch male by 1/2-inch female connections in accordance with figure 1. Connection sizes for class 3 valves shall be as specified (see 6.2). Connections shall be threaded with American Standard taper pipe threads, in accordance with FED-STD-H28.

3.8.2 Float. The float shall be bell, ball, or cylindrically shaped and shall be fabricated of nonferrous metal. Inverted, open type floats may be used for class 2 and class 3 valves, at the option of the manufacturer. All floats shall be sized and arranged to prevent discharge or condensate.

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3.8.3 Thermostatic element. The thermostatic element may be integral with the float, or a separate diaphragm or bellows may be used in conjunction with the float. The thermostatic element shall operate by pressure variations of a temperature-activated medium sealed inside the element causing the element to expand and close the port when steam enters the valve, and to contract and open the port when cooling occurs.

3.8.4 Vent. The vent shall be located in the highest part of the valve body and shall be of the nonadjustable design.

3.8.5 Valve needle and seat. The valve needle and seat shall be of corrosion-resistant material. The seat shall be designed to insure proper seating of the valve needle.

3.8.6 Vacuum holding device. Type II valves shall be equipped with a suitable automatic device for holding the vacuum. The device shall operate quickly and effectively during the formation of the vacuum, and shall hold a seal for vacuums normally encountered in tight, one-pipe, vapor-vacuum systems. The device shall release without sticking when the pressure in the system rises above zero psig.

3.9 Finish. The exterior surfaces of the valves fabricated with brass bodies may be the natural finish produced by the casting, forging, or drawing process, or may be plated. Exterior surfaces of valves with cast iron or steel bodies shall be treated and painted or plated in accordance with the manufacturer's standard practice. When specified (see 6.2), exterior surfaces shall be chromium-plated or nickel-plated.

3.10 Identification marking. Each valve shall be marked in accordance with MSS SP-25.

3.11 Workmanship.

3.11.1 Steel fabrication. The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to insure uniformity of size and shape.

3.11.2 Castings. All castings shall be sound and free from patching, misplaced coring, warping, or any other defect which reduces the castings ability to perform its intended function.

3.11.3 Bolted connections. Boltholes shall be accurately punched or drilled and shall have the burrs removed. Washers or lockwashers shall be provided in accordance with good commercial practice, and all bolts, nuts, and screws shall be tight.

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4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by 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 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.2.1).
- b. Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. The first article inspection shall be performed on one valve, when a first article is required (see 3.2 and 6.2). This inspection shall include the examination of 4.4 and the tests of 4.5. The first article may be either a first production item or a standard production item from the supplier's current inventory provided the item meets the requirements of the specification and is representative of the design, material, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.4, the tests of 4.5, and the packaging inspection of 4.6 when applicable; this inspection shall be performed on the samples selected in accordance with 4.6.

* 4.3 Sampling. Sampling and inspection procedures shall be in accordance with MIL-STD-105. The unit of product shall be one valve. All valves offered for delivery at one time shall be considered a lot for the purpose of inspection. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units, and resubmit for a complete reinspection. Resubmitted lots shall be reinspected using tightened inspection. If the rejected lot was screened, reinspection shall be limited to the defect causing rejection. If the lot was reprocessed, reinspection shall be performed for all defects. Rejected lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.3.1 Sampling for examination. Examination shall be based on inspection level II and an Acceptable Quality Level (AQL) of 2.5 percent defective for major defects and 4.0 percent defective for minor defects.

4.3.2 Sampling for tests. Tests shall be based on inspection level S-2 and an AQL of 4.0 percent defective.

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4.3.2 Sampling for tests. Tests shall be based on inspection level S-2 and an AQL of 4.0 percent defective.

4.4 Examination. First article, when furnished, and each sample selected in accordance with 4.3.1 shall be examined for compliance with the requirements specified in section 3 of this specification. Examination shall be conducted as specified in table I.

TABLE I. Classification of defects (MIL-STD-105).

Classification	Defects
Major:	
101	Material not as specified or of an inferior quality affecting serviceability, and maintainability.
102	Parts missing.
103	Threads not as specified.
104	Threads damaged.
105	Body shell deformed.
106	Blow holes, shrinkage, or cracks in casting.
Minor:	
201	Plating, if required, partially missing or blistered.
202	Heavy scratch or burr.
203	Sharp edges or corners.
204	Identification marking omitted.

4.5 Tests.

4.5.1 Hydrostatic test. Valve bodies shall be tested hydrostatically, pneumatically, or with steam to a pressure 50 percent above the maximum rated system steam pressure (see 1.2).

4.5.2 Operation test. Type I and type II valves shall be tested both with saturated steam and condensate to determine conformance to 3.6 and 3.7. During the tests the valve shall effectively prevent the discharge of steam or condensate through the vent port, and shall be closed at rated pressure during the steam test.

4.5.3 Vacuum test. Type II valves shall also be tested under specified vacuum conditions. Valves shall be capable of allowing the vacuum to form, of holding the vacuum, and of opening readily when the pressure rises above zero psig.

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4.6 Packaging inspection. The preservation-packaging, packing, and marking of the valves shall be inspected to determine compliance with the requirement of MIL-V-3.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging, packing, and marking. Preservation, packaging, packing, and marking shall be in accordance with the requirements of MIL-V-3 with the level of preservation and packaging and the level of packing as specified (see 6.2).

6. NOTES

6.1 Intended use. The air-venting valves covered by this specification are intended primarily for venting mains in one-pipe and two-pipe gravity steam heating systems. The valves may also be used for venting unit heaters and systems supplying steam to process equipment, and steam-heated galley equipment. Type I valves are used in systems operating at or above atmospheric pressure. Type II valves are intended primarily for use in one-pipe vapor-vacuum systems. Class 3 valves are intended for special applications not associated with gravity steam-heating systems.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type and class required (see 1.2).
- c. When a first article sample is required for first article inspection and approval (see 3.2, 4.2.1, and 6.5).
- d. When a specific drop-away pressure is required for class 2 and class 3 valves (see 3.6).
- e. Valve capacity required (see 3.7.1).
- f. When a particular body material is required (see 3.8.1).
- g. When connection sizes smaller than 3/4 inch are required for class 1 and class 2 valves; connections required for class 3 valves (see 3.8.1).
- h. When chromium- or nickel-plating is required (see 3.9).
- i. Level of preservation-packaging and level of packing required (see 5.1).

6.3 Definitive specification part number. The specification part number is a definitive part number which corresponds to the types and classes of valves covered by this specification and defines the requirements or options presented under this specification. The specification number, and the type and class code number are combined to form the definitive specification part number.

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6.3.1 Cataloging data. For cataloging purposes, part numbers for the valves are assigned as follows:

<u>M18499 - X</u>	
Specification part number _____	
Type and class code number (see 6.2) _____	

6.3.2 Type and class. The type and class of the valve (see 3.6) are identified by a single digit number (see table II).

TABLE II. Code number to type and class.

	Class I (Low pressure)	Class II (Medium pressure)	Class III (High pressure)
Type I (Without vacuum holding device)	1	2	3
Type II (With vacuum holding device)	4	5	6

* 6.4 Data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL) and invokes the provisions of DoD Federal Acquisition Regulations (FAR) Supplement 27.410-6, the data requirements will be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL (DD Form 1423) incorporated into the contract. When the provisions of DoD FAR 27.410-6 are not invoked, the data shall be delivered in accordance with the contract requirements.

6.5 First article. When a first article inspection is required, the item will be tested and should be a first article sample or it may be a standard production item from the contractor's current inventory as specified in 4.2.1. The first article should consist of one unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.6 Changes from previous issue. The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

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1. DOCUMENT NUMBER MIL-V-194994E		2. DOCUMENT TITLE VALVES, AIR VENTING, STEAM	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)	
b. ADDRESS (Street, City, State, ZIP Code)		<input type="checkbox"/> VENDOR	
		<input type="checkbox"/> USER	
		<input type="checkbox"/> MANUFACTURER	
		<input type="checkbox"/> OTHER (Specify): _____	
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	