

INCH-POUND
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SUPERSEDING  
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## MILITARY SPECIFICATION

### VALVE, PRESSURE EQUALIZING, GASEOUS PRODUCTS

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

#### 1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers low pressure equalizing,  
gaseous product valves for use in shipping containers.

1.2 Classification. Unless otherwise specified, relief valves  
shall be of the following types and reseal pressures (see 6.2).

##### Type I - Vacuum Relief.

Reseal Pressure	1/2 psi (3.4 kPa)
Reseal Pressure	1 psi (6.9 kPa)
Reseal Pressure	2 psi (13.8 kPa)
Reseal Pressure	3 psi (20.7 kPa)

##### Type II - Pressure Relief.

Reseal Pressure	1/4 psi (1.7 kPa)
Reseal Pressure	1/2 psi (3.4 kPa)
Reseal Pressure	1 psi (6.9 kPa)
Reseal Pressure	2 psi (13.8 kPa)
Reseal Pressure	3 psi (20.7 kPa)
Reseal Pressure	5 psi (34.5 kPa)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to the Air Force Packaging Evaluation Activity, HQ AFLC/LGTP, Wright- Patterson AFB, OH 45433-5540, by using the self-addressed Standardization Documentation Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
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AMSC N/A

FSC 4820

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## Type III - Pressure and Vacuum Relief.

Reseal Pressures	1/2 psi (3.4 kPa) Pressure, 1/2 psi (3.4 kPa) Vacuum
Reseal Pressures	1 psi (6.9 kPa) Pressure, 1/2 psi (3.4 kPa) Vacuum
Reseal Pressures	1 psi (6.9 kPa) Pressure, 1 psi (6.9 kPa) Vacuum
Reseal Pressures	1 1/2 psi (10.4 kPa) Pressure, 1 1/2 psi (10.4 kPa) Vacuum
Reseal Pressures	2 psi (13.8 kPa) Pressure, 1 psi (6.9 kPa) Vacuum
Reseal Pressures	2 psi (13.8 kPa) Pressure, 2 psi (13.8 kPa) Vacuum
Reseal Pressures	3 psi (20.7 kPa) Pressure, 2 psi (13.8 kPa) Vacuum
Reseal Pressures	5 psi (34.5 kPa) Pressure, 2 psi (13.8 kPa) Vacuum

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1. Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

## SPECIFICATIONS

Federal

ZZ-R-765	Rubber, Silicone
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Military

MIL-T-31000	Technical Data Packages, General Specification for
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## STANDARDS

Federal

FED-STD-H28	Screw-Thread Standards for Federal Services
FED-STD-101	Test Procedures for Packaging Materials

Military

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

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MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-810	Environmental Test Methods and Engineering Guidelines
MIL-STD-831	Test Reports, Preparation of
MIL-STD-889	Dissimilar Metals
MIL-STD-970	Standards and Specifications, Order of Preference for the Selection of
MIL-STD-2073-1	DoD Materiel Procedures for Development and Application of Packaging Requirements
MIL-STD-45662	Calibration Systems Requirements

(Unless otherwise indicated, copies of federal and military specifications, standards and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Y14.5M Dimensioning and Tolerancing for Engineering Drawing

(Application for copies of ANSI Y14.5M should be addressed to American National Standards Institute, 11 West 42nd Street, New York, NY 10036.)

ASTM

D 3951 Standard Practice for Commercial Packaging

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103-1137.)

(Non-Government standards and other publications are normally available from the organizations that prepare or 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 document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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## 3. REQUIREMENTS

3.1 First article. When specified (see 6.2), or if recovered or recycled materials are used (see 3.3), a sample shall be subjected to first article inspection (see 6.2) in accordance with 4.4.

3.2 Selection of specifications and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-970 except as specified in 3.2.1 and 3.2.2.

3.2.1 Commercial parts. Commercial parts having suitable properties may be used where, on the date of invitation for bids, there are no suitable standard parts. In any case, commercial utility parts, such as screws, bolts, nuts, and cotter pins, having suitable properties may be used provided:

a. They can be replaced by the standard parts (MS or AN without alteration).

b. The corresponding standard part numbers are referenced in the parts list and, if practicable, on the contractor's drawings.

3.2.2 AN and MS standard parts. With the exception specified in 3.2.1, AN and MS standard parts shall be used where they suit the purpose. They shall be identified on the drawings by their part numbers.

3.2.3 Part numbering of interchangeable parts. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The item identification and part number requirements of MIL-T-31000 (see 6.2) shall govern manufacturer's part numbers and changes thereto.

3.3 Materials. All materials shall be as specified herein. Materials not specified shall be of the best quality used for the purpose in commercial practice. The materials shall be free from all defects or imperfections that might affect the serviceability of the finished product. Recovered or recycled materials may be used provided the end product is capable of passing the first article tests.

3.3.1 Metals. Metals shall be of the corrosion-resistant type or suitably treated to resist corrosion or atmospheric conditions likely to be met in storage or normal service. MIL-STD-889 shall be utilized to determine compatibility of metals from which the valves are fabricated.

3.3.2 Protective treatment. When materials used in the construction of the valves are subject to deterioration when exposed to climatic and environmental conditions likely to occur during service usage, they shall be protected against such

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deterioration in a manner that will in no way prevent compliance with the performance requirements of this specification. The use of any protective coating that will crack, chip, or scale with age or extremes of climatic and environmental conditions shall be avoided. Protective treatments used shall be non-hazardous and environmentally safe.

3.3.3 Non-Metals. When utilized, non-metallic parts such as packings, interior gaskets, and valve seats shall be of the oil-resistant type.

3.3.4 Exterior Gaskets. Exterior gaskets for sealing valves to the container shall be made of silicone rubber conforming to ZZ-R-765 class 2 or 3, grade 60. No additional sealing material shall be required.

### 3.4 Construction.

3.4.1 Gasket seat. Unless otherwise specified, valves employing exterior gaskets shall be provided with a groove to retain and seat such gaskets. The depth of the groove shall not be less than 50 percent nor more than 70 percent of the original gasket thickness.

3.4.2 Castings. When used, castings shall be of high quality, clean, sound, and free of blow-holes, porosity, cracks, and other defects which may adversely affect the valve performance.

3.4.3 Valve body. Unless specifically approved by the procuring agency, non-metallic materials shall not be used in the construction of the valve body.

3.4.4 Mounting devices. Unless otherwise specified, each valve shall be provided with a nut, washer, and gasket or other suitable device for installation purposes.

### 3.5 Design.

3.5.1 Maintenance. The design of the valve shall be such that installation and removal from containers may be accomplished with common hand tools.

3.5.2 Special features. Special features, such as manual relief devices to permit equalization of pressure prior to opening the container or filters to limit the entrance of sand or dust, may be used provided they do not interfere with the other requirements of this specification.

3.5.3 Lubrication. The design of the valve shall be such that lubrication shall not be required for operation during the service life.

3.5.4 Screw threads. All screw threads shall be in accordance with FED-STD-H28, class 2.

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3.5.5 Locking of parts. All internal and external threaded parts shall be locked.

3.5.6 Pipe threads. Pipe threads shall be in accordance with FED-STD-H28.

3.5.7 Dimensions. Dimensions and tolerances shall be in accordance with ANSI Y14.5M. Where dimensions and tolerances may affect interchangeability, consistent operation, or performance of the valve, they shall be limited accordingly.

3.5.8 Weight and size. Weight and size of the valve shall be as small as possible consistent with the requirements specified herein and with sound engineering practices.

### 3.6 Performance.

3.6.1 Reseal. The valve reseal pressure shall be specified by the using activity (see 6.2). The specified reseal pressure establishes a lower limit by which the valve must be closed. The valve shall not leak at a rate of 0.061 cubic inch (1 cubic centimeter) of standard air per minute or more in the flow direction at the specified reseal pressure when tested as specified in 4.7.1.2. The actual reseal pressure will be equal to or greater than the specified reseal pressure.

3.6.1.1 Leakage. Types I and II valves shall not leak at a rate of 0.061 cubic inch (1 cubic centimeter) of standard air per minute or more in the reverse flow direction at a pressure differential of 10 psi (68.9 kPa) when tested as specified in 4.7.1.2.

3.6.2 Cracking. The valve cracking pressure shall be greater than the specified reseal pressure by a value that is within the pressure offset range specified below. The valve cracking pressure offset range is determined by the specified reseal pressure.

Specified Reseal Pressure Range	Cracking Pressure Offset Range
0.00 - 1.00 psi (0.0 - 6.9 kPa)	0.00 - 0.50 psi (0.0 - 3.4 kPa)
1.01 - 1.50 psi (6.9 - 10.4 kPa)	0.00 - 0.75 psi (0.0 - 5.2 kPa)
1.51 - 3.00 psi (10.4 - 20.7 kPa)	0.00 - 1.00 psi (0.0 - 6.9 kPa)
3.01 psi and greater (20.8 kPa and greater)	0.00 - 1.50 psi (0.0 - 10.3 kPa)

3.6.3 Minimum flow rate. The valve minimum flow rate shall be specified by the using activity (see 3.6.3.1 and 6.2). When



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tested as specified in 4.7.1.2, valve minimum flow rate shall be determined at a differential pressure 1.5 psi (10.3 kPa) greater than the specified reseal pressure in the flow direction.

3.6.3.1 Minimum flow rate calculations. Calculations shall be made as follows by the valve using activity, to determine the minimum flow rate required to protect the container (see 6.2):

$$\text{Minimum Flow Rate ft}^3/\text{minute (m}^3/\text{minute)} = (V_c - V_m) 0.12$$

Where:  $V_c$  = Volume of container  $\text{ft}^3 (\text{m}^3)$

$V_m$  = Volume of material in container  $\text{ft}^3 (\text{m}^3)$

3.6.4 Operating life. The valves shall withstand 2500 cycles, at ambient conditions, from the closed position to the open position for either or both positive and negative pressure differentials, as applicable for the type concerned.

3.6.5 Environmental tests. The valves shall be capable of withstanding the following environmental conditions when tested as specified in 4.7.3.

3.6.5.1 Temperature. The valves shall be capable of withstanding, without degradation of performance attributes, temperatures ranging from  $-80^\circ\text{F}$  to  $+160^\circ\text{F}$  ( $-62^\circ\text{C}$  to  $+71^\circ\text{C}$ ) during operation and nonoperation.

3.6.5.2 Humidity. The valves shall be capable of withstanding, without degradation of performance attributes, relative humidity up to 95 percent at  $160^\circ\text{F}$  ( $71^\circ\text{C}$ ) during operation and nonoperation.

3.6.5.3 Vibration. The valves shall be capable of withstanding, without degradation of performance attributes, vibration incident to service use during operation and nonoperation.

3.6.5.4 Sand and dust. The valves shall be capable of withstanding, without degradation of performance attributes, sand and dust particles encountered in desert areas during operation and nonoperation.

3.6.5.5 Rough handling. The valves shall be capable of withstanding, without degradation of performance attributes, rough handling which may be encountered during shipping and service life.

3.6.5.6 Salt fog. The valves shall be capable of withstanding, without degradation of performance attributes, exposure to salt atmosphere as encountered in coastal areas.

3.7 Identification of product. The valves shall be marked for identification in accordance with MIL-STD-130.

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3.8 Workmanship. All parts of each valve shall be constructed and finished in accordance with good commercial practice. Particular attention shall be given to the machining of mating parts, finish of sealing surfaces, freedom of parts from burrs and sharp edges, and the removal of chips and other foreign material prior to and after assembly.

## 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 (examinations and tests) 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements; however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

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

- a. First article inspection (see 4.4, 6.2 and table I).
- b. Quality conformance inspection (see 4.5 and table II).

TABLE I. First article inspection tests.

Test	Requirement	Method
Quality Conformance		4.7.1
a. Cycling		4.7.1.1
b. Reseal	3.6.1	4.7.1.2
c. Leakage	3.6.1.1	4.7.1.2
d. Cracking	3.6.2	4.7.1.2
e. Flow rate	3.6.3	4.7.1.2
Operating life	3.6.4	4.7.2



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TABLE I. First article inspection tests - Continued.

<u>Test</u>	<u>Requirement</u>	<u>Method</u>
Environmental	3.6.5	4.7.3
a. High temperature	3.6.5.1	4.7.3.1
b. Low Temperature	3.6.5.1	4.7.3.2
c. Humidity	3.6.5.2	4.7.3.3
d. Vibration	3.6.5.3	4.7.3.4
e. Sand and dust	3.6.5.4	4.7.3.5
f. Rough handling	3.6.5.5	4.7.3.6
g. Salt fog	3.6.5.6	4.7.3.7

TABLE II. Quality conformance inspection tests.

<u>Test</u>	<u>Requirement</u>	<u>Method</u>
Cycling		4.7.1.1
Reseal	3.6.1	4.7.1.2
Leakage	3.6.1.1	4.7.1.2
Cracking	3.6.2	4.7.1.2
Flow rate	3.6.3	4.7.1.2

4.3 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in 4.6.

4.4 First article inspection. When specified in the contract or purchase order, first article inspection shall be performed by the contractor, after award of contract and prior to production, at a location acceptable to the Government. First article inspection shall be performed on sample units which have been produced with equipment and procedures normally used in production. First article approval is valid only on the contract under which it is granted, unless extended by the Government to other contracts. A certified test report in accordance with MIL-STD-831 shall be submitted to the cognizant engineering activity.

4.4.1 Test samples. The first article test samples shall consist of 3 valves of each manufacturer's part number to be tested and shall be representative of the production valves. For valves employing filters (see 3.5.2), the filters shall be used during all tests to which the valve is subjected. The contractor shall be required to retest ever 3 years as a minimum; otherwise, the first article tests cannot be waived.

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4.4.2 Test sequence. The 3 test samples shall be subjected to the following specified tests:

Valve 1

- a. Cracking, Reseal, Leakage Flow Rate (4.7.1)
- b. Humidity (4.7.3.3)
- c. Salt Fog (4.7.3.7)
- d. Cracking, Reseal, Leakage, Flow Rate (4.7.1.2)

Valve 2

- a. Cracking, Reseal, Leakage, Flow Rate (4.7.1)
- b. High Temperature (4.7.3.1)
- c. Low Temperature (4.7.3.2)
- d. Sand and Dust (4.7.3.5)
- e. Cracking, Reseal, Leakage, Flow Rate (4.7.1.2)

Valve 3

- a. Cracking, Reseal, Leakage, Flow Rate (4.7.1)
- b. Rough Handling (4.7.3.6)
- c. Vibration (4.7.3.4)
- d. Operating Life (4.7.2)
- e. Cracking, Reseal, Leakage, Flow Rate (4.7.1.2)

4.4.3 Failures. One or more failures shall be cause for refusal to grant first article approval.

4.5 Quality conformance inspection. Quality conformance inspection shall be performed on sample valves chosen from a lot to determine conformance of said lot with the requirements set forth in this specification prior to acceptance. Quality conformance inspection shall consist of the cracking, reseal, leakage, and flow rate tests in 4.7.1 and the inspection of packaging under 4.5.3.

4.5.1 Sampling. Samples shall be selected at random and sampling shall be conducted in accordance with MIL-STD-105, inspection level II, AQL 2.5.

4.5.1.1 Inspection lot. An inspection lot shall consist of all valves of the same type and reseal pressure, produced under essentially the same conditions, and offered for inspection at one time.

4.5.1.2 Examination. Each sample valve shall be subjected to an examination to determine conformance to the manufacturer's drawings and the requirements of this specification.

4.5.1.3 Sample tests. Each sample valve chosen as specified in 4.5.1 shall be tested as specified in 4.7.1.

4.5.1.3.1 Lot rejection. Failure of the inspection lot to pass quality conformance inspection at MIL-STD-105, inspection level II with an acceptable quality level (AQL) of 2.5 percent defective shall be cause for rejection.

4.5.1.3.2 Rejected lots. If an inspection lot is rejected, the

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contractor may rework it to correct the defects or screen out the defective units and resubmit for reinspection. Resubmitted lots shall be inspected using MIL-STD-105, inspection level III with an AQL of 2.5 percent defective. Such lots shall be separate from new lots and shall be clearly identified as reinspected lots.

4.5.2 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality, and quantity to permit performance of the quality conformance inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with MIL-STD-45662.

4.5.3 Inspection of packaging. Except when commercial packaging is specified, the sampling and inspection of the preservation and interior package marking shall be in accordance with groups A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing for shipment and storage shall be in accordance with the quality assurance provisions of MIL-STD-2073-1. The inspection of marking for shipment and storage shall be in accordance with MIL-STD-129. The inspection of commercial packaging shall be in accordance with ASTM D 3951.

4.6 Test conditions.

4.6.1 Pressure. Pressures specified are gauge pressures plus or minus 0.1 psi (689 Pa).

4.6.2 Temperature. Unless otherwise specified, tests shall be conducted at ambient temperatures of from 50°F to 90°F (10°C to 32°C).

4.6.3 Flow. Unless otherwise specified, all flow rates specified are cubic feet per minute taken at standard conditions. Standard conditions are defined to be 68°F (20°C) for temperature and 14.7 psi (101.4 kPa) for pressure.

4.7 Performance tests.

4.7.1 Cycling, cracking, reseal, leakage, and flow rate. Cycling and the following tests shall be performed for each sample valve in the order listed.

4.7.1.1 Cycling. The valves shall be initially cycled 10 times in order to normalize operating conditions as follows.

4.7.1.1.1 Types I and II. Air pressure shall be applied to the inlet port of the valve with the outlet port open to the atmosphere or suitably vented. The pressure differential shall be uniformly increased until an air flow of at least 20 percent of the rated flow rate is reached. The air pressure shall then

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be reduced to zero differential. The cycle shall be accomplished in 3 to 10 seconds.

4.7.1.1.2 Type III. One complete cycle shall consist of the cycle detailed in 4.7.1.1.1 accomplished in each direction of flow.

4.7.1.2 Cracking, reseal, leakage, and flow rate. The valve shall be placed in a test cell so that required pressure differentials can be applied. Suitable gauges or manometers shall be connected to the cell to determine the pressure differential across the valve to within  $\pm 5$  percent of the actual values. For reseal, cracking, and leakage testing, a gas flowmeter, capable of measuring a flow rate of  $0.061 \pm 0.006$  cubic inch ( $1.0 \pm 0.1$  cubic centimeter) of standard air per minute, shall be connected in series with the valve test cell so that all air flowing through the valve flows through the flowmeter. For valve flow rate testing, a flowmeter capable of measuring the specified valve flow rate  $\pm 5$  percent shall be connected in series with the valve test cell. A suitable regulator or throttling valve shall be used to control the test pressure so that test conditions are maintained to within  $\pm 5$  percent of specified values during the test. Test results shall be reported in standard air conditions. For reseal and leakage tests, an indicated flow of 0.061 cubic inch (1.0 cubic centimeter) of standard air per minute through the valve, or the reseal pressure to be less than the specified reseal pressure shall be an indication of failure and cause for rejection. For cracking tests, failure of the cracking pressure to be within the offset range of the specified reseal pressure shall be an indication of failure and cause for rejection. For flow rate tests, failure to develop at least the specified flow rate at a differential pressure of 1.5 psi (10.3 kPa) greater than the specified reseal pressure across the valve in the flow direction shall be an indication of failure and cause for rejection.

4.7.1.2.1 Types I and II cracking, and reseal. Initially, the valve shall be in the closed state with an applied pressure differential of 0.0 psi (0.0 kPa) for a period of at least 5 seconds. The pressure differential shall then be increased until the flow rate is slightly greater than 0.061 cubic inch (1.0 cubic centimeter) per minute. The pressure at which the valve cracks shall be measured. The valve shall then be subjected to the pressure differential causing the specified flow rate. The pressure differential shall be decreased until the valve flow rate is slightly less than 0.061 cubic inch (1.0 cubic centimeter) per minute. The pressure at which the valve reseals shall be measured. Failure of the valve to crack within the offset range (see 3.6.2) of the specified reseal pressure, or to reseal at or above the specified reseal pressure shall be cause for rejection.

4.7.1.2.2 Types I and II leakage. The valve shall be subjected to a pressure differential of 10.0 psi (68.9 kPa) which tends to produce flow in the non-flow direction. Observation for leakage shall then be made.

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4.7.1.2.3 Type III cracking and reseal. The valve shall be subjected to the test detailed in 4.7.1.2.1 for both pressure and vacuum relief directions.

4.7.1.2.4 Flow rate. For each flow direction, the valve shall be subjected to a pressure differential of 1.5 psi (10.3 kPa) greater than the specified reseal pressure which tends to produce flow in that respective flow direction. The flow rate through the valve shall be measured in each respective flow direction. For valves using filters, the filters shall be installed during the flow rate test.

4.7.1.2.4.1 Types I and II flow rate. The valve shall be subjected to the test described in 4.7.1.2.4 in the specified relief direction.

4.7.1.2.4.2 Type III flow rate. The valve shall be subjected to the test described in 4.7.1.2.4 for both pressure and vacuum relief directions.

4.7.2 Operating life. The valve shall be subjected to 2500 cycles, at room temperature, as specified in 4.7.1.1.1 or 4.7.1.1.2. After completion of the test, the valve shall be tested as specified in 4.7.1.2 and applicable sub-paragraphs.

4.7.3 Environmental tests. The valve shall be subjected to the following tests in accordance with applicable procedures of MIL-STD-810 and FED-STD-101. The valve shall be mounted in a test cell that permits operation of the valve during those tests that require valve operation. The valve shall be mounted in a manner that exposes those surfaces to the test environment that would normally be exposed when the valve is installed in a shipping container. For Type II and Type III valves a vacuum shall be applied to the test cell to produce vacuum relief operation. Surfaces of the valve normally protected by the shipping container internal environment may be protected by the test cell internal environment.

4.7.3.1 High temperature. MIL-STD-810, Method 501.3, Procedure II, Operation shall be used, except that during the +160°F (+71°C) exposure period, the valve shall be operated through 1000 cycles as specified in 4.7.1.1.1 or 4.7.1.1.2. The duration of the test shall be 72 hours. After completion of the test, the valve shall be tested as specified in 4.7.1.2 and applicable sub-paragraphs.

4.7.3.2 Low temperature. MIL-STD-810, Method 502.3, Procedure II, Operation shall be used, except that during the -80°F (-62°C) exposure period the valve shall be operated through 1000 cycles as specified in 4.7.1.1.1 or 4.7.1.1.2. The duration of the test shall be 72 hours. After completion of the test, the valve shall be tested as specified in 4.7.1.2 and applicable sub-paragraphs.



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4.7.3.3 Humidity. MIL-STD-810, Method 507.3, Procedure II, Induced Hot Humid Condition for 10 diurnal periods shall be used. Cycling shall be performed periodically during the test. At least 2 complete cycles as specified in 4.7.1.1.1 or 4.7.1.1.2 shall be accomplished each hour. After completion of the test, the valve shall be tested as specified in 4.7.1.2 and applicable sub-paragraphs.

4.7.3.4 Vibration. FED-STD-101, Method 5020.1 shall be used. After completion of the test, the valve shall be tested as specified in 4.7.1.2 and applicable sub-paragraphs.

4.7.3.5 Sand and dust. MIL-STD-810, Method 510.3, Procedure I - Blowing dust shall be used. The air velocity through the test chamber shall be  $5 \text{ ft/s} \pm 1.6 \text{ ft/s}$  ( $1.5 \text{ m/s} \pm 0.5 \text{ m/s}$ ). The test temperature shall be  $73^{\circ}\text{F}$  ( $23^{\circ}\text{C}$ ). At least 2 complete cycles as specified in 4.7.1.1.1 or 4.7.1.1.2 shall be accomplished each hour during the test. After completing the test, the valve shall be tested as specified in 4.7.1.2 and applicable sub-paragraphs. Removal of accumulated dust from the test item by brushing, wiping, shaking, air blast, or vacuum cleaning prior to testing shall not be permitted.

4.7.3.6 Rough handling. The valve shall be mounted in a container conforming to figure 1. The container shall be dropped 3 times on each of the 3 mutually perpendicular adjoining faces, for a total of 9 drops, from a height of 3 ft (0.91 m) onto a concrete surface. The valve shall then be tested as specified in 4.7.1.2 and applicable sub-paragraphs.

4.7.3.7 Salt fog. MIL-STD-810, Method 509.3, Procedure I shall be used. After completion of the test, the valve shall be tested as specified in 4.7.1.2 and applicable sub-paragraphs.

## 5. PACKAGING

5.1 Packing. Packaging requirements for the desired levels of protection will be specified by the acquisition activity in their procurement documents (see 6.2.h ordering data). If requirements are not specified, package in accordance with MIL-STD-2073-1.

5.2 Marking. Marking requirements will be specified by the acquisition activity in their procurement documents. If requirements are not specified, mark in accordance with MIL-STD-129.

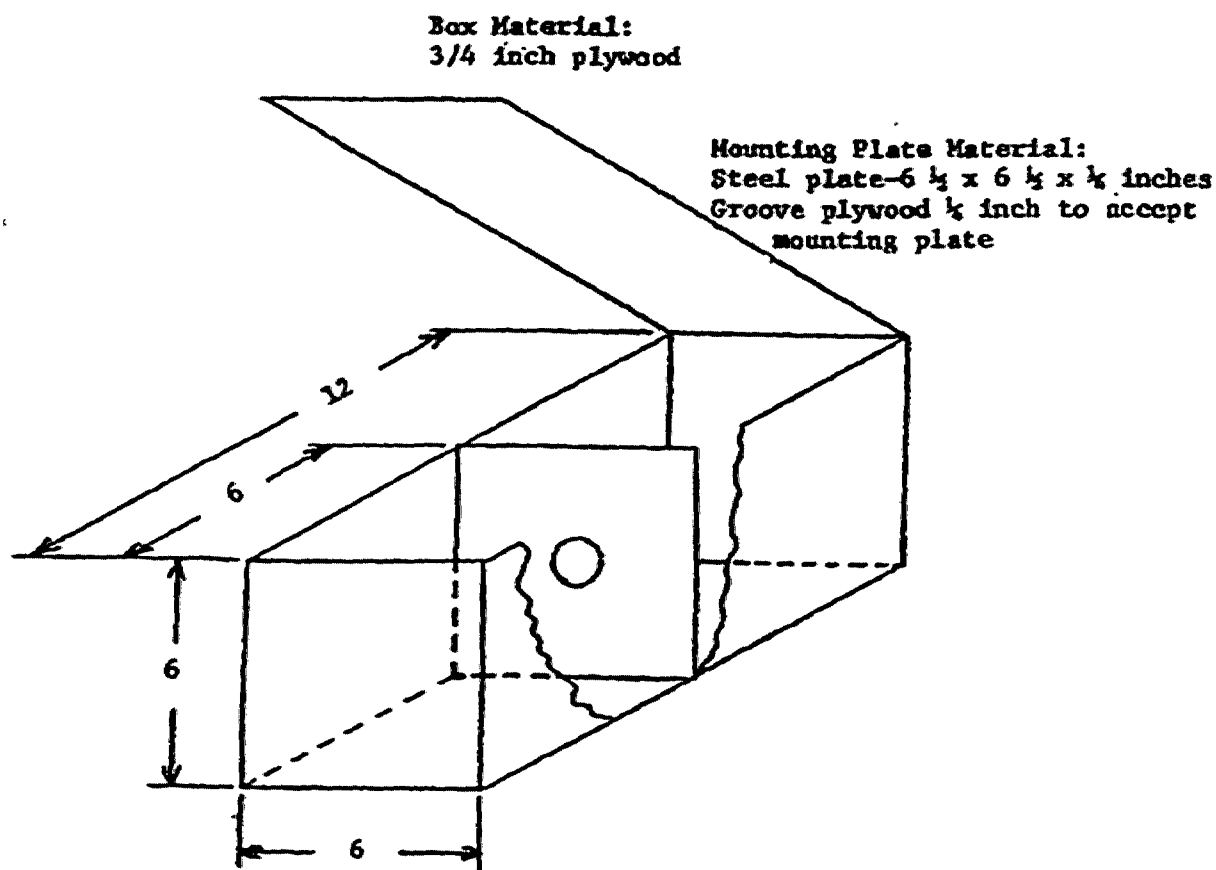
## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful but is not mandatory.)

6.1 Intended use. The air relief valves covered by this specification are intended for use in shipping containers as a protective device against excessive internal pressure or vacuum



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FIGURE 1. Container for rough handling test.

resulting from air lift or extreme temperature changes. Type I and II valves are intended to be used in sets of one of each type where a separation of the pressure and vacuum relief ports may be desirable.

**6.1.1 Use recommendations.** The relief valves are intended to allow significant container weight reductions by limiting differential gas pressure loads that the container must support. When a valve-equipped controlled humidity container is to be in outdoor storage, the difference between pressure and vacuum reseal pressures should be at least 3 psi (20.7 kPa) to prevent cyclic breathing caused by daily solar heating and nightly cooling. Under some environmental conditions, breathing-induced air movement into and out of the container may increase the desiccant depletion rate unacceptably.

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6.2 Acquisition Requirements. Procurement documents shall specify the following:

- a. Title, number, and date of this specification.
- b. Type and reseal pressures required (see 1.2 and 3.6.1).
- c. If required, cracking pressure (see 3.6.2).
- d. Flow rate required (see 3.6.3, 3.6.3.1 and 4.6.3).
- e. If required, manufacturer's part number (see 3.2.3).
- f. First article inspection (see 4.2 and 4.4).
- g. Waiver of first article testing (see 4.4.1).
- h. Specific preservation, packaging and packing instructions (see Section 5).
- i. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).

6.3 Disposability. The preferred methods of disposing of valves are recycling, baling, and sanitary landfill.

6.4 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, a standard production item from the contractor's current inventory, and the number of items to be tested as specified in 4.4. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitation for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.4.1 Waiver of first article tests. If a particular valve has been delivered under previous government contract and a certified first article test report for that valve has been submitted to the cognizant engineering activity, first article tests for like valves shall be waived (see 6.2.g). When the first article tests have been waived, the contractor shall certify that the valve will conform to the requirements of this specification.

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6.4.2 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract (see 4.4). The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 227.405-70 exempts the requirement for a DD Form 1423.

<u>Reference Paragraph</u>	<u>DID Number</u>	<u>DID Title</u>	<u>Suggested Tailoring</u>
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## DI-NDTI-80809A Test Reports

The above DID's were those cleared as of the date of this specification. The current issue of DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.5 Subject term (key word) listing.

- Container components
- Packaging
- Shipping container components
- Valve
- Valve, equalizing
- Valve, pressurizing
- Valve, pressure equalizing
- Valve, pressure equalizing, gaseous products

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

## Custodians:

- Air Force - 69
- Navy - AS
- Army - MI

## Preparing activity:

- Air Force - 69

## Review activities:

- Air Force - 99, 18, 82
- Army - AR
- DLA - CS

(Project 4820-0601)

## User activities:

- Air Force - 11
- Army - AV
- Navy - OS

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

## INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

<b>RECOMMEND A CHANGE</b>		1. DOCUMENT NUMBER MIL-V-27166D	2. DOCUMENT DATE (YYMMDD) 940310								
3. DOCUMENT TITLE VALVE, PRESSURE EQUALIZING, GASEOUS PRODUCTS											
4. NATURE OF CHANGE <i>(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)</i>											
5. REASON FOR RECOMMENDATION											
<table border="1"> <tr> <td colspan="2">SUBMITTER NAME (Last, First, Middle Initial) EDWARD A. MORAVEC, Physicist</td> <td colspan="2">ORGANIZATION 5203 LEESBURG PIKE, SUITE 1403, FALLS CHURCH, VA 22041-3466</td> </tr> <tr> <td colspan="2">ADDRESS (Include Zip Code) HQ AFMC/LGTPM 5215 THURLOW ST BLDG 70 WPAFB OH 45433-5540</td> <td>6. TELEPHONE (Include Area Code) (1) Commercial 513-257-4519</td> <td>7. DATE SUBMITTED (YYMMDD) 940310</td> </tr> </table>				SUBMITTER NAME (Last, First, Middle Initial) EDWARD A. MORAVEC, Physicist		ORGANIZATION 5203 LEESBURG PIKE, SUITE 1403, FALLS CHURCH, VA 22041-3466		ADDRESS (Include Zip Code) HQ AFMC/LGTPM 5215 THURLOW ST BLDG 70 WPAFB OH 45433-5540		6. TELEPHONE (Include Area Code) (1) Commercial 513-257-4519	7. DATE SUBMITTED (YYMMDD) 940310
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8. PREPARING ACTIVITY											
a. NAME EDWARD A. MORAVEC, Physicist		b. TELEPHONE (Include Area Code) (1) Commercial 513-257-4519 (2) AUTOVON DSN 787-4519									
c. ADDRESS (Include Zip Code) HQ AFMC/LGTPM 5215 THURLOW ST BLDG 70 WPAFB OH 45433-5540		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340									