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28 September 1987
SUPERSEDING
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(See 6.9)

MILITARY SPECIFICATION

DESICCANTS, ACTIVATED FOR DYNAMIC DEHUMIDIFICATION

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

1. SCOPE

1.1 Scope. This specification covers desiccants that remove moisture from air, other gases, and from liquids by dynamic means and that offer an approximate indication of the relative humidity of an enclosed space.

1.2 Classification. Desiccants shall be provided in the following types and grades, as specified (see 6.2.1):

Type I - Large particle size.

Grade H - High adsorption capacity.
Grade M - Medium adsorption capacity.
Grade L - Low adsorption capacity.

Type II - Medium particle size.

Grade H - High adsorption capacity.
Grade M - Medium adsorption capacity.

Type IV - Medium particle size impregnated with a humidity indicator.

Grade H - High adsorption capacity.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 6850

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications 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.

SPECIFICATIONS

FEDERAL

QQ-B-639 - Brass, Naval: Flat Products (Plate, Bar, Sheet, and Strip).
RR-S-366 - Sieve, Test.
TT-E-485 - Enamel, Semigloss Rust-Inhibiting.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
PPP-C-96 - Cans, Metal, 28 Gage and Lighter.
PPP-D-705 - Drum, Shipping and Storage: Steel, 16 and 30 Gallon Capacity.

STANDARDS

FEDERAL

FED-STD-313 - Material Safety Data Sheets Preparation and the Submission of.

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-147 - Palletized Unit Loads.
MIL-STD-1186 - Cushioning, Anchoring, Bracing, Blocking, and Waterproofing, with Appropriate Test Methods.
MS16188 - Chart, Humidity Indicator Color Comparison.
MS20003 - Indicator, Humidity, Card, Three Spot, Impregnated Areas (Cobaltous Chloride).

2.1.2 Other Government documents. The following other Government documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

CODE OF FEDERAL REGULATIONS

49 CFR 171-195 - Rules and Regulations for Transportation of Explosives and Other Dangerous Articles.
29 CFR 1910.1200 - Hazard Communication Standard.

(The Code of Federal Regulations is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

(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 documents 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 documents not listed in the DoDISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 568 - Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for. (DoD adopted)

B 90 - Standard Specification for Magnesium-Alloy Sheet and Plate. (DoD adopted)

B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate. (DoD adopted)

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(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.

3. REQUIREMENTS

3.1 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3 and 6.3).

3.2 Material. Desiccants shall be silica gel.

3.3 Impregnation. Impregnation shall be in accordance with 3.3.1 through 3.3.2.

3.3.1 Types I and II. Types I and II shall not be impregnated.

3.3.2 Type IV. Type IV shall be impregnated with an indicator for the purpose of providing for a visual approximation of the degree of saturation of the desiccant. The material shall have characteristic colors when in equilibrium with atmospheres of varying relative humidities, and shall coincide with the colors in accordance with MS16188.

3.4 Apparent density. The apparent density shall be as follows (see 4.7.1):

	Pounds per cubic foot
Grades H and M	Not less than 45
Grade L	Not less than 50

3.5 Water vapor adsorption capacity. The water vapor adsorption capacity shall be as shown in table I (see 4.7.2).

TABLE I. Minimum water vapor adsorption capacity.

Nominal relative humidity (percent)	Types I, II and IV, grade H (percent)	Types I and II, grade M (percent)	Type I, grade L (percent)
10	5.5	14.7	3.3
20	10.0	15.6	5.0
40	19.0	16.9	7.5
60	28.0	18.2	11.7
80	33.0	19.2	15.0

3.6 Particle size. The particle sizes of types I, II and IV shall be as shown in table II. Unless otherwise specified herein, the sieves shall be in accordance with RR-S-366 (see 4.7.3).

TABLE II. Particle size.

Type	Sieve number or designation	Distribution	Percent
	[1]0.265 inch	Retained (max)	0.5
	.5	Through 0.265 inch, retained on 5 minimum (min)	35.00
	6	Through 0.265 inch, retained on 6 (min)	36.5
I	10	Through 6, retained on 10 (max)	50.0
	18	Through 10, retained on 18 (max)	2.5
	18	Through 18 (max)	0.5
	6	Retained on 6 (max)	2.0
	14	Through 6, retained on 14 (min)	93.0
II	18	Through 14, retained on 18 (max)	4.0
	20	Through 18, retained on 20 (max)	2.5
	20	Through 20 (max)	0.5
	6	Retained (max)	2.0
	12	Through 6, retained on 12 (min)	55.0
IV	18	Through 12, retained on 18 (min)	19.0
	18	Through 18 (max)	3.5
	20	Through 20 (max)	0.5

See footnote at top of next page.

[1] The permissible variations in average openings shall be plus or minus 8 percent. The permissible variations in maximum openings shall be plus 5 percent. The wire diameter shall be 0.138 to 0.141 inch.

3.7 Particle strength. The particle strength shall be as shown in table III (see 4.7.4).

TABLE III. Particle strength.

Type	Percent passing through a No. 30 sieve (max)
I, Grade H	0.2
I, Grade M and II, Grades H and M and IV, grade H	1.5
I, grade L	2.5

3.8 Loss-on-ignition. The loss-on-ignition shall be as shown in table IV (see 4.7.5).

TABLE IV. Loss-on-ignition.

Type	Percent (max)
I and II, grade H	6.50
IV, grade H	5.75
I and II, grade M	4.00
I, grade L	10.00

3.9 Corrosiveness, types I and II. When types I and II are tested as specified in 4.7.6, the test specimens of steel, brass, magnesium and aluminum in contact with the desiccant shall not be more corroded than the bare metal.

3.10 Material safety data sheet. The contracting activity shall be provided a material safety data sheet (MSDS) at the time of contract award. The MSDS shall be provided in accordance with the requirements of FED-STD-313 and 29 CFR 1910.1200. When FED-STD-313 is at variance with the CFR, 29 CFR 1910.1200 shall take precedence over, modify and supplement FED-STD-313. The MSDS shall be included with each shipment of the material covered by this specification. The MSDS shall list the complete composition of the product, provide available pertinent toxicity information, and delineate acceptable personal protective measures for use when applying the product.

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.

4.1.1 Responsibility for compliance. All items must 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 assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

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

(a) First article inspection (see 4.3).
(b) Quality conformance inspection (see 4.4).

4.3 First article inspection. First article inspection shall consist of the examinations and tests as specified in 4.5 and 4.7.

4.3.1 Sampling for first article inspection. Prior to production, 15 pounds of material shall be tested as specified in 4.7.

4.3.2 First article inspection report. When specified in the contract or purchase order, a first article inspection report shall be prepared (see 6.2.2).

4.4 Quality conformance inspection. The quality conformance inspection shall consist of the examinations and tests as specified in 4.5 and 4.6.

4.4.1 Sampling for quality conformance inspection. Sampling for quality conformance inspection shall be in accordance with 4.4.1.1 through 4.4.1.2.4.

4.4.1.1 Lot. A lot shall consist of material of the same type and grade from one day's production or any fraction of a day's production which constitutes completion of a manufacturing run, offered for delivery at one time.

4.4.1.2 Method of sampling. Method of sampling shall be in accordance with 4.4.1.2.1 through 4.4.1.2.4.

4.4.1.2.1 Types I and II, grades H and M, type IV, grade H. Four separate 15-pound samples of material shall be selected from separate portions of the lot. Each of the four 15-pound samples shall immediately be placed in clean, dry containers, which, when sealed, shall be air- and moisture-tight. Extreme care shall be taken to ensure that the material is exposed for a minimum time and that the containers are closed and sealed immediately.

4.4.1.2.2 Type I, grade L. The method of sampling shall be as specified in 4.4.1.2.1. In addition to the smaller samples, a separate sample of at least 150 pounds shall be taken for retention by the Government inspector for retest in case of dispute (see 4.6.1).

4.4.1.2.3 Identification and use of samples. Samples shall be identified with the name of manufacturer, name of the material, the specification number, type, grade, the reactivation instructions, the contract or order number, and the lot number. The four separate 15-pound samples shall be used as follows:

(a) Two for the acceptance inspection.
(b) One for the contractor.
(c) One to be held 90 days to be used for retests in case of dispute.

4.4.1.2.4 Sampling for examination of filled containers. A random sample of filled containers shall be selected in accordance with MIL-STD-105 at inspection level I and acceptance quality level (AQL) of 2.5 percent defective to verify conformance to all requirements regarding fill, closure, marking, and other requirements not involving tests.

4.5 Examination of filled containers at place of manufacture. Each sample-filled container selected as specified in 4.4.1.2.4 shall be examined for defects of construction of the container and the closure for evidence of leakage, and for unsatisfactory markings; each filled container shall also be weighed to determine the amount of contents. Any container in the sample having one or more defects or under required fill, shall be rejected, and if the number of defective containers in any sample exceeds the acceptance number for appropriate sampling in accordance with MIL-STD-105, the lot represented by the sample shall be rejected.

4.6 Tests. Samples shall be subjected to all of the tests as specified in 4.7, except the corrosiveness tests and the water vapor adsorption capacity test for 40, 60, and 80 percent.

4.6.1 Retests. If, in the opinion of the contractor, failure of a portion of a sample to conform to this specification was caused by faulty test methods or damage to the test sample, the test shall be repeated on the other two portions of the sample. If any two of the three portions of a sample are found to be nonconforming, the entire sample shall be rejected.

4.7 Test procedures. Test procedures shall be in accordance with 4.7.1 through 4.7.7.

4.7.1 Apparent density. A clean dry 100-milliliter (mL), graduated cylinder shall be weighed to the nearest 0.1 gram. The cylinder shall be filled to approximately the 100-mL mark with activated desiccant and shall be weighed again. The cylinder shall be firmly tapped on a resilient surface, such as heavy sheet rubber, until the volume of desiccant remains constant between two successive 1-minute tapping periods. The apparent density shall be calculated by the following formula:

$$\text{Apparent density (pounds per cubic foot)} = \frac{\text{Weight of desiccant (grams)} \times 62.45}{\text{Volume of desiccant (mL)}}$$

4.7.2 Water vapor adsorption capacity. Water vapor adsorption capacity shall be in accordance with 4.7.2.1 through 4.7.2.2.

4.7.2.1 Apparatus. The general arrangement of the apparatus shall be as shown on figure 1. The fitting comprising the inlet, outlet, and petticoat bubbler for each saturator bottle shall have a ground glass stopper to fit the bottle. The saturator bottle and bubbler shall be so configured that with 1 liter (L) of solution in the bottle the upper holes of the bubbler shall be not more than 3 inches, nor less than 1 inch below the surface of the liquid. Each of the six saturator bottles shall be filled with 1 L of identical sulfuric acid solutions to give the required nominal relative humidity at 25 degrees Celsius (°C). Table V shows the solutions to be used for this purpose. The sample-containing bottle shall be a Nesbitt, Fleming or other standard form of adsorption bulb. The bulb shall be provided with a closure to prevent diffusion. The room in which the tests are being run shall be controlled to 25 ± 1°C. The temperature variation within the saturator bottles, the inlet air and the sample-containing bottle during any one run shall vary by not more than plus or minus 0.5°C. A desiccant trap filled with activated desiccant under test shall be placed in front of the saturator bottles to pick up any adsorptive impurities in the inlet air.

TABLE V. Relative humidity solutions.[1]

Solution	Percent by weight	R.H. percent at 25°C	Specific gravity[2] 20°C/4°C	Specific gravity[2] 77°F/60°F
H_2SO_4	64.61	10	1.5499	1.5462
H_2SO_4	58.21	20	1.4789	1.4754
H_2SO_4	47.85	40	1.3739	1.3715
H_2SO_4	38.36	60	1.2889	1.2859
H_2SO_4	26.23	80	1.1894	1.1858

[1] This table has been computed on the basis of values for the specific gravity found in the International Critical Tables. The nominal relative humidities represent values that would be obtained in a closed static system. The actual effluent relative humidities generally will be slightly below these nominal values.

[2] Specific gravity measurements should be made at either indicated temperature using a precision hydrometer with a smallest subdivision of 0.0005. The specific gravity of the sulfuric acid solution should be checked prior to each determination since the acid-water ratio will change during the course of determination.

4.7.2.2 Procedure. A 6- to 10-gram sample of the desiccant shall be weighed to the nearest milligram in the tared adsorption bulb. Extreme care shall be exercised to ensure that the material is exposed to the air for a minimum time. The adsorption bulb shall then be connected to the apparatus and the airflow adjusted to 4 ± 0.5 L per minute with the bypass closed. If the manometer indicates the pressure in the last bottle to be greater than 1-inch mercury, the bleed-off line shall then be cracked open until the manometer indicates less than 1 inch and that point maintained for the balance of the run. When using the bypass an occasional check shall be made of the amount of air passing through the adsorption bulb by diverting the bypass air from the flowmeter to atmosphere through the "T" connection. The flowmeter reading will then indicate the actual airflow through the adsorption bulb. Periodically the adsorption bulb shall be removed from the train, stopcocks closed, and the bulb

weighed. This process shall be repeated until two successive weighings, approximately 1 hour apart, show a weight variation not exceeding 0.1 percent; however, the test shall be considered complete if at any time the minimum specification values are attained. Generally, it will be found that the weight will rise to a maximum and then decrease slightly before approaching a constant value. The moisture adsorption capacity shall be calculated from the following equation:

$$\text{Moisture adsorption capacity, percent} = 100 \times \frac{W_f - W_o}{W_o - W_e}$$

Where:

W_f = Final weight of adsorption bulb.
W_o = Original weight of bulb and sample.
W_e = Weight of empty bulb.

4.7.3 Particle size. Particle size shall be determined in accordance with 4.7.3.1 through 4.7.3.2.

4.7.3.1 Apparatus. The mechanical shaker to be employed in conducting the particle size test shall operate with a single eccentric circular motion at 285 ± 10 revolutions per minute (r/min) and with a tapping action of 150 ± 5 strokes per minute to obtain dependable sieve analyses. To permit flexible operation, the shaker shall accommodate one to six 8-inch sieves with one pan and cover. For ease of operation and reproducibility of sizing tests, an automatic electric time switch is desired.

4.7.3.2 Procedure. The sieves shall be nested in order of decreasing sizes with the largest sieve on top and a pan at the bottom. A sample of approximately 150 grams of the material shall be weighed and shall be placed on the top sieve of the nest. The nest of sieves with the cover shall be placed in the testing machine and shall be vibrated for 3 minutes ± 3 seconds with the tapper in operation. It shall be weighed accurately to within 0.1 gram, and the percentage of desiccant retained on each sieve shall be calculated immediately following the shaker operation. The sum of all individually retained weights shall be used as the total weight of the sample.

4.7.4 Particle strength. Particle strength shall be determined in accordance with 4.7.4.1 through 4.7.4.2.1.

4.7.4.1 Apparatus. The apparatus shall be the same as specified in 4.7.3.1.

4.7.4.2 Procedure. Procedures shall be as follows:

4.7.4.2.1 Type I, grade H, M and L; type II, grade H and M; and type IV, grade H. Thoroughly mix all material retained on the no. 18 and coarser sieves in accordance with RR-S-366, as specified in 4.7.3.2. Weigh a sample to approximately 50 grams. Place the sample on the no. 18 sieve together with five copper disks (of the size and weight of 1-cent pieces), backing the sieve with a no. 30 sieve and retaining pan. Shake the sample in the apparatus for 15 minutes. Immediately following conclusion of the specified shaker operation time, report the percentage of the desiccant passing through the no. 30 sieve which is determined by accurate weighing to within 0.2 gram. Use the sum of the individually retained weights as the total weight of the sample.

4.7.5 Loss-on-ignition. Two to 4 grams of the sample of the material shall be accurately weighed, and immediately transferred to a silica crucible. The crucible (with a cover lid) shall be placed in a cool electric furnace. The temperature shall be allowed to rise to 960 ± 20°C in approximately 1 hour. The cover lid shall be removed. The crucible shall be heated for 1/2 to 3/4 hour at that temperature. The crucible shall be removed from the furnace and placed in a desiccator to cool before weighing. The loss-on-ignition shall be calculated as follows:

$$\text{Loss-on-ignition percent} = \frac{\text{Loss in weight} \times 100}{\text{Sample weight}}$$

4.7.6 Corrosiveness type I, grades H, M, and L; type II, grades H and M. Corrosiveness shall be determined as follows: Grind 20 grams of the desiccant, retaining that portion that passes a U.S. no. 40 sieve and is held on a U.S. no. 80 sieve in accordance with RR-S-366. Place this 40 to 80 mesh material in a desiccator maintained at 25°C and 60 percent relative humidity by sulfuric acid solutions (see table V) for a minimum of 24 hours. Prepare a 2 by 1/8-inch specimen of hot rolled steel in accordance with ASTM A 568, magnesium in accordance with ASTM B 90, brass in accordance with QQ-B-639, and aluminum in accordance with ASTM B 209, by grinding and polishing one surface to 6 to 8 root mean square microinches. Clean the panel of each metal by successive treatments with:

(a) Hot toluene 100°C (212°F) 2-minute immersion.
(b) Hot acetone 50°C (120°F) quick rinse.
(c) Hot methanol 50°C (120°F) quick rinse.

During and after cleaning, handle the panels with either forceps (on the edge only) or with wire loops passing through holes previously drilled near one corner. Do not blot dry, but immediately after the methanol rinse, dry each panel for 1 to 2 (but not more than 2) minutes in an oven at 38°C (100°F). Cover one half of each of the panels with the desiccant and place the panels in a desiccator maintained at 60 percent relative humidity by sulfuric acid solutions (see table V). Place the desiccator in an oven maintained at a temperature of 38 ± 1°C for 72 hours. Remove the panels from the desiccator, carefully brush with a brush made of camel's hair, and visually compare the covered and uncovered surfaces for extent of corrosion.

4.7.7 Color comparison (type IV only). Color comparison shall be as follows: Place samples of type IV desiccant in tubes and pass conditioned air of 20, 40, and 60 percent relative humidity through the tubes in the manner as specified in 4.7.2 until equilibrium is reached. Also, place a sample of a few grains in an oven kept at 149°C (300°F). After 24 hours, remove the activated desiccant. Examine the desiccant for uniformity of color throughout and for conformity of the characteristic colors in accordance with MS16188.

4.8 Inspection of packaging. Sample packages and packs, and the inspection of the packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition).

5.1 General requirements. The material shall be furnished in bulk, and each container enclosing type I or II desiccant shall contain at least one humidity indicator in accordance with MS20003. Containers enclosing type IV desiccant shall contain at least one humidity indicator color comparison chart not less than 1 by 4 inches, with colors in accordance with MS16188. No cushioning or overpacking shall be included in the containers enclosing the desiccant.

5.2 Preservation Preservation shall be level A or B as specified (see 6.2.1 and 6.4).

5.2.1 Level A. The desiccant shall be preserved in 5-, 25-, 100- or 200-pound capacity containers, as specified (see 6.2.1), conforming to the following requirements:

5.2.1.1 Five-pound containers. Five-pound containers shall be multiple friction or screw cap closure cans in accordance with PPP-C-96, type V, class 2 or 4 respectively. Screw cap closure cans shall be provided with inner seals. Plan B exterior coating shall be required.

5.2.1.2 Twenty-five pound containers. Twenty-five pound containers shall be lug cover metal pails in accordance with type II, class 1, of PPP-D-705. Wire handles or bails shall be galvanized or protectively coated to resist corrosion.

5.2.1.3 One hundred or 200-pound capacity containers. One hundred or 200-pound capacity metal containers shall be of the bolted ring cover style in accordance with Title 49 of the Code of Federal Regulations except that bottom seams shall be compound lined and covers shall be fitted with a tubular or flowed-in gasket securely affixed so that it will remain in position when covers are removed. The entire exterior shall be protected with a corrosion-resistant coating in accordance with TT-E-485. Minimum dry film thickness shall be 1.5 mils applied to a cleaned and degreased surface.

5.2.2 Level B. When specified (see 6.2.1 and 6.6), desiccant may be preserved for domestic shipment in 100-pound capacity fiberboard drums. The drums shall be in accordance with Title 49 of the Code of Federal Regulations. The drums shall have a water vapor barrier consisting of metal foil laminated between sheets of kraft paper with thermoplastic adhesive wound into the side wall of the drum and located not more than two plies from the interior. A metal foil shall also be used in the bottom heading. The drum interior shall be wax-coated after manufacture. Covers shall be of metal and fitted with a tubular or flowed-in gasket securely affixed so that it will remain in position when the cover is removed.

5.3 Packing. Packing shall be level A or B as specified (see 6.2.1).

5.3.1 Level A. Twelve 5-pound containers, arranged in two tiers of three rows having two containers per row shall be packed in wood or wood-cleated plywood boxes conforming to PPP-B-621 class 2, or PPP-B-601 overseas class with box selection at the option of the contractor. Boxes shall be provided with caseliners conforming to MIL-STD-1186. Boxes shall be closed, strapped or banded in accordance with the applicable box specification or appendix thereto.

5.3.2 Level B. Twelve 5-pound containers, arranged as specified in 5.3.1, shall be packed in a domestic type of container in accordance with appendix of PPP-C-96. Twenty-five pound pails and 100- or 200-pound drums shall not require additional packing.

5.4 Pallets. When specified (see 6.2.1), 25-pound pails and 100- or 200-pound drums shall be palletized in accordance with MIL-STD-147.

5.5 Marking. In addition to any special marking required (see 6.2.1), interior packs and exterior shipping containers and palletized unit loads shall be marked in accordance with MIL-STD-129 and shall include date (month and year) of manufacture, type and grade of the desiccant and hazardous material markings as applicable.

6. NOTES

6.1 Intended use. Desiccants are intended for use in removing moisture from liquids and gases as follows:

6.1.1 Types I and II desiccants. Types I and II desiccants are particularly adaptable for use in mechanical dehumidification machines of the regenerative type and are furnished in desiccant containers complete with desiccant in accordance with MIL-C-3263.

6.1.2 Type IV desiccants. Type IV desiccant is intended for use in indicator cards or humiplugs, when approximate indication of the relative humidity in the surrounding atmosphere is desired.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number, and date of this specification.
(b) Type and grade of desiccant required (see 1.2).
(c) First article inspection, when required (see 3.1).
(d) Levels of preservation and packing required (see 5.2, 5.2.1 and 5.3).
(e) Whether 100-pound capacity drums are required (see 5.2.2).
(f) Whether shipping containers shall be palletized (see 5.4).
(g) Special marking required (see 5.5).

6.2.2 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD FAR Supplement, Part 27, Sub-Part 27.475-1 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraph.

Paragraph no.	Data requirement title	Applicable DID no.	Option
4.3.2	First article inspection report	DI-T-4902	----

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5010.12-L., AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 The data requirements of 6.2.2 and any task in sections 3, 4, or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 First article. When a first article inspection is required, the item should be a first article sample. The first article should consist of one unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first articles. Invitations 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.

6.4 Particular attention should be paid to acquisition of the smallest size exterior container commensurate with the probable rate of use of the desiccant. The material rapidly loses its dehydrating strength when exposed to air so that use of containers requiring a minimum of openings will help ensure most efficient use of the desiccant.

6.5 Color standard. The colors given on MS16188 possibly may be found to have faded subsequent to printing. Additional information concerning the desired colors is given in table VI wherein the colors are further identified by numbers from the Munsell Book of Color, published by the Munsell Color Company Incorporated, Baltimore, MD.

TABLE VI. Color standard.

	Munsell chart number	Munsell color number
Activated (shade A)	77.5	7.5PB 4/16
20 percent R.H. (shade B)	82.5	2.5P 7/6
40 percent R.H. (shade C)	95	5RP 7/6
60 percent R.H. (shade D)	5	5R 8/4

6.6 For Government installations, the use of the 100-pound capacity containers (see 5.2.2) should be restricted to direct shipment to the using activity in carload or truckload lots.

6.7 Material safety data sheets. Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission of data are listed in appendix B of FED-STD-313. In order to obtain the MSDS, FAR clause 52.223-3 must be in the contract.

6.8 Subject term (key word) listing.

Relative humidity
Silica gel
Water vapor adsorption

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

Custodians:
Army - MR
Navy - SH
Air Force - 85

Review activities:
Army - MI, AT
DLA - GS

User activities:
Army - CR, ER
Navy - OS, AS

Preparing activity:
Navy - SH
(Project 6850-0831)

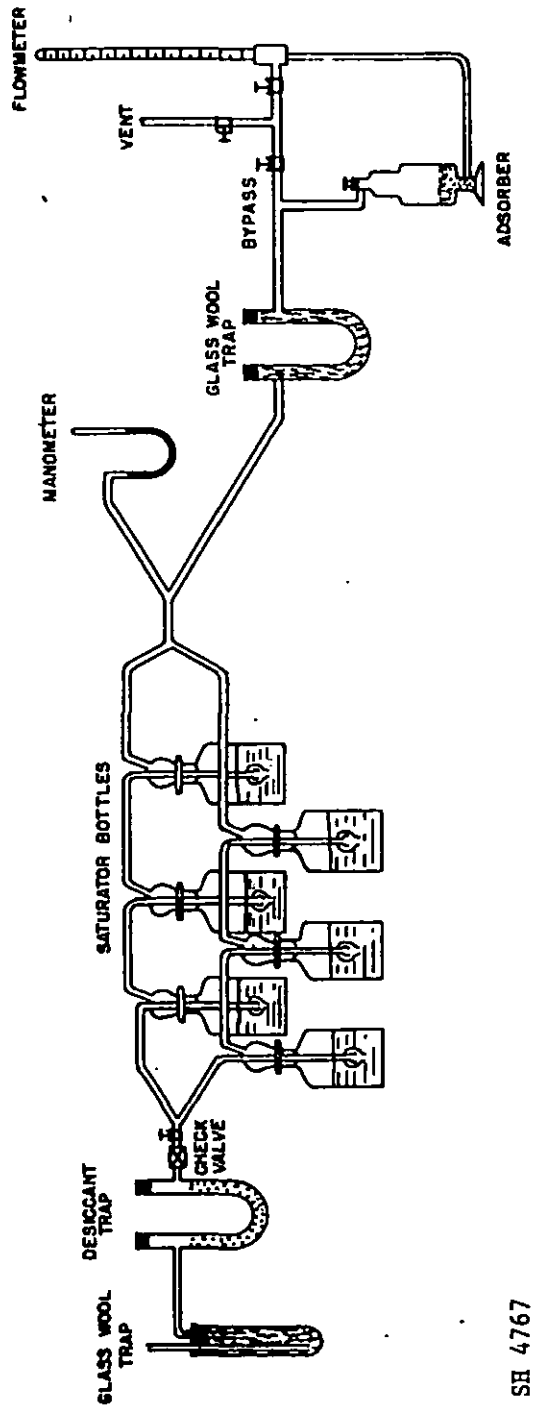

FIGURE 1. Apparatus for water vapor adsorption capacity test.