

INCH-POUND

MIL-C-4952E (USAF)

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SUPERSEDING

MIL-C-4952D (USAF)

21 October 1964

MILITARY SPECIFICATION

CARTRIDGES, DESICCANT, DEHYDRATOR

This specification is approved for use within the Department of the Air Force and is available for use by all Departments and Agencies of the Department of Defense

1. SCOPE

1.1 Scope. This specification covers two types of dehydration cartridges.

1.2 Classification. Cartridges shall be of the following types as specified (See 6.2):

TYPES

Type I - MA-1

Type II - MA-2

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.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be use in improving document should be addressed to: WR-ALC/MMIRFW, Robins AFB, GA 31098 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 4440

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SPECIFICATIONS

FEDERAL

L-P-378 Plastic Film (Polyethylene Thin Gage)

TT-I-735 Isopropyl Alcohol

TT-N-95 Naphtha, Aliphatic

QQ-S-571 Solder, Tin Alloy, Lead-Tin Alloy,
and Lead Alloy

QQ-T-425 Tinplate (Hot Dip and Electrolytic)

PPP-B-621 Boxes, Wood, Nailed and Lock-Corner

PPP-B-636 Box, Fiberboard

DOD-D-1000B Drawings, Engineering and Associated
Lists.

MILITARY

MIL-P-116 Preservation, Methods of

MIL-D-3716 Desiccants, Activated for Dynamic
Dehumidification

MIL-C-83960 Cylinder, Dehydrator

MIL-T-81533A Trichloroethane, 1,1,1, (Methyl Chloroform)
Inhibited, Vapor Degreasing

STANDARDS

MILITARY

MIL-STD-129 Marking for Shipment and Storage

MIL-STD-130 Identification Marking of
U.S. Military Property

MIL-STD-143 Specifications and Standards, Order
of Precedence for the Selection of

MIL-STD-831 Test Reports, Preparation of

(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 officer.)

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2.2 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 standard), 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 Qualification. The cartridge furnished under this specification shall be a product that has been tested, has passed the qualification tests specified herein, and has been listed on or approved for listing on the applicable qualified products list (See 6.3)

3.2 Components. The cartridge shall consist of the following major components:

<u>Item Name</u>	<u>See Requirement</u>
Container	3.7.1
Filters	3.7.2
Desiccant	3.7.3

3.3 Selection of specifications and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.

3.4 Materials. Materials that are combustible, deteriorate easily, or are otherwise adversely affected by continued use with high-pressure oxygen, hydrogen, helium, nitrogen, or air shall not be used in the cartridge.

3.4.1 Combustibility. Materials that are combustible in contact with high-purity (99.5 percent) oxygen at 300 ° F and 2,000 psig shall not be used in the cartridge.

3.4.2 Protective treatment. When materials are used in the construction of the cartridge that are subject to deterioration when exposed to climatic and environmental conditions likely to occur during service usage, they shall be protected against such deterioration in a manner that will in no way prevent compliance with the 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.

3.4.3 Reclaimed Materials. Recycled and recovered raw materials shall be used to the maximum extent possible in lieu of virgin raw materials, as long as these materials do not jeopardize the intended use and fully comply with all contract requirements. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. None of the above shall be interpreted to mean that the use of used or rebuilt products will be allowed.

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3.5 Design and construction. The cartridge shall fit into a cylinder conforming to MIL-C-83960 and shall be designed and constructed in accordance with figure 1.

3.6 Performance.

3.6.1 MOISTURE REMOVAL.

3.6.1.1 Type I. The cartridge shall maintain an outlet moisture content not in excess of that equivalent to a dewpoint of -65°F at 0 psig in a minimum of 250 standard (70°F and 760 mm Hg) cubic feet of gas saturated at $130 +5 -0^{\circ}\text{F}$ and $450 +0 -25$ psig, and passed through the cartridge at a flow rate of not less than 10 scfm under these conditions.

3.6.1.2 Type II. The cartridge shall maintain an outlet moisture content not in excess of that equivalent to a dewpoint of -65°F at 450 psig (approximately -180°F at 0 psig) in a minimum of 500 standard (70°F and 760 mm Hg) cubic feet of gas saturated at $130 +5 -0^{\circ}\text{F}$ and $450 +0 -25$ psig, and passed through the cartridge at a flow rate of not less than 10 scfm under these conditions.

3.6.2 Settling and compaction. The contents of a vertically mounted cartridge shall be neither settled nor compacted so as to permit the top end retainer being depressed into the cartridge body to a depth greater than 0.469 inch below the top of the cartridge and seam after being subjected to vibration with a vertical double amplitude of not less than 0.032 inch and a simultaneous horizontal double amplitude of not less than 0.035 inch applied over a frequency range of 10 to 55 cps for not less than 20 hours, and when:

- a. The cartridge remains in the same position it occupied during the vibration.
- b. The top end cover has been removed in a manner which will not damage the end-to-body seam or restrict movement of the end retainer.
- c. An evenly distributed force of not less than 7 pounds is applied along the cartridge centerline so as to force the end retainer into the cartridge body.
- d. The end retainer depression is measured parallel to the cartridge centerline from the extreme top edge of the cartridge end seam to the rim of the retainer cup.

3.6.3. Leakage. Indication of leakage shall not be evident when a cartridge previously temperature stabilized at 95°F or below is totally immersed for not less than 30 minutes in water maintained at 180°F .

3.7 Details of components.

3.7.1 Container

3.7.1.1 Body. The container body shall be fabricated from type I, grade 3, 107-pound base weight (pounds per base box) tinsplate, having a tin coating of 1.05 pounds per base box minimum average weight test value in accordance with QQ-T-425.

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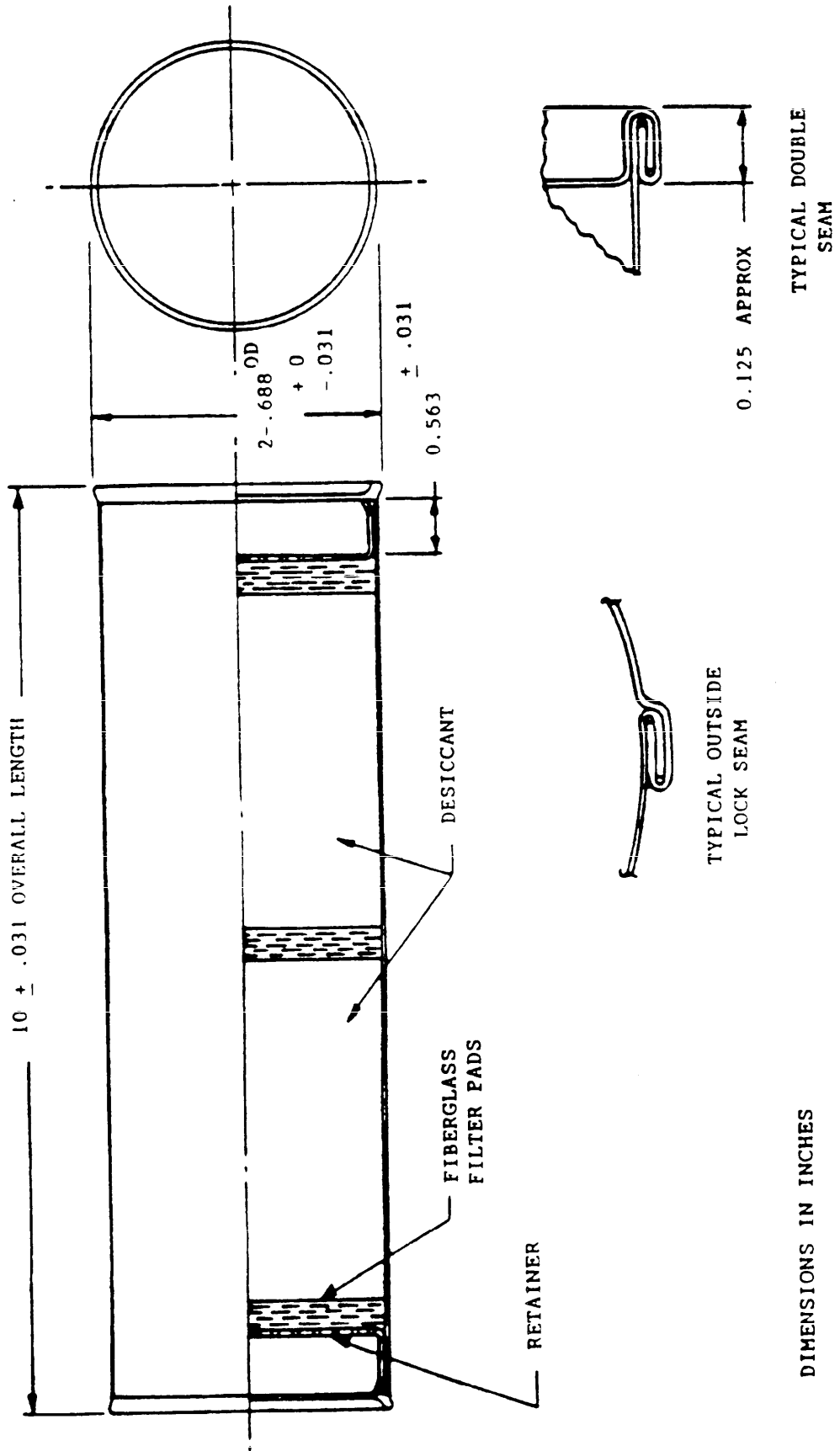


Figure 1 - Cartridge Details

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3.7.1.2 Seams. The body joint shall be an outside lock seam soldered the entire length with tin-lead solder, or welded (see 3.7.1.7). The end-to-body seam shall be a double seam approximately 0.125 inch in height. See figure 1 for a typical lock and double seam.

3.7.1.3 Ends. The container ends shall be fabricated from type I, grade 3, 75- to 90-pound base weight (pounds per base box) tinplate, having a tin coating of 1.05 pounds per base box minimum average weight test value in accordance with QQ-T-425.

3.7.1.4 Lining compound. Lining compound used for end sealing shall be as recommended by the manufacturer. The lining compound shall not adversely affect or be affected by the desiccant.

3.7.1.5 Soldering. Soldering operations shall be made with tinlead solder, composition Sn40, Sn50, or Sn60 conforming to QQ-S-571. Corrosive or combustible flux may be used provided all traces of flux are removed from the outside of the cartridge and, insofar as possible, from the inside of the cartridge. A maximum of 5 mg of solvent-extractable flux may be left inside the cartridge. Flux containing toxic materials or giving off toxic fumes at a temperature of 200 F or less shall not be used.

3.7.1.6 End retainers. Retainers shall be provided at the ends of the cartridge as shown on figure 1. The retainers shall be formed from iron or steel sheet of nominal 0.030-inch thickness and perforated with 0.094 inch holes on 3/16-inch centers. The retainers shall be a free-sliding fit with a clearance not to exceed 0.078-inch on diameter and shall not be bound into the end seams when the container is sealed.

3.7.1.7 Welding. The body shall be seamed the entire length by overlapping the body blank edges and applying continuous electrical resistance seam weld.

3.7.2 Filters. Three glass-fiber filters shall be provided in each cartridge, one at each end and one in the middle as shown on figure 1. The filters shall withstand temperatures up to 600o F without damage. They shall contain no bounding agent or impregnation that will burn or be absorbed by the desiccant. The filters shall be cut not less than 0.750 inch oversize on diameter from glass-wool stock of sufficient density and thickness to support a uniform load of 1.500 psi without being compressed to a thickness of less than 0.313 inch. The filters shall be so installed that free passage of gases or desiccant particles will not occur between the filter and the wall of the container, and so as to prevent desiccant dust from leaving the cartridge.

3.7.3 Desiccant.

3.7.3.1 Type I. The desiccant shall be in accordance with MIL-D-3716, type I or II, grade H or M. The desiccant shall be mechanically and chemically nontoxic and shall not deliquesce in the presence of water or water vapor. A gas or liquid shall not be produced or caused to be produced by the desiccant material in reaction to water or water vapor.

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3.7.3.2 Type II. The desiccant material shall meet the particle size, particle strength, and corrosiveness requirements as applicable to type II, grade H desiccant in accordance with MIL-D-3716. The desiccant particle size shall be between 8 and 16 mesh. The desiccant shall be mechanically and chemically nontoxic and shall not deliquesce in the presence of water or water vapor. A gas or liquid shall not be produced or caused to be produced by the desiccant material in reaction to water or water vapor.

3.7.3.3 Desiccant quantity. The cartridge shall be filled with sufficient desiccant to insure that:

- a. The desiccant will be held in compression by the fiber-glass filter pads after cartridge assembly.
- b. When the top cover is removed from a cartridge with its centerline in the vertical plane, the end retainer will be so forced from the cartridge body by the filter pad resiliency that the upper edge of the retainer cup lip will extend not less than 0.031 inch outside the cartridge beyond the unbroken end-to-body seam.

3.8 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 DoD-D-1000 shall govern the manufacturer's part numbers and changes thereto.

3.9 Exterior finish. The exterior surface of the cartridge shall be finished with tinplate only.

3.10 Operational markings.

3.10.1 Handling instructions. The instructions specified in table I shall be printed on the polyethylene bag specified in 3.12.3. The printing shall be legible and of a permanent nature.

3.10.1.1 Intended use marking. In addition to the instructions specified in table I, the following note shall be printed on the polyethylene bag:

THE CARTRIDGE IS INTENDED FOR USE WITH THE DEHYDRATOR CYLINDER
CONFORMING TO MIL-C-83960 TO DRY HIGH-PRESSURE AIR, OXYGEN, HY-
DROGEN, HELIUM, OR NITROGEN GASES DURING GROUND SERVICING OF
AIRCRAFT OR MISSILE GAS SYSTEMS.

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TABLE I

INSTRUCTIONS FOR REPLACING
CARTRIDGES IN CARTRIDGE HOLDERS

1. Release pressure in cartridge holder.
2. Remove cartridge holder cap assembly and extract exhausted cartridge.
3. Inspect cartridge holder and cap assembly to insure gaskets are in proper condition and position.
4. Cartridge holder interior should be free from dust, paint, or metal chips; grease, oil, water, or other contaminants. NOTE: When oil, grease, or any hydrocarbon is found in cartridge holders on BREATHING OXYGEN, or water-pumped nitrogen, hydrogen, helium, or air servicing units, remove the complete cartridge holder from the unit, wash the holder (including cap assembly) in clean, pure cleaning solvent, then wash with hot water detergent or soap solution. Rinse in clean water, dry, and bake in an oven at 400° F for 1 hour. Install new packing and replace holder on the servicing unit. Avoid even the slightest contamination of the cartridge or cartridge holder with oil or grease, particularly when used on an oxygen servicing unit.
5. Open the end of the plastic bag and slip cartridge into holder. On oxygen servicing units, do not touch the cartridge during insertion.
6. Fit the cap assembly into place, press down, and start threads into engagement. The cutters will be forced into the top and bottom of the cartridge as the cap assembly is screwed into place.
7. Screw cap assembly down to a moderately tight fit using a handtool between the cap lugs.
8. Pressurize SLOWLY and check for leaks.

3.11 Identification of product. The cartridge protective bag shall be marked in accordance with MIL-STD-130 as specified for parts.

3.11.1 Ending marking. The manufacturer's mark and the year of manufacture shall be stamped on one end of the cartridge.

3.12 Cleaning and degreasing.

3.12.1 Cleaning and degreasing prior to assembly. The cartridge shell, including the ends and retaining discs, shall be degreased before assembly. After the cartridge shell side seam and one end have been assembled and sealed, cleaning shall be accomplished by one of the following methods:

3.12.1.1 Method A. A vapor degreasing method with stabilized trichloroethane conforming to MIL-T-81533 shall be used. The cartridge shall be blown clean and dry with a stream of clean, dry, oil-free air until all traces of the trichloroethane fluid have been removed. As an alternate after degreasing, the cartridge shall be dipped in a hot water (180°) bath and then wiped with a soft wiping cloth until all traces of the trichloroethane are removed.

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3.12.1.2 Method B. The cartridge shall be flushed with naphtha conforming to TT-N-95 and blown clean and dry of all solvent with oil-free air. It shall then be flushed with anti-icing fluid conforming to TT-I-735 or anhydrous ethyl alcohol and rinsed thoroughly with fresh, clean water. Following this, the cartridge shall be thoroughly dried with a stream of clean, dry, oil-free air.

3.12.1.3. Method C. The cartridge shall be flushed with a hot, inhibited, alkaline cleaner until all traces of foreign matter have been removed and thoroughly rinsed with clean water. It shall then be thoroughly dried with a stream of clean, dry, oil-free air.

3.12.2 Final degreasing. After final assembly and testing, all cartridges shall be degreased, defluxed, and thoroughly dried before being packaged in the polyethylene bag specified in 3.12.3. Final degreasing shall be accomplished in accordance with method A, B, or C as specified in 3.12.1.1, 3.12, 1.2, and 3.12.1.3. After final degreasing, the cartridge shall be handled in such a manner as to preclude contamination.

3.12.3 Protective bag. After final cleaning and inspection, each cartridge shall be sealed within a polyethylene bag conforming to L-P-378, type I, grade B, finish 2, having a minimum thickness of 5 mils. The bag shall be of sufficient size to permit the cartridge to be slipped from the bag and into the holder without touching the cartridge with the bare hands.

3.13 Workmanshp. The cartridge shall be fabricated and finished in a thoroughly workmanlike manner. Particular attention shall be given to freedom from blemishes, defects, burrs, and sharp edges; accuracy of dimensions; thoroughness of soldering; et cetera. Loose, spattered, or excess solder; metal chips; solder flux; and all other foreign material shall be removed prior to final degreasing.

4. QUALITY ASSURANCE PROVISIONS

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

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4.2 Classification of tests. The inspection and testing of the cartridge shall be classified as follows:

- a. Qualification testing..... See 4.4
- b. Acceptance tests..... See 4.5

4.3 Test conditions.

4.3.1 Instrumentation

4.3.1.1 Pressure measurements. Pressures shall be recorded in pounds per square inch gage. Pressure differentials shall be recorded in inches of water or inches of mercury, as applicable.

4.3.1.2 Temperature measurements. Temperatures shall be measured by appropriately located thermometers or thermocouples used with calibrated potentiometers. Temperatures shall be recorded in degrees Fahrenheit.

4.3.1.3 Flow measurements. Gas flow measurements shall be obtained by passing the material through a properly calibrated meter designed to handle the gas being measured. Gas flow rates shall be recorded as standard cubic feet per minute (scfm). Total quantities of gas passed shall be recorded as standard cubic feet (scf).

4.3.2 Preparation for test. The cartridge shall be prepared for testing as required by the specific test instructions.

4.3.3 Observations. During the progress of all tests, the performance of the cartridge shall be observed to determine the degree of compliance with all requirements specified herein.

4.3.4 Test data. Test data shall be recorded as required under the specific tests.

4.3.4.1 Correction of data. If the tests specified herein cannot be conducted under the specified conditions, the tests may, upon approval by the procuring activity for each deviation from the specified conditions, be conducted under other conditions and the performance under the specified conditions calculated from the test results obtained. The manner of calculation shall be demonstrated, and actual data proving the correctionness of the calculation methods shall be presented along with the report for review by the procuring activity.

4.3.4.2 Tolerances. The tolerances shall be as follows:

- a. Pressure gages shall be accurate to within 2 percent of the numerical figure recorded.
- b. Temperatures shall be accurate to within 2 ° F.
- c. Dewpoints/frostpoints shall be accurate to within 3 ° F.
- d. Gas flow rates shall be accurate to within 2 percent of the numerical figure recorded.

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e. Total gas flow quantities shall be accurate to within 2 percent of the numerical figure recorded.

4.4 Qualification testing.

4.4.1 Test samples. The qualification tests samples shall consist of 12 cartridges. Samples shall be appropriately identified with the manufacturer's own part number and any additional identification required by the authorizing letter.

4.4.3 Test Report. After completion of the qualification tests, a test report shall be prepared in accordance with MIL-STD-831 and three copies furnished to the Procuring Activity.

4.4.3 Qualification tests. Qualification tests and allocation of the test samples shall be in accordance with the following schedule:

	<u>Test</u>	<u>Sample Number</u>											
		1	2	3	4	5	6	7	8	9	10	11	12
4.6.1	Examination of product	X	X	X	X	X	X	X	X	X	X	X	X
4.6.2	Dimensions	X	X	X	X	X	X	X	X	X	X	X	X
4.6.4	Thirty-minute, leakage	X	X	X	X	X	X	X	X	X	X	X	X
4.6.5	Quantity of desiccant	X	X	-	-	-	-	-	-	-	-	-	-
4.6.6	Performance	-	-	X	X	X	X	X	X	X	X	-	-
4.6.7	Solder flux removal	X	-	-	-	-	-	-	-	-	-	-	-
4.6.8	Combustibility	-	X	-	-	-	-	-	-	-	-	-	-
4.6.9	Settling and compaction	-	-	-	-	-	-	-	-	-	X	X	

4.5 Acceptance tests. The acceptance test shall consist of the following:

- a. Individual tests
- b. Sampling plan and tests

4.5.1 Individual tests. Each cartridge shall be subjected to the following tests as described under 4.6:

- a. Examination of product..... See 4.6.1
- b. Dimensions..... See 4.6.2
- c. Two-minute leakage..... See 4.6.3
- d. Cleaning effectiveness..... See 4.6.10.1 and 4.6.10.2

4.5.2 Sampling plan and tests.

4.5.2.1 Lot. A lot shall consist of cartridge manufactured under essentially the same conditions and submitted for inspection at substantially the same time.

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4.5.2.2 Sampling plan. Two cartridges shall be selected at random from each lot of 500, or a fraction thereof, on the order and subjected to the following tests:

<u>Test</u>	<u>Sample Number</u>	
	<u>1</u>	<u>2</u>
4.6.4 Thirty-minute leakage	X	X
4.6.5 Quantity of desiccant	X	
4.6.6 Performance		X
4.6.7 Solder flux removal	X	

4.5.2.2.1 Rejection and retest. When one or more items from a lot fail to meet the specification, acceptance of all items in the lot shall be withheld until the extent and cause of failure are determined. The contractor shall fully explain to the government representative the cause of failure and the action taken to preclude recurrence. After corrections have been made, all necessary tests shall be repeated.

4.5.2.2.2 Individual tests may continue. For production reasons, individual tests may be continued pending the investigation of a sampling test failure. But final acceptance of the entire lot or lots produced later shall not be made until it is determined that all items meet all the requirements of the specification.

4.5.3 Defects in items already accepted. The investigation of a test failure could indicate that defects may exist in items already accepted. If so, the contractor shall fully advise the procuring activity of all defects likely to be found and method of correcting them.

4.6 Test methods.

4.6.1 Examination of product. The cartridge shall be inspected to determine compliance with the requirements specified herein with respect to materials, workmanship, and marking. Particular attention shall be given to freedom from excess solder or imperfections in the lip formed by the end-to-body seam.

4.6.2 Dimensions. The cartridge shall be checked by go and no-go gages to determine compliance with the diameter and length requirements specified herein.

4.6.3 Two-minute leakage. The cartridge shall be temperature stabilized throughout at 95 ° F or below immediately prior to this test. The cartridge shall be immersed in water maintained at a minimum temperature of 180 ° F for a minimum of 2 minutes to check for leakage. A definite continuous forming and breaking away of air bubbles from definite points on the surface of the cartridge shall be an indication of leakage and cause for rejection. Presence of bubbles clinging to the surface of the container or occasional formation of bubbles due to escape of air trapped within the seams shall not be considered cause for rejection. If no leakage is evident after this test, the cartridges shall be cleaned in accordance with one of the methods specified in 3.12.1.1, 3.12.1.2, or 3.12.1.3.

4.6.4 Thirty-minute leakage. The cartridge shall be temperature stabilized throughout at 95 ° F or below immediately prior to this test. The cartridge shall be completely submerged in a hot water bath for at least 30 minutes with the water

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maintained at a temperature of not less than 180 ° F for at least 30 minutes. A definite and continuous forming and breaking away of air bubbles from definite points on the surface of the cartridge shall be an indication of leakage and cause for rejection. When a cartridge fails to pass this test, four additional cartridges shall be tested. Failure of any of the additional four shall be cause for rejection of the lot. Presence of bubbles clinging to the surface of the container or occasional formation of bubbles due to escape of air trapped within the seams shall not be considered cause for rejection.

4.6.5 Quantity of desiccant. The cartridge shall be placed in an upright position and the top end cover removed in a manner that will not damage the end-to-body seam. The resiliency of the fiberglass filters shall cause the upper edge of the retainer to raise and project not less than 0.031 inch above the top of the cartridge end-to-body seam, or the cartridge shall be considered to have failed the test. When a cartridge fails to pass this test, four additional cartridges shall be tested. Failure of any of the additional four shall be cause for rejection of the lot.

4.6.6 Performance test.

4.6.6.1 Apparatus. Apparatus for this test shall consist of a 10-cfm source of 450-psi oil-free air or nitrogen, a saturator, dewpoint meter, and gas-flow measuring apparatus. The dewpoint meter shall be accurate to within +_ 3 percent and verification of the accuracy of the dewpoint meter shall be furnished.

4.6.6.2 Conditions. The test shall consist of a continuous run until the dewpoint of the gas leaving the cartridge reaches +50 ° F at 450 psig (approximately -20 ° F at 0 psig) or until not less than 900 standard (70 ° F and 760 mm Hg) cubic feet of gas has passed through the cartridge. For qualification testing only, the sample cartridge(s) shall be weighed to an accuracy of +_ 0.5 gram immediately before and after each test run.

4.6.6.3 Test. The air or nitrogen shall be saturated with water vapor at a temperature of not less than 130 ° F and a pressure not greater than 450 psi. The saturated air or nitrogen shall then be passed through the sample cartridge at the above specified temperature and pressure and at the rate of 10 scfm. The dewpoint and quantity of flow shall be measured. The flow rate shall be constant for each run to within +_ 1 percent.

4.6.6.3.1 The following readings shall be taken at intervals of not less than 2 minutes during a test run:

- a. Saturate temperature and pressure
- b. Temperature at inlet to cartridge
- c. Dewpoint/frostpoint of gas leaving cartridges
- d. Rate of flow through cartridge
- e. Total flow through cartridge

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4.6.6.3.1.1 The total moisture content of the gas leaving the cartridge shall not exceed that equivalent to a frostpoint of -65° at 0 psig before a total flow of 250 standard (70° F and 760 mm Hg) cubic feet, or the cartridge shall be considered to have failed the test. When a cartridge fails to pass this test, four additional cartridges shall be tested. Failure of any of the additional four shall be cause for rejection of the lot.

4.6.7 Solder flux removal. The interior and exterior of the cartridge shall be examined to determine if any solder flux is evident. The seams of the cartridge shall be washed with a flux solvent and the amount of flux extractable determined. If more than 5 mg of the flux is found in the cartridge, the cartridge shall be rejected.

4.6.8 Combustibility. Samples of each of the materials used in the cartridge shall be tested for combustibility by exposing them to oxygen at high temperatures. Approximately 0.5 gram of each material shall be placed in an oxygen bomb that shall be pressurized to 2,000 psi with 99 percent pure oxygen and heated uniformly to 300° F for not less than 1 hour. A sudden temperature rise or change in the appearance of the material shall be considered to be evidence of combustion and noncompliance with 3.4.1.

4.6.9 Settling and compaction. The cartridge shall be mounted in an upright position on the test facility. The facility shall be so adjusted that a vertical double amplitude of 0.032 inch and a horizontal double amplitude of 0.035 inch will be applied over a range of frequencies beginning at 10 cps, increasing to 55 cps, and returning to 10 cps over a time interval of 2 minutes. The above vibration sequence shall be continued for 20 hours. With the cartridge remaining in an upright position on the vibration facility, the top end cover shall be removed in a manner that will not damage the end-to-body seam or restrict free movement of the end retainer. An evenly distributed force of no less than 7 pounds shall then be applied vertically downward on the end retainer to force it into the cartridge body. The top edge of the retainer rim shall not be depressed to more than 0.469 inch below the top of the cartridge end seam, or the cartridge shall be considered to have failed the test.

4.6.10 Cleaning effectiveness tests.

4.6.10.1 Visual inspection. During and after assembly, the cartridge shell, including the ends and retaining discs, shall be visually examined for evidence of corrosion products, metal chips, scale, oil, grease, paints, preservatives, decals, or other contamination or foreign matter. Any evidence of contamination or foreign matter shall be cause for recleaning and retest.

4.6.10.2 Ultraviolet light inspections. With the cartridge shell side seam and one end assembled and sealed, all accessible surfaces and parts of the cartridge shall be visually inspected for hydrocarbons with ultraviolet light. With the container filled and completely closed, the cartridge shall again be visually inspected for hydrocarbons with ultraviolet light. Evidence of fluorescence during either inspection shall be cause for recleaning and retest.

4.7 Inspection of the preservation, packaging, and packing. The inspection of the preservation, packaging, and packing shall be in accordance with the instructions of section 5 herein.

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5. PREPARATION FOR DELIVERY

5.1. Preservation and packaging. Preservation and packaging shall be level A or C as specified (see 6.2).

5.1.1 Level A. Prior to preservation and packaging, each cartridge shall be thoroughly cleaned and dried in accordance with 3.12.2. Cartridges bagged in accordance with 3.12.3 shall be unit packaged one each, method III in accordance with MIL-P-116, in containers conforming to PPP-B-636. Closure and sealing of the containers shall be in accordance with the specification and appendix thereto.

5.1.2 Level C. Packaging shall be in accordance with the manufacturers commercial practice.

5.2 Packing.

5.2.1 Packing Levels. Packing shall be levels A, B, or C as specified (see 6.2). Shipping containers, insofar as practical, shall be uniform in size and shape and of minimum cube and tare weight consistent with the protection required, and shall contain identical quantities.

5.2.1.1 Level A. Cartridges preserved and packaged in accordance with 5.1.1 shall be packed in an overseas type container conforming to PPP-B-621. Closure and strapping shall be in accordance with the container specification and appendix thereto.

5.2.1.2 Level B. Cartridges preserved and packaged as specified under 5.1.1 shall be packed in domestic-type exterior containers conforming to PPP-B-621, or PPP-B-636. Exterior containers shall be of uniform shape and size and shall contain identical quantities. Containers shall be closed and strapped in accordance with the applicable container specification or appendix thereto.

5.2.1.3 Level C. Cartridges preserved and packaged as specified in 5.1 which require overpacking for acceptance by carrier shall be packed in a shipping container which will insure safe delivery at the lowest transportation rate. Containers shall meet the Consolidated Freight Rules and regulations of other common carriers as applicable to the mode of transportation.

5.3 Marking. Unit, intermediate, and shipping containers shall be marked in accordance with MIL-STD-129. The nomenclature shall be:

- Type I - Cartridge, Desiccant Dehydrator, Type MA-1
- Type II - Cartridge, Desiccant Dehydrator, Type MA-2

6. NOTES

6.1 Intended use. The dehydrator cylinder cartridges are intended for use in the oxygen purifier conforming to MIL-C-83960 and will be utilized to dehydrate high-pressure gases for charging aircraft and missile high-pressure gas systems from the ground.

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6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification
- b. Type of cartridge (see 1.1)
- c. Applicable levels of preservation and packaging, and packing (see 5.1 and 5.2.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of suppliers is called to this requirement, and manufacturers are urged to arrange to have the products covered by this specification. The activity responsible for the Qualified Products List is WR-ALC/MMIRFW and information pertaining to qualification of products may be obtained from that activity.

6.4 Subject term (Key Word) Listing.

Cartridge
Combustibility
Dehydrator
Desiccant

6.5 Changes from Previous Issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:
Air Force - 99

Preparing activity
Air Force - 84

Reviewers:
DLA-CS

Project Number:
4440-F051

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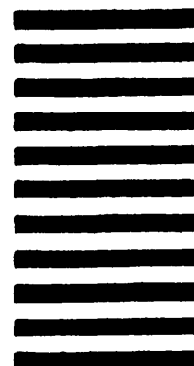
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