

BB-A-1034B
20 December 1985
SUPERSEDING
BB-A-1034A
June 21, 1968

FEDERAL SPECIFICATION
COMPRESSED AIR, BREATHING

This specification is approved by the Assistant Administrator, Office of Federal Supply and Services, General Services Administration, for the use of all Federal Agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification establishes the requirements for breathing air that is supplied in a pressurized container or directly from a compressor. The composition of the breathing air is similar to that normally found in the atmosphere. This specification does not apply to compressed air that is used in manufacturing plants for industrial purposes (see 6.1).

1.2 Classification. The breathing air shall be of the following sources and grades, as specified (see 6.2):

Source I - Breathing air supplied in a pressurized container

Grade A - High purity, very low water content

Grade B - Standard purity, low water content

Source II - Breathing air supplied directly from a compressor

Grade A - High purity, very low water content

Grade B - Standard purity, low water content

2. APPLICABLE DOCUMENTS

2.1 Government publications. The issues of the following documents, in effect on date of invitation for bids or solicitation for offers, form a part of this specification to the extent specified herein.

Federal Standards

FED-STD-123 - Marking for Shipment (Civil Agencies)

FSC 6830

DISTRIBUTION STATEMENT A, Approved for public release; distribution is unlimited.

AMSC N/A

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(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions, as outlined under General Information in the Index of Federal Specifications, Standards, and Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

(Single copies of this specification, and other Federal specifications and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.)

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specifications

- MIL-L-25567 - Leak Detection Compound, Oxygen Systems
- MIL-T-27710 - Tape, Antisieze, Tetrafluoroethylene, With Dispenser

Military Standards

- MIL-STD-101 - Color Code for Pipelines and for Compressed-Gas Cylinders
- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-1411 - Inspection and Maintenance of Compressed Gas Cylinders

(Copies of military specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

Laws and Regulations

Department of Transportation

49 CFR - Transportation

(The Code of Federal Regulations (CFR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated reprints of certain regulations may be obtained from the Federal Agency responsible for issuance thereof.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is

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identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Chemical Society Publications

Reagent Chemicals, ACS Specifications

(Application for copies should be addressed to the American Chemical Society, 1155 Sixteenth Street, N.W., Washington, DC 20006.)

American Society for Testing and Material (ASTM)

ASTM E 29 Recommended Practices for Indicating Which Places of Figures are to be Considered Significant in Specified Limiting Values.

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

3. REQUIREMENTS

3.1 Preproduction. When specified (see 6.2), the breathing air furnished under this specification shall be a product which has passed the preproduction inspection (see 4.4).

3.2 Composition.

3.2.1 Air mixture. The composition of the air mixture shall conform to the requirements specified in table I and 3.2.1.1.

TABLE I. Air mixture composition.

Component	Source I (pressurized container air)		Source II (compressor air)		Test method
	Grade A	Grade B	Grade A	Grade B	
Oxygen, percent by volume	20 to 22	19 to 23	20 to 22	19 to 23	4.7.1
Carbon dioxide 1/	500	1000	500	1000	4.7.2
Carbon monoxide 1/	10	10	10	10	4.7.3
Oil (mist and vapor) and	0.005	0.005	0.005	0.005	4.7.4

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TABLE I. Air mixture composition. (continued).

Component	Source I (pressurized container air)		Source II (compressor air)		Test method
	Grade A	Grade B	Grade A	Grade B	
particulate matter 2/ Separated water	None	None	None	None	4.7.5
Total water 2/	0.02	<u>3/</u>	0.02	<u>3/</u>	4.7.6

1/ Maximum parts per million (ppm) by volume.

2/ Milligrams per liter, maximum

3/ Minimum total water content for Grade B may be set in purchase order.

3.2.1.1 Balance. The composition of the balance of the air mixture, when tested as specified in 4.7.10, shall consist of nitrogen and, if present, the usual quantities (or less) of the other gases usually found in the atmosphere. The trace constituents for all sources and grades shall not exceed the values specified in table II.

TABLE II. Air mixture trace constituents.

Component	Maximum ppm by volume	Test method
Gaseous hydrocarbons (as methane)	25	4.7.10
Halogenated solvents (trichloroethylene and freon TF)	0.2	4.7.10

3.3 Odor. When tested as specified in 4.7.7, the breathing air shall be free from a pronounced or objectionable odor.

3.4 Preparation of Cylinders (Source I). Cylinders shall be processed according to 3.4.1 and MIL-STD-1411 except the hydrostatic test date shall be no more than 5 years prior to the intended filling date.

3.4.1 Filling pressure. Pressurized containers shall be filled to the nominal pressure specified in the contract or order (see 6.2). When tested as specified in 4.7.8, the container pressure shall be within \pm 25 pounds per square inch gauge (psig) of the specified value.

3.5 Type of compressor chambers (source II). Compressor chambers for source II breathing air may be either water-lubricated or unlubricated.

4. QUALITY ASSURANCE PROVISIONS

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4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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 that supplies and services conform to prescribed requirements.

4.2 Classification of inspection. The examination and testing of the breathing air shall be classified as follows:

- (a) Preproduction inspection (see 4.4)
- (b) Quality conformance inspection (see 4.5)

4.3 Inspection conditions.

4.3.1 Purging of connecting lines. Except for the filling pressure test, sufficient breathing air shall be discharged through all connecting lines to completely purge and displace air or other gas in the lines before coupling to the test equipment.

4.3.2 Temperature and pressure. Unless otherwise specified, tests shall be conducted at local ambient temperature and barometric pressure. Test instruments shall be calibrated or adjusted according to their required usage in conducting individual tests. Temperatures and pressure shall be recorded at the time of inspection and, when required, the test results shall be corrected to standard temperature and pressure (STP) conditions. STP conditions are 29.92 inches of mercury (760 mm) and 21.1°C (70°F).

4.4 Preproduction inspection. When specified (3.1 and 6.2), the preproduction inspection shall consist of a review of the test report (see 4.4.2) for approval, and by examination and testing to determine that the preproduction inspection sample (see 4.4.1) complies with all the requirements of 3.2 and 3.3.

4.4.1 Preproduction inspection samples.

4.4.1.1 Source I. Unless otherwise specified, as soon as practicable after the award of the contract or purchase order, the contractor shall submit one container of each grade of source I breathing air specified in the contract or purchase order. Each container shall have a minimum volume of 276 cubic inches, charged to a pressure of 400 psig and contain a minimum quantity of 25 cubic feet. The composition of the compressed breathing air shall be representative of the item or items to be delivered under the contract. The samples shall be furnished to the Government as specified in the contract or order (see 6.2).

4.4.1.2 Source II. Preproduction samples of source II breathing air of each grade specified in the contract or order shall be submitted and furnished to the Government as specified in the contract or order.

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4.4.1.3 Identification markings. The preproduction sample shall be plainly identified by a securely attached durable tag or label marked with the following information:

Sample for preproduction inspection
 AIR, COMPRESSED FOR BREATHING PURPOSES
 Source and grade
 Name of manufacturer
 Product code number
 Batch number
 Date of filling
 Submitted by (name) (date) for preproduction inspection in
 accordance with BB-A-1034B

4.4.2 Test reports. Two copies of the manufacturer's test report, containing complete test data, referring specifically to the applicable paragraphs, showing that the material submitted for preproduction inspection conforms to the requirements of this specification (see 4.4), shall be submitted with the preproduction sample.

4.5 Quality conformance inspection.

4.5.1 Sampling for tests.

4.5.1.1 Source I. A quantity of filled pressurized containers shall be selected at random from each lot in accordance with table III. A lot shall consist of pressurized containers that have been charged on the same manifold at the same time.

4.5.1.2 Source II. Unless an alternate procedure is specified by the procuring activity (see 6.2), samples of the breathing air shall be taken from each compressor at the intervals specified in table III.

4.5.1.3 Preparation for delivery (source I only). Samples of filled pressurized containers shall be selected at random from each lot in accordance with MIL-STD-105 and table IV, and must meet all requirements of section 5.

4.5.1.4 Retention samples. When specified by the procuring activity (see 6.2), a sample of the breathing air being manufactured to fulfill a contract shall be taken at a maximum interval of once every 45 days for the duration of the contract. The samples shall be taken and forwarded as specified in the contract or order (see 6.2).

4.5.1.5 Inspection procedure.

4.5.1.5.1 Source I. Each of the source I filled pressurized containers selected in accordance with 4.5.1.1 shall be tested to determine conformance to the applicable requirements specified in table III. The test sequence specified in footnote 1/ of table III shall be followed. The manufacturer shall certify in writing that the breathing air supplied conforms to the requirements of Table I and 3.2.1. The filled pressurized container or the lot shall be accepted or rejected and reprocessed as specified in table III.

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TABLE III. Quality conformance sampling and tests for source X and source Y breathing air.

Requirements	Inspection level	Sample unit	Test method	Rejection criteria: Nonconformance of (A) shall be cause for rejection of (B)		Reprocessing instructions
				(A)	(B)	
Source I breathing air: 1/						
All requirements of table I	2/	A filled pressurized container	See table I	A sample for each requirement	The lot represented by the sample	See 4.6.1
Odor	100 percent	A filled pressurized container	4.7.7	A sample	The selected container	See 4.6.1
Filling pressure	100 percent	A filled pressurized container	4.7.8	A sample	The selected container	See 4.6.2
Leakage	100 percent	A filled pressurized container	4.7.9	A sample	The selected container	See 4.6.3
Source II breathing air:						
Odor	Sample every hour	One compressor	4.7.7	See footnote 3/	None	None
Carbon monoxide	Continuous	One compressor	4.7.3	See footnote 2/	None	None
All the other requirements of table I	Sample every 24 hours	One compressor	See table I	See footnote 3/	None	None

1/ For source I breathing air, the following test sequence shall be followed: (1) Odor (2) Other tests specified in table I, as applicable (3) Filling pressure (4) Leakage.

2/ Number of samples Lot size

1	1 to 10
2	11 to 40
3	41 to 70
4	over 70

3/ Unless an alternate procedure has been specified by the procuring activity (see 6.2), nonconformance of a sample to a single requirement shall require the shutdown of the compressor until the defective condition is corrected.

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TABLE IV. Quality conformance sampling for preparation for delivery.

Inspection	Inspection level	AQL - percent defective	Sample unit
Filled pressurized containers (see Table V)	S-3	2.5	A filled pressurized container 1/
Packing (see Table VI)	S-3	2.5	A pallet or shipping container 2/

1/ The lot size shall be the number of filled pressurized containers of one size and type containing one grade of breathing air produced by one manufacturer being inspected at one time.

2/ The lot size shall be the number of filled pallets or shipping containers produced by one manufacturer being inspected at one time.

4.5.1.5.2 Source II. Each sample of source II (compressor) air (see 4.5.1.2) shall be tested to determine conformance to the applicable requirements specified in table III. The manufacturer shall certify in writing that the breathing air supplied conforms to the requirements of Table I and 3.2.1. Whenever a sample fails to conform to a single requirement, action shall be taken as specified in footnote 3/ of table III.

4.5.1.5.3 Preparation for delivery (source I only). The source I preparation for delivery samples selected in accordance with 4.5.1.3 and table IV shall be examined for the defects listed in tables V and VI to determine compliance with all the applicable requirements of section 5. If the number of defective samples exceeds the acceptable quality level specified in table IV, the lot represented by the samples shall be rejected.

Table V. Filled pressurized containers.

Examine	Defect
Material	Not material required
Construction	Not size, type, or class specified Closure not as specified Evidence of leakage
Marking	Warning labels or marking missing, omitted, illegible, incorrect, incomplete Not in accordance with contract requirements

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Table VI Packing.

Examine	Defect
Intermediate Packaging	Not level required by contract or purchase order Material or construction not as specified
Packing	Not level required by contract or purchase order Materials or construction not as specified Any nonconforming component, incomplete closures, inadequate strapping, bulged or damaged containers
Count	Less than specified or indicated quantity of primary containers per shipping container
Markings	Warning labels or marking missing, omitted, illegible, incorrect, incomplete, or not in accordance with contract requirements Shipping containers fully prepared for delivery shall be examined after closure for closure defects

4.6.1 Nonconformance to filling pressure.

4.6.1 High pressure. A pressurized container having more than the maximum allowable filling pressure shall be discharged to the acceptable value (see 3.4.1).

4.6.2. Low pressure. A pressurized container having less than the specified minimum filling pressure shall be charged to the acceptable value (see 3.4.1), and shall be considered as one of a new lot of pressurized containers. Unless it has been filled alone, such a container shall not be selected for tests other than odor, filling pressure, and leakage.

4.7 Test methods. Except for the filling pressure test, sufficient breathing air shall be permitted to flow through all connecting lines to completely displace air or other gas in the lines before coupling to the test equipment. Gas volumes shall be measured at, or calculated to standard conditions of 760 mmHg. (29.92 inches Hg.) and 21.1°C (70°F). American Chemical Society (ASC) reagent chemicals and distilled water shall be used in all tests.

4.7.1 Oxygen content. Determination of the oxygen content shall be made by one of the following methods:

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- (a) Nitrometer Method. Performed by placing a sufficient quantity of mercury in a 100 cubic centimeter (cc) calibrated nitrometer, provided with a two-way stopcock and a two-way outlet, and properly connected with a balancing tube. Connect one of the outlet tubes of the nitrometer with a gas pipette of suitable capacity. Place in the pipette a coil of copper wire that extends to the uppermost portion of the bulb, and add approximately 125 milliliters (ml) of ammonium chloride ammonium hydroxide solution. This solution shall be freshly prepared (immediately before use) by mixing equal volumes of water and 27 percent concentrated ammonia; then saturating with ammonium chloride. Draw the liquid (free from air bubbles) through the capillary opening connection and stopcock opening in the nitrometer by reducing the pressure in the nitrometer tube and opening the stopcock controlling connection with the gas pipette. Close the stopcock. Having completely filled the nitrometer, the other stopcock opening, and the other intake tube with mercury, the apparatus is ready for the addition of the sample. Before taking test data, the ammonium chloride - ammonium hydroxide solution in the gas pipette shall be aged by passing five 100 cc portions of the breathing air through the solution. After aging the solution, 100 cc of the breathing air sample shall be drawn into the nitrometer by reducing the pressure in the tube. Close the stopcock. Increase the pressure on the breathing air in the nitrometer tube, and open the stopcock controlling the connection with the gas pipette. Force the entire volume of gas into the pipette. Close the stopcock and rock the pipette gently for 15 minutes providing frequent contact of the liquid, breathing air and copper spiral. Draw some of the liquid into the nitrometer tube, and force the residual gas back upon the surface of the liquid in the pipette. Again rock the pipette until no further diminution in the volume of the gas occurs. Draw the residual gas into the nitrometer tube and measure its volume.
- (b) Paramagnetic Type Analyzer. The analyzer shall be calibrated (zeroed and spanned) at appropriate intervals by use of calibrated purity standards. The range shall be no greater than ten times the difference between the specified minimum percent oxygen and 100 percent. Thus, for 99.5 percent minimum oxygen the analyzer would have a maximum range of five percent impurity or from 95 percent to 100 percent oxygen.
- (c) Thermal Conductivity Type Analyzer. The analyzer shall be calibrated (zeroed and spanned) at appropriate intervals by use of calibrated purity standards. The range shall be no greater than ten times the difference between the specified minimum percent oxygen and 100 percent. Thus, for 99.5 percent minimum oxygen the analyzer would have a maximum range of five percent impurity or from 95 percent to 100 percent oxygen.

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- (d) Gas chromatograph method by determining the total aggregate of impurities. The impurities are expressed as volume percent and subtracted from 100 to obtain the percent oxygen value. This method may be used not only for the noble gases (inerts e.g., argon, krypton, and xenon) and nitrogen, but also for the determination of any of the other limiting gaseous compositions. The analyzer must be capable of separating and determining the composition with a sensitivity of 0.1 ppm or 20 percent of the specified maximum amount of the composition, whichever is greater. Appropriate impurity concentrating techniques may be used to attain the sensitivity.

4.7.2 Carbon dioxide. Determination of carbon dioxide shall be performed by one of the following methods:

- (a) An apparatus employing a comparison tube filled with a color reactive chemical.
- (b) A volumetric or manometric gas absorption (Orstat type) analysis apparatus using a suitable carbon dioxide absorbing reagent. Precision of the apparatus should be at least 10% of the specified maximum amount.
- (c) A gas cell-equipped dispersive or non-dispersive infrared analyzer. The analyzer is to be calibrated (zeroed and spanned) at appropriate intervals with calibration gas standards at approximately 4.3 microns. The analyzer should be operated so that its sensitivity for carbon dioxide is 10% of the specified maximum amount.
- (d) A gas chromatograph.

4.7.3 Carbon monoxide. Determination of carbon monoxide shall be performed by one of the following methods:

- (a) An apparatus employing a comparison tube filled with a color reactive chemical.
- (b) A catalytic combustion analyzer. The analyzer is to be calibrated (zeroed and spanned) at appropriate intervals with calibration gas standards using air as the base gas. The limit of detectability shall be no greater than the specified maximum amount of carbon monoxide.
- (c) A gas cell-equipped dispersive or non-dispersive infrared analyzer. The analyzer is to be calibrated (zeroed and spanned) at appropriate intervals with calibration gas standards at approximately 4.6 microns. The analyzer should be operated so that its sensitivity for carbon monoxide is 1 ppm.
- (d) A gas chromatograph.

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4.7.4 Oil and particulate matter. Determination of oil and particulate matter will be done by passing a sample of air through an adequate filter medium and measuring the increase in weight of the filter or noting the presence of visible discoloration. The filter must be attached to the compressor outlet during filling or air-line operation.

4.7.5 Separated water. Prior to testing, a pressurized container shall be inverted (valve at bottom) for 5 minutes. A compressor outlet or a piece of clean, dry tubing attached to it shall be held downward so that separated water may drain by gravity. Allow the breathing air to leak slowly into a clean, dry 10 ml graduated cylinder for one minute.

CAUTION: Rapid escape of air will cause dispersion and loss of any separated water that may be present.

Examine the graduated cylinder for the presence of separated water.

4.7.6 Total water. The breathing air shall be tested for total water content by means of the dewpoint method, the electrical conductivity method, the accelerated gravimetric method or other method that has been approved by the procuring activity. In case of dispute, the accelerated gravimetric method shall be the referee method.

4.7.6.1 Accelerated gravimetric method. Moisture content shall be determined by the measurement of the increase in weight of phosphorous pentoxide (P_2O_5) by the following procedure:

- (a) Invert the container to be tested and place it on a rack. Connect the container to the test apparatus by means of a length of bent, seamless, corrosion-resistant steel tubing and a high-pressure union with a needle valve and a glass-to-metal joint (rubber connections shall not be used). A safety valve shall be connected between the low-pressure outlet of the needle valve and the first absorber. The steel tubing shall be fabricated so that it shall pass through two water baths at room temperature. The apparatus shall consist of three U-tube absorbers in series, each 4 inches high and 1/2 inch in diameter, containing phosphorous pentoxide on glass wool and connected through a water saturator to a calibrated wet test meter of 1/20 cubic feet size equipped with a 1-liter dial. The needle valve connecting the container to the absorber shall be so flushed that only gas shall be discharged from the container and shall pass through the absorber. The absorbers shall be brought to constant weight in a stream of dry air before they are weighed so that they shall be filled with air at all times. Before each weighing of the absorbers, they shall be opened momentarily to the air, closed and cleaned. One hundred liters of the breathing air shall be discharged through the apparatus at a rate not to exceed 0.4 liter per minute. The gas volume corresponding to the gain in weight shall be calculated to standard conditions (see 4.3.2). The moisture content shall be computed in terms of milligrams per liter at standard conditions.

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4.7.7 Odor. The breathing air shall be tested for odor by slightly opening the pressurized container valve or the compressor outlet and smelling the escaping air.

4.7.8 Filling pressure (source I only). The filling pressure of the source I breathing air container shall be measured with an accurately calibrated Bourdon tube gage or other suitable gage. The gage shall be attached to the valve outlet and a calibrated thermometer or a thermocouple to the wall of the pressurized container. The thermocouple EMF shall be measured with a calibrated potentiometer. The bulb of the thermometer or the thermocouple shall be protected from room temperature changes by the application of insulating material such as tape or putty. The insulation shall not be placed between the wall of the pressurized container and the thermometer bulb or thermocouple. The pressurized container shall be stabilized to approximately room temperature. Immediately before measuring the pressure, the temperature of the container shall be recorded. The container valve shall then be opened, the internal pressure read on the gage, and recorded.

4.7.9 Leakage (source I only). The source I breathing air pressurized container shall be tested for leakage by brushing a leak test compound conforming to MIL-L-25567 over the container and all parts of the valve except the closed valve outlet. The closed valve outlet shall be tested for leakage by attaching a tube to the closed outlet and immersing the other end in the leak test compound. Bubbling after application of or immersion in the leak test compound shall be evidence of leakage.

4.7.10 Balance of the air mixture. An infrared spectrophotometer or other instrument approved by the procuring activity shall be used to determine the balance of the product specified in 3.2.1.1. The analyzer shall be capable of separating and determining the specified component with a sensitivity of 0.1 ppm or 20 percent of the specified maximum amount of the component, whichever is greater. Approved impurity concentrating techniques may be used to attain this sensitivity. The analyzer is to be calibrated at appropriate intervals by the use of calibration gas standards.

4.7.11 Significant Places. For the purpose of determining conformance with this specification, an observed or calculated value shall be rounded off "to the nearest unit" in the last right hand place of figures used in expressing the limiting value, in accordance with the rounding-off method ASTM E 29.

5. PREPARATION FOR DELIVERY

5.1 Packaging and packing (source I only). Unless otherwise specified by the procuring activity, the pressurized containers and packing shall conform to the requirements of Department of Transportation (DOT) Code of Federal Regulations, Title 49.

5.2 Marking (source I only).

5.2.1 Civil agencies. In addition to marking required by the contract or order, unit containers, interior packages and shipping containers shall be marked in accordance with FED-STD-123 and DOT Code of Federal Regulations, Title 49.

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5.2.2 Military activities. In addition to markings required by the contract or order, unit containers, interior packages and shipping containers shall be marked in accordance with MIL-STD-129 and DOT Code of Federal Regulations, Title 49.

5.2.3 Additional marking. Each pressurized container shall be also marked with the lot number and filling date.

5.2.3.1 Color code (sources I and II). Unless otherwise specified (see 6.2), pressurized containers and the piping system used with the air compressor shall be color coded in accordance with MIL-STD-101.

6. NOTES

6.1 Intended use. The breathing air covered by this specification is intended for use in air-sea rescue work, fire fighting, decompression chambers, hyperbaric and other pressurized compartments; and to supply pure air to personnel in an environment having a contaminated or insufficient air supply.

6.1.1 Source I. Used in applications that require the use of a self-contained supply of breathing air. Source I can be used at temperatures below -29°C (-20°F).

6.1.2 Source II. Used in applications that require a direct supply of breathing air from a compressor.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- (a) Title, number, and date of this specification
- (b) Breathing air source and grade (see 1.2)
- (c) Size, construction of container, filling pressure at 21.1 degrees Celsius (70°F), for source I, and quantity required (see 3.4.1 and 5.1)
- (d) Whether source I containers will be furnished by the contractor without cost to the Government for return when empty, whether the Government will furnish the containers for filling, or whether containers will be furnished by the contractor and remain the property of the Government
- (e) Packaging and packing requirements (see 5.1)
- (f) Preproduction approval and where samples are to be forwarded, if required (see 3.1 and 4.4)
- (g) Retention samples and where samples are to be forwarded, if required (see 4.5.1.4)
- (h) Alternate instructions for compressor operation, if required (see table III, footnote 3/)
- (i) Waiver of color coding (see 5.2.3.1)
- (j) Total water requirement for Grade B.

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6.3. Basis of purchase. The basis of purchase shall be the cubic foot, based upon standard atmospheric conditions, 29.92 inches Hg (760 mm) and 21.1 degrees Celsius (70°F).

6.4 Manufacture. Breathing air may be produced by the following commercial processes:

6.4.1 Mixing oxygen and nitrogen. Oxygen and nitrogen, neither of which shall contain contaminants exceeding the limits shown in table I and 3.2.1.1, may be mixed to meet the requirements of this specification.

6.4.2 Compression of atmospheric air. Atmospheric air may be compressed by means of suitable compressor(s) to attain the pressure desired. Compressor chambers used for compression of breathing air shall not have received prior treatment with materials, such as corrosion preventatives, of known toxicity to man. Proper precaution should be taken to assure that only respirable (uncontaminated) air is admitted into the compressor intake. This requires attention to the location of the compressor intake and to the provision of a suitable intake screening or filtration. Strict attention is necessary to the operation and maintenance of compressors in accordance with the manufacturer's instructions; with specific attention to cooling of compression chambers, the type of lubricant, drier and filter, and to the condition of piston rings, driers, filters, and other accessories.

6.5 Safety precautions. Compressors, filters, piping, hose lines and containers must be selected to provide an adequate factor of safety between the maximum anticipated working pressure and the bursting pressure of the component. Internal corrosion, or external damage, can weaken components sufficiently to nullify the safety factor which existed when the component was new. Any compressed gas presents a stored kinetic energy capable of violent explosion if not properly contained. Compressed air containers should not be dropped, dragged, rolled, or allowed to strike each other or be struck violently. No part of a pressurized container should be allowed to reach a temperature exceeding 51.7°C (125°F). A pressurized container which has been exposed to flame (or excessive heat) must be reinspected, retested and if necessary, reprocessed in accordance with DOT Code of Federal Regulations. Air under pressure, from a hose line or cylinder valve, must not be allowed to impinge on any part of the body. A small jet of air under pressure can penetrate the skin and cause severe injury.

6.6 International standardization. Certain provisions of this specification are the subject of international standardization agreement ASCC STD 14/11. When amendment, revision, or cancellation of this specification is proposed which affects or violates the international agreement concerned, the preparing activity will inform GSA so that appropriate reconciliation action may be taken through international standardization channels.

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MILITARY INTEREST:
Custodians

Army-ME
Navy-AS
Air Force-68

Review Activities

Army-MD, MI
Navy-SH

User Activities

Army-AR
Navy-CG, MS, OS

CIVIL AGENCY COORDINATING ACTIVITIES:
GSA-FSS
NBS

PREPARING ACTIVITY:

NAVY-AS

DOD Project 6830-0112

Orders for this publication are to be placed with the General Services Administration, acting as an agent for the Superintendent of Documents. See Section 2 of this specification to obtain extra copies and other documents referenced herein.