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INCH-POUND

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DEPARTMENT OF DEFENSE STANDARD PRACTICE

COLOR CODE FOR PIPELINES AND FOR COMPRESSED GAS CYLINDERS

AMSC N/A

FSC 8120

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DEPARTMENT OF DEFENSE
Washington, D.C. 20301

Color Code for Pipelines and for Compressed Gas Cylinders

MIL-STD-101B

1. This Military Standard is mandatory for use by all Departments and Agencies of the Department of Defense.

2. Recommended corrections, additions, or deletions should be addressed to Commanding Officer, Edgewood Arsenal, ATTN: SMUEA-QAES-A, Edgewood Arsenal, MD 21010.

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1. SCOPE

1.1 Object. The object of this standard is to establish a common color code for visual warnings to accompany the written identification of materials covered in piping systems and contained in compressed gas cylinders, and to facilitate the segregation of these cylinders at depots. The use of this standard will promote greater safety and will lessen the chances of error, confusion, or inaction in times of emergency by providing a uniform color code to quickly warn personnel of outstanding hazards inherent in the materials involved. However, this standard does not define the manner or conditions under which these materials may be used safely.

1.2 Application. This standard is applicable to all ground based piping systems and to all compressed gas cylinders owned by or procured for the Department of Defense including type D one-ton containers (Department of Transportation Specification 10GA-500). The applicability of this standard to industry piping systems and commercial-owned cylinders (see 5.2.5.1) is encouraged. Requirements specified herein are optional for hose lines and nozzles, ship installations, equipment intended for operations in forward area facilities, steam plants, and hydroelectric plants. The identification method for bulk petroleum product systems is covered in MIL-STD-161. The identification of pipe lines for aircraft, missiles, and space vehicles is covered in MIL-STD-1247. Color coding for containers of liquid propellants is covered in MIL-STD-172.

1.3 Method. This standard establishes, defines, and assigns a color for recognition to each of six classes of materials. Five classes have been selected to represent universally recognized types of hazards involved in the handling of dangerous gases and liquids. The sixth class is assigned for exclusive use of fire protection materials and equipment. This standard requires the application of the color warnings in a distinctive manner, as a visual aid and supplement to written identification.

2. REFERENCED DOCUMENTS

2.1 The issues of the following documents in effect on the date of invitation for bids form a part of this standard to the extent specified herein.

FEDERAL STANDARD NO. 595 - Colors.

AMERICAN NATIONAL STANDARD Z48.1 - Method of Marking Portable Compressed Gas Containers to Identify the Material Contained.

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DEPARTMENT OF TRANSPORTATION REGULATIONS

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

3. DEFINITIONS

3.1 For the purpose of this standard, the following definitions shall apply:

(a) Commercial colors. Commercial colors are the colors which may be used, in a limited arrangement, on a small portion of the body and bottom of a compressed gas cylinder for commercial identification and designation of ownership.

(b) Compressed gas cylinder. A compressed gas cylinder is any tube, bottle, or other type of pressure cylinder larger than 3 inches in diameter by 6 inches in length, which contains a pressure that exceeds 104 pounds per square inch at 130° F or any liquid flammable material having a vapor pressure exceeding 40 pounds per square inch absolute at 100° F. One-ton type bulk containers are included. All ammunition is excluded.

(c) Piping systems. Piping systems consist of any pipe line or conduit used for the transport of gases, liquids, or semiliquids, but not those used for carrying solids in air or gas. Valves, fittings, operating accessories, pipe coverings, and pipe installations of any kind (including submerged or buried pipe lines, their markers or buoys, and their points of tie-in with pumping stations and storage or dispensing facilities) shall be considered as parts of a piping system. Supports, brackets, or other nonoperating accessories are not considered parts for application of warning colors.

(d) Primary color warning. A primary color warning is the color assigned to the class into which a material is classified in accordance with its primary hazard from a safety standpoint. These colors appear as a circular band on piping systems, and as main body, top, or band colors on compressed gas cylinders.

(e) Secondary color warning. A secondary color warning is the color assigned as a warning of a secondary hazard possessed by a material having a type of hazard distinctly different from that indicated by its primary color warning. These colors appear as arrows (or triangles) on piping systems and as main body, top, or band colors on compressed gas cylinders.

(f) Title. A title is any lettered identification required on a piping system or a compressed gas cylinder. Titles shall identify

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the contents by complete names, or by generally recognized abbreviations, symbols, letters, numerals, or combinations thereof.

4. GENERAL REQUIREMENTS

4.1 Colors. The colors assigned in this standard shall conform in hue and chroma to the requirements identified by number in Fed. Std. No. 595. No change shall be made in the assigned colors without prior approval of the preparing activity of this standard.

4.2 Warning colors. The following colors are assigned for use as both primary and secondary warnings:

(a) Yellow, No. 13655 - flammable materials. All materials known ordinarily as flammables or combustibles.

(b) Brown, No. 10080 - toxic and poisonous materials. All materials extremely hazardous to life or health under normal conditions as toxics or poisons.

(c) Blue, No. 15102 - anesthetics and harmful materials. All materials productive of anesthetic vapors and all liquid chemicals and compounds hazardous to life and property but not normally productive of dangerous quantities of fumes or vapors.

(d) Green, No. 14187 - oxidizing materials. All materials which readily furnish oxygen for combustion and fire producers which react explosively or with the evolution of heat in contact with many other materials.

(e) Gray, No. 16187 - physically dangerous materials. All materials, not dangerous in themselves, which are asphyxiating in confined areas or which are generally handled in a dangerous physical state of pressure or temperature.

(f) Red, No. 11105 - fire protection materials. All materials provided in piping systems or in compressed gas cylinders exclusively for use in fire protection.

4.3 Colors having no significant meaning.

(a) Black, No. 17038 and White, No. 17875. These colors are assigned, without significant meaning, for general use where specified in this standard except as follows: Water-piping systems containing water suitable for human consumption and installed for this purpose shall be painted White, No. 17875 throughout or shall be painted to match surroundings when not in conflict with other color designations in this standard.

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(b) Orange, No. 12246 and Buff, No. 13594. These colors are assigned, without significant meaning, for use as colors on selected compressed gas cylinders for segregation of identical material requiring recognition within more than one assigned class (see table III).

5. DETAIL REQUIREMENTS

5.1 Piping system identification.

5.1.1 Exact identification. Exact identification of materials in any piping system for hazardous materials and the use classification for fire protection is mandatory and shall be made only by means of titles lettered in black or white. These titles shall be prominently displayed adjacent to color warnings to obviate errors by personnel. It is recommended, where the view is unobstructed, that titles be lettered on the two lower quarters of the pipe or covering. Lettering in this position is unlikely to be obscured by dust collection or mechanical damage. However, titles should be clearly visible from operating positions, especially those adjacent to control valves. The use of stencils with standard size letters specified in table I is recommended. For pipe lines smaller than 3/4 inch in diameter, the use of securely fastened metal tags, with lettering etched or filled in with enamel, is suggested. It is recommended that titles be applied by use of upper case letters and arabic numerals whenever applicable.

Table I. Size of stencil letters

Outside diameter of pipe or covering, inches	Size of stencil letters, inches
Less than 1-1/2	1/2
1-1/2 to 3-1/2	3/4
3-1/2 to 6	1-1/4
6 to 9	2
9 to 13	3
Over 13	3-1/2

5.1.2 Use of colors. The appearance of any of the six colors specified in 4.2 on a piping system shall provide a warning of danger from the hazard involved in the system according to the definitions for warning colors specified therein. Piping systems which do not require warning colors may be painted to match surrounding, if not in conflict with other color designations in this standard or such systems may be painted aluminum, black, or remain unpainted.

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5.1.3 Primary color warning.

5.1.3.1 Use and application. A primary color warning shall appear on all dangerous piping systems and on all fire protection materials in any installation which is color coded in accordance with this standard. Primary color warnings shall consist of a single color applied as a band or bands which completely encircle the piping system. Color bands shall be applied in conformance with dimensional information shown on figure 1. In lieu of color bands, all pipe and covering on an entire system, including all encircling or partially encircling straps, hangers, and supports, may be painted with the primary color warning. However, the use of color bands is preferred because they will indicate dangerous systems to color-blind personnel.

5.1.3.2 Location on piping systems. Immediately adjacent to all operating accessories such as valves, regulators, flowchecks, strainers, cleanouts, pumps, dispensing points, and vents, all coded piping systems shall be painted with a primary color warning. In addition, primary color warnings shall be painted throughout the system at convenient intervals, e.g., where branch lines join the system, where the system passes underground or through walls, and at any other conspicuous places where warnings are required by safety authorities. If desired, operating accessories may also be painted with the primary color warning.

5.1.4 Arrows and secondary color warnings. An arrow shape shall appear on coded piping systems in any installation which is color coded in accordance with this standard. Any material system possessing an outstanding hazard of a type distinctly different from that indicated by its primary color warning shall have a secondary color warning applied in the shape of an arrow. The color of the arrow shall be selected according to the definitions for warning colors specified in 4.2. Systems which do not involve such additional hazards shall have arrows either the same color as the primary warning, or black or white. When bands are used for the primary warnings, the colored arrows shall appear adjacent to each primary color warning applied to the piping system. When the entire piping system is painted with the primary color warning, the colored arrows shall appear in all locations specified in 5.1.3.2. The arrows shall indicate the normal direction(s) of flow of material in the system. A double-headed arrow shall be placed on lines subject to reverse flow. Dimensional information is shown on figure 1. Tails may be omitted on arrows, creating triangles with one corner indicating the normal direction of flow. Operating accessories may also be painted with the secondary color warning.

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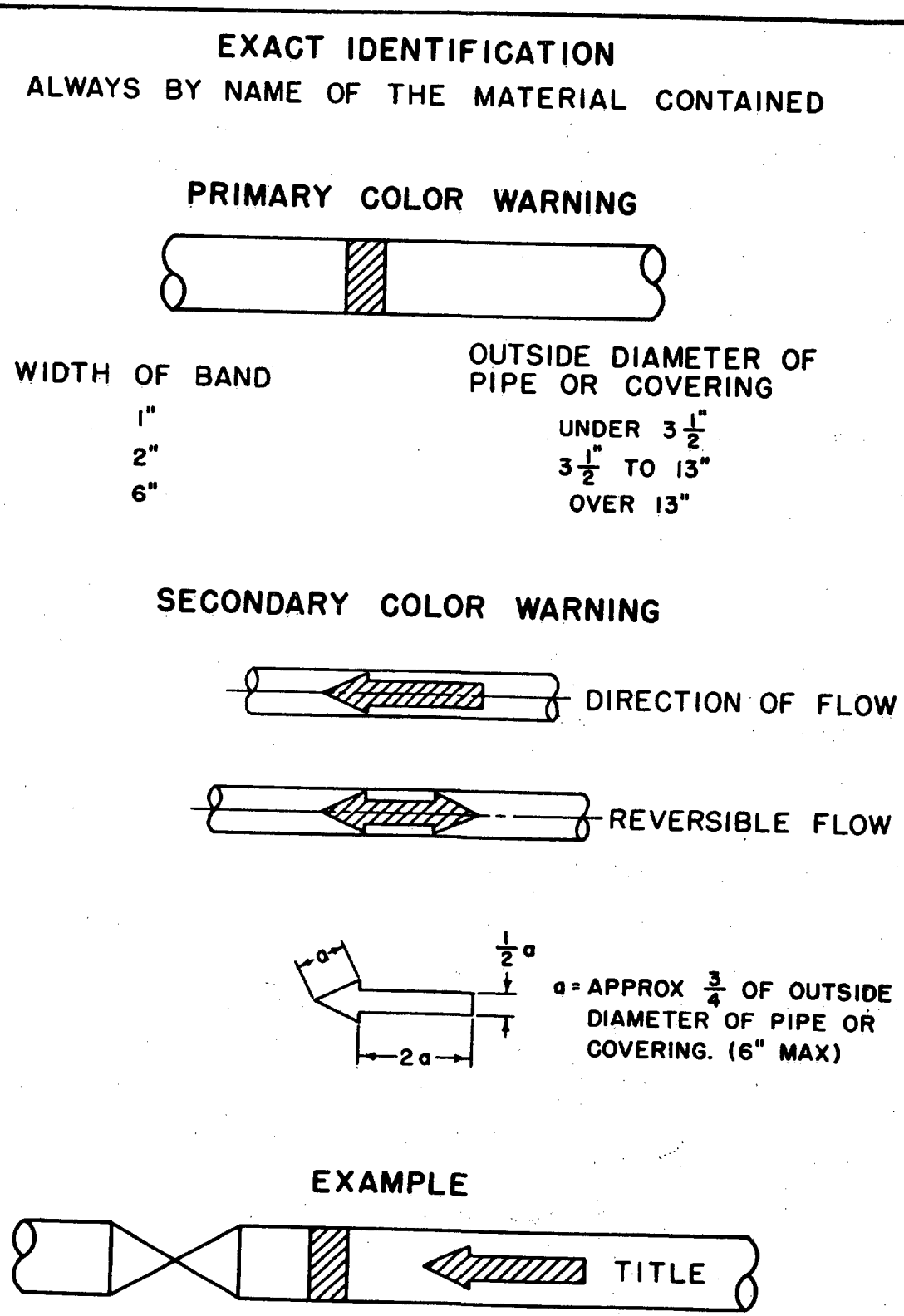

Figure 1. *Piping systems*

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5.1.5 Classification of material in piping systems. The classification of materials in a piping system shall be as specified in table II. N.O.S. refers to materials of like name and hazardous properties but "not otherwise specified." When no secondary color warning is specified, the arrow may be the same color as the primary warning or black or white, as preferred.

Table II. Classification of materials in piping systems

Material	Primary color warning	Secondary color warning
Acetaldehyde	Yellow	Blue
Acetic acid, aqueous solution	Blue	Yellow
Acetic acid, glacial	Blue	Yellow
Acetic anhydride	Blue	Yellow
Acetone	Yellow	-----
Acetone oils	Yellow	-----
Acetyl chloride	Blue	-----
Acetylene	Yellow	-----
Acid, liquid, N.O.S.	Blue	-----
Acrolein	Brown	Yellow
Acrylonitrile	Yellow	Brown
Aerosol insecticide	Gray	-----
Air, compressed	Gray	Green
Alcohol, allyl, liquid	Yellow	Brown
Alcohol, amyl, butyl, ethyl, propyl, N.O.S.	Yellow	-----
Alcohol, methyl	Yellow	Blue
Alkaline corrosive liquids, N.O.S.	Blue	-----
Aluminum borohydride	Yellow	Brown
Ammonia, anhydrous	Brown	Yellow
Amyl acetate	Yellow	-----
Aniline (oil), liquid	Brown	Yellow
Argon	Gray	-----
Argon-oxygen mixture	Green	-----
Arsenic trichloride	Brown	Blue

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Table II. Classification of materials in piping systems (continued)

Material	Primary color warning	Secondary color warning
Arsenical acids and liquids, N.O.S.	Brown	Blue
Benzaldehyde	Yellow	-----
Benzene (benzol, coal tar light oil)	Yellow	Brown
Benzine (petroleum ether, petroleum naphtha)	Yellow	-----
Benzoyl chloride	Blue	-----
Benzyl chloride	Blue	Yellow
Boron hydrides (alkyl decaborane, alkyl pentaborane, diborane, dihydrotetraborane, hexaborane, pentaborane, and N.O.S.)	Brown	Yellow
Boron trichloride	Brown	-----
Boron trifluoride	Brown	Gray
Bromine	Brown	Green
Bromine pentafluoride	Brown	Green
Bromine trifluoride	Brown	Green
Bromoacetone	Brown	-----
Bromobenzene	Yellow	-----
Bromochloromethane	Brown	Gray
Bromochloromethane, fire	Red	Brown
Bromotrifluoromethane	Gray	-----
Bromotrifluoromethane, fire	Red	-----
Butadiene	Yellow	-----
Butane (see petroleum gas)	Yellow	-----
Butyl acetate	Yellow	-----
Butyl ether	Yellow	-----
Camphor oil	Yellow	-----
Carbon bisulfide (carbon disulfide)	Yellow	Brown
Carbon dioxide	Gray	-----
Carbon dioxide, fire	Red	-----
Carbon monoxide	Yellow	Brown
Carbon tetrachloride	Brown	Blue
Caustic potash, liquid (potassium hydroxide)	Blue	-----
Caustic soda, liquid (sodium hydroxide)	Blue	-----
Chloroacetyl chloride	Blue	-----
Chlorine	Brown	Green
Chlorine trifluoride	Brown	Green

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Table II. Classification of materials in piping systems (continued)

Material	Primary color warning	Secondary color warning
Chloroacetone	Brown	Yellow
Chlorosulfonic acid	Blue	Green
Chloropicrin	Brown	-----
Chloropropane	Yellow	Blue
Chromic acid solution	Blue	Green
Coal gas (see manufactured gas)	Yellow	Brown
Coal tar distillates, N.O.S.	Yellow	Brown
Crotonaldehyde	Blue	Yellow
Crude oil, petroleum	Yellow	-----
Cyanide, liquid (potassium solutions, sodium solutions), N.O.S.	Brown	-----
Cyanogen gas	Brown	Yellow
Cyclopropane	Yellow	Blue
Decalin (decahydronaphthalene)	Yellow	-----
Dibromodifluoromethane	Gray	-----
Dibromodifluoromethane, fire	Red	-----
Dichloropentane	Yellow	-----
Diethanolamine	Yellow	-----
Diethylenetriamine	Yellow	-----
Difluorochloroethane	Gray	Yellow
Difluoroethane	Gray	Yellow
Diisobutyl ketone	Blue	Yellow
Dimethylamine, anhydrous	Yellow	Blue
Dimethyl ether	Yellow	Brown
Dimethyl sulfate	Brown	Blue
Dimethyl sulfide	Yellow	Blue
Diphenyl-diphenyl oxide ("Dowtherm A")	Gray	-----
Dispersant (dichlorodifluoromethane-difluoroethane mixture)	Gray	-----
Electrolyte acid, N.O.S.	Blue	-----
Ethane	Yellow	Blue
Ethers, anesthetic: diethyl, ethyl, isopropyl, sulfuric, N.O.S.	Yellow	Blue
Ethyl acetate	Yellow	-----
Ethyl benzene	Yellow	-----
Ethyl bromide	Yellow	Blue

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Table II. Classification of materials in piping systems (continued)

Material	Primary color warning	Secondary color warning
Ethyl butyl acetate	Yellow	-----
Ethyl butyrate	Yellow	-----
Ethyl chloroacetate	Yellow	-----
Ethyl chloride	Yellow	Blue
Ethylenediamine	Yellow	Blue
Ethyl hexaldehyde	Yellow	-----
Ethyl lactate	Yellow	-----
Ethyl methyl ketone	Yellow	Blue
Ethyl nitrate	Yellow	Blue
Ethyl nitrite	Yellow	-----
Ethyl silicate	Yellow	-----
Ethylamine	Yellow	Blue
Ethylene	Yellow	Blue
Ethylene chlorohydrin	Yellow	-----
Ethylene dichloride	Yellow	Blue
Ethylene glycol	Yellow	-----
Ethylene oxide	Yellow	Blue
Fluorine	Brown	Green
Formaldehyde	Yellow	Brown
Formic acid	Blue	Yellow
Fuel oil, N.O.S.	Yellow	-----
Fuels: JP, RP, RS, diesel, N.O.S.	Yellow	-----
Fumigant, carbon dioxide - ethylene oxide mixture	Gray	Blue
Furfural	Blue	Yellow
Gasoline (motor fuel)	Yellow	-----
Helium	Gray	-----
Hydrazine	Brown	Yellow
Hydrocarbons, heavy: hexanes, heptanes, octanes, N.O.S.	Yellow	-----
Hydrochloric acid	Blue	-----
Hydrocyanic acid	Brown	-----
Hydrofluoric acid	Brown	-----
Hydrofluorosilic acid	Blue	-----
Hydrogen	Yellow	-----
Hydrogen bromide	Brown	-----

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Table II. Classification of materials in piping systems (continued)

Material	Primary color warning	Secondary color warning
Hydrogen chloride, anhydrous	Brown	-----
Hydrogen cyanide, anhydrous	Brown	Green
Hydrogen fluoride, anhydrous	Brown	Green
Hydrogen, liquid	Yellow	Gray
Hydrogen peroxide	Green	Blue
Hydrogen sulfide	Yellow	Brown
Hydroxyacetic acid (glycolic acid), aqueous solutions	Blue	-----
Ink (solvent type), N.O.S.	Yellow	-----
Insecticide, liquid, N.O.S.	Brown	Yellow
Iodine heptafluoride	Brown	Green
Isopentane	Yellow	Blue
Jet fuel (all grades)	Yellow	-----
Kerosene	Yellow	-----
Krypton	Gray	-----
Lacquer	Yellow	-----
Manufactured gas (coal, oil, pintsch, producer, water, and N.O.S.)	Yellow	Brown
Mercaptans (thioalcohols, N.O.S.)	Yellow	-----
Mercury componds (solutions), N.O.S.	Brown	-----
Methane	Yellow	-----
Methylamine	Yellow	Brown
Methyl acetate	Yellow	-----
Methyl acetone	Yellow	-----
Methyl acetylene propadiene mixture (MAPP)	Yellow	-----
Methyl amyl acetate	Yellow	-----
Methyl amyl ketone	Yellow	-----
Methyl bromide	Brown	-----
Methyl bromide, fire	Red	Brown
Methyl chloride	Yellow	Brown
Methyl cyanide (acetonitrile)	Brown	Yellow
Methyl formate	Yellow	Blue
Methyl hydrazine	Brown	Yellow
Methyl mercaptan	Yellow	Brown
Methyl sulfide	Yellow	Brown
Methylene chloride	Blue	Gray

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Table II. Classification of materials in piping systems (continued)

Material	Primary color warning	Secondary color warning
Natural gas, fortified, N.O.S.	Yellow	Brown
Neon	Gray	-----
Nickel carbonyl	Brown	Yellow
Nicotine compounds	Brown	-----
Nitrating acid (mixed acid)	Blue	Green
Nitric acid	Blue	Green
Nitric acid, fuming	Brown	Green
Nitrobenzene	Brown	Yellow
Nitrogen	Gray	-----
Nitrogen dioxide	Brown	Green
Nitrogen peroxide	Brown	Green
Nitrogen tetroxide	Brown	Green
Nitrogen-helium mixture	Gray	-----
Nitrogen-oxygen mixture	Gray	Green
Nitrogen trifluoride	Blue	Green
Nitromethane	Yellow	Blue
Nitrosyl chloride	Brown	-----
Nitrous oxide	Blue	-----
Oil, hydraulic	Yellow	Gray
Oil, lubricating, N.O.S.	Yellow	-----
Oil, fish, vegetable, edible, N.O.S.	Yellow	-----
Oxygen	Green	-----
Oxygen-carbon dioxide mixture	Gray	Green
Oxygen, electrolytic	Green	-----
Oxygen fluoride	Brown	Green
Oxygen, liquid (LOX)	Green	Gray
Ozone	Green	Brown
Paint	Yellow	-----
Paraldehyde	Yellow	-----
Pentane	Yellow	-----
Perchloric acid	Green	Blue
1-Pentene	Yellow	-----
Petroleum gas (acetogen, butane-propane mixture, 1-butene, cyclopropane, isobutane, neo-pentane, and N.O.S.)	Yellow	-----

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Table II. Classification of materials in piping systems (continued)

Material	Primary color warning	Secondary color warning
Perchloroethylene	Blue	-----
Perchloryl fluoride	Brown	Green
Phenylcarbylamine chloride	Brown	Gray
Phosgene	Brown	-----
Phosphorus oxychloride	Blue	Green
Phosphorus tribromide	Blue	Green
Phosphorus trichloride	Blue	Green
Potassium permanganate solution	Green	-----
Propylene	Yellow	Gray
n-Propyl nitrate	Yellow	Brown
Propyne	Yellow	Gray
Pyrosulfuryl chloride	Blue	-----
R-11, Trichlorofluoromethane	Gray	-----
R-12, Dichlorodifluoromethane	Gray	-----
R-14, Tetrafluoromethane	Gray	-----
R-21, Dichlorofluoromethane	Gray	-----
R-22, Chlorodifluoromethane	Gray	-----
R-112, Tetrachlorodifluoroethane	Gray	-----
R-113, Trichlorotrifluoroethane	Gray	-----
R-114, Dichlorotetrafluoroethane	Gray	-----
R-115, Chloropentafluoroethane	Gray	-----
R-124A, Chlorotetrafluoroethane	Gray	-----
R-C-316, Dichlorohexafluoro-cyclobutane	Gray	-----
R-C-317, Chlcroheptafluoro-cyclobutane	Gray	-----
R-C-318, Octafluorocyclobutane	Gray	-----
Shellac	Yellow	-----
Solvents, N.O.S.	Yellow	-----
Steam	Gray	-----
Stoddard solvent	Yellow	-----
Sulfur dichloride	Brown	-----
Sulfur dioxide	Brown	Gray
Sulfur hexafluoride	Gray	-----
Sulfur monochloride	Blue	-----
Sulfur trioxide	Brown	Green
Sulfuric acid	Brown	Green
Sulfuric acid, fuming (oleum)	Brown	Green

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Table II. Classification of materials in piping systems (continued)

Material	Primary color warning	Secondary color warning
Tetraethyl lead	Brown	-----
Tetrafluoroethylene, inhibited	Gray	-----
Thionyl chloride	Brown	Green
Tin tetrachloride, anhydrous	Blue	-----
Titanium tetrachloride	Blue	-----
Toluene	Yellow	Brown
Triamylamine	Brown	Yellow
Tributylamine	Yellow	Blue
Triethanolamine	Blue	Yellow
Triethylamine	Brown	Yellow
Trimethylamine, anhydrous	Brown	Yellow
Turpentine	Yellow	-----
Unsymmetrical dimethyl hydrazine	Brown	Yellow
Vacuum (noncontaminated)	Gray	-----
Varnish	Yellow	-----
Vinyl bromide	Blue	-----
Vinyl chloride	Yellow	-----
Vinyl methyl ether	Yellow	-----
Waste acid (spent nitrating acid)	Blue	Yellow
Water, over 50 p.s.i.g. or 150°F	Gray	-----
Water, fire	Red	-----
Water, potable	White	-----
Waxes, liquid	Yellow	-----
Xenon	Gray	-----
Xylene	Yellow	Brown
Xylidine	Brown	Yellow

5.2 Cylinder identification.

5.2.1 Assignment of colors. The use of color coding for compressed gas cylinders covered by this standard is mandatory. The assignment of colors to extend coverage of material handled in compressed gas cylinders shall be made only after approval of the preparing activity of this standard. Requests for color coding of additional materials not covered by this standard should include technical details of the material, primary and secondary hazards of the material, and technical details of the cylinder, including the type of cylinder valve used.

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5.2.2 Exact identification. Exact identification of any material contained in a compressed gas cylinder is mandatory and shall be made only by means of the written title as specified in table III. The title shall appear in two locations diametrically opposite and parallel to the longitudinal axis of the cylinder. It is recommended that the titles be applied by use of upper case letters and arabic numerals whenever applicable. On cylinders 4 inches in diameter and larger, the title shall be in approximately 2-inch high letters. On cylinders less than 4 inches in diameter, letters may be reduced in size. Where a title includes a modifier, such as "medical" or "oil-free," the modifier shall follow the chemical designation and should be shown in letters approximately three-fourths as high. Cylinders having a background color of yellow, orange, or buff shall have the title painted with black letters. Cylinders having a background color of red, brown, blue, gray, green, or black shall have the title painted with white letters. Mixtures of two or more gases shall show the percent of each gas as part of the title.

5.2.3 Use of colors.

5.2.3.1 Color warnings. The appearance on the body, top, or as a band(s) on compressed gas cylinders of any of the six colors specified in 4.2 shall provide a warning of danger from the hazard involved in handling the type of material contained in the cylinder according to the definitions for warning colors in 4.2.

5.2.3.2 Cylinder color band(s). Cylinder color bands appear upon the cylinder body and serve as color warnings when they are yellow, brown, blue, green, or gray. The bands also provide color combinations to separate and distinguish cylinders for convenience in handling, storage, and shipping. Color bands for segregation purposes will not be specified for new materials not presently covered by this standard when new color codes for them are assigned.

5.2.4 Painting of cylinders. All cylinders shall be painted in accordance with table III and figures 2 and 3 to provide uniform recognition throughout the Department of Defense.

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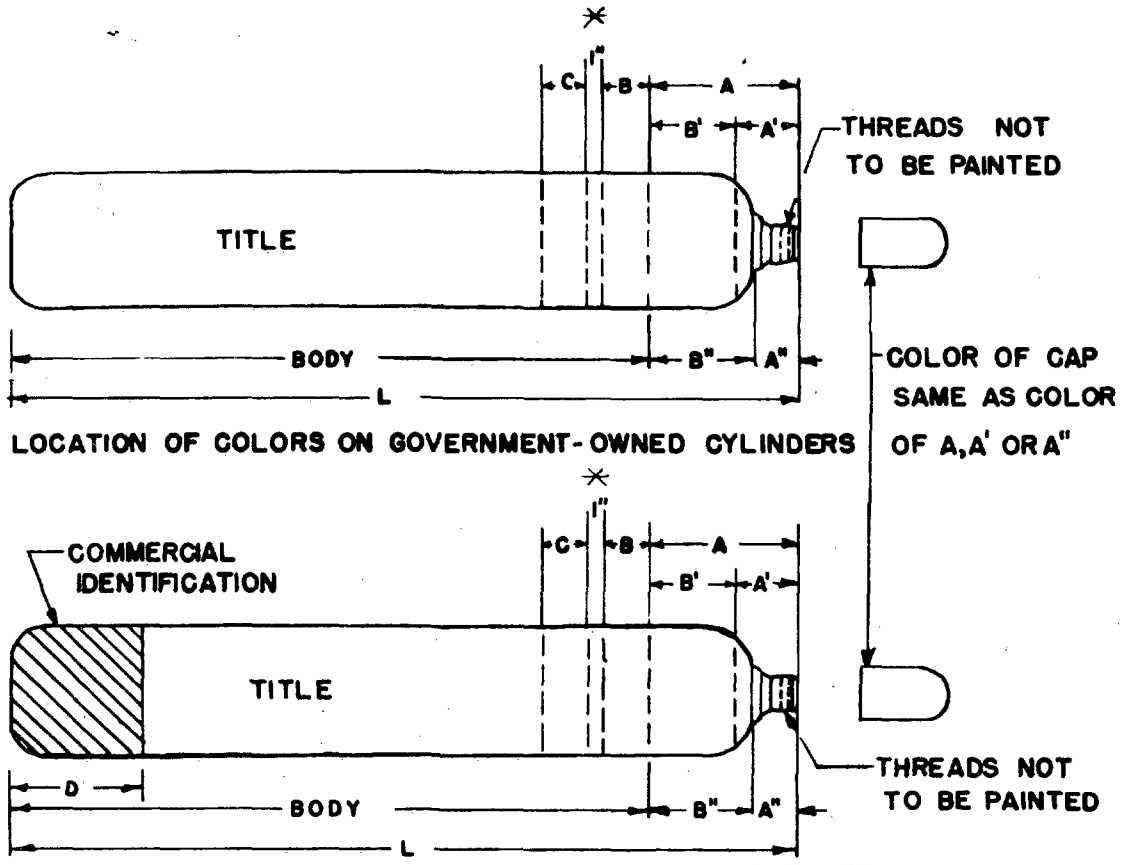

LOCATION DIMENSIONS ON CYLINDERS FOR MEDICAL GAS MIXTURES, 1" SPACE AND BAND C ARE LOCATED IMMEDIATELY BELOW BANDS B' OR B"

CYLINDERS FOR	OVERALL LENGTH L	SHOULDER COLOR (S)			CYLINDER COLOR BAND (S)				COMMERCIAL IDENTIFICATION
		A	A'	A"	B	B'	B"	C	D
MEDICAL GAS MIXTURES	OVER 30"	L/5	3 1/2"	—	—	A LESS 3 1/2"	—	3"	L/6
OTHER GASES	"	L/5	—	—	3"	—	—	3"	L/6
MEDICAL GAS MIXTURES	30" AND UNDER	L/5	—	—	—	—	A LESS A"	2"	L/6
OTHER GASES	"	L/5	—	—	2"	—	—	2"	L/6

FROM CYLINDER TOP TO BOTTOM OF NECK RING

*1" SPACE TO BE OMITTED IF BANDS B & C ARE OF DIFFERENT COLORS

Figure 2. *Bottle type cylinders*

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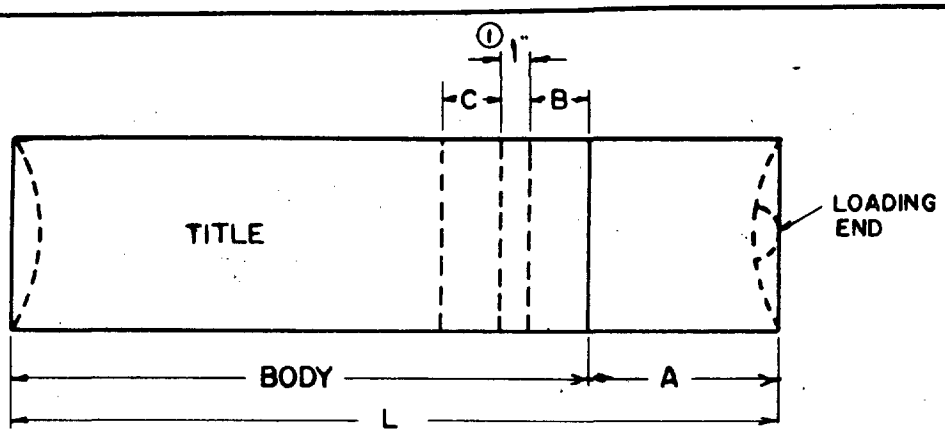
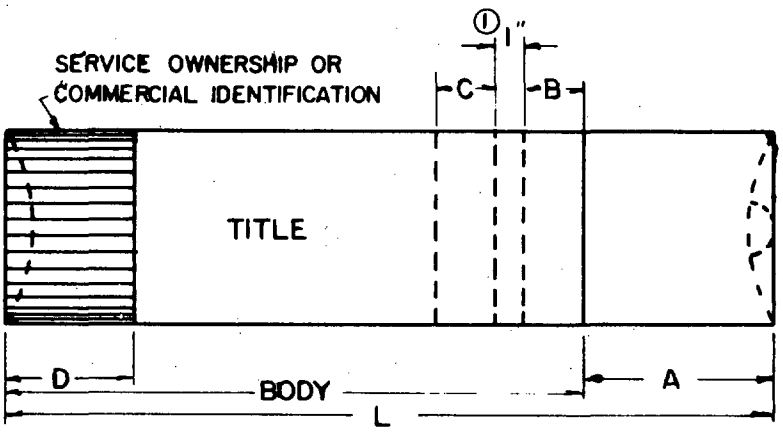


LOCATION OF COLORS ON GOVERNMENT-OWNED CYLINDERS



LOCATION OF COLORS ON COMMERCIAL- OWNED CYLINDERS

LOCATION DIMENSIONS

OVERALL LENGTH	CAP AND SHOULDER COLOR	CYLINDER COLOR BAND(S)	COMMERCIAL IDENTIFICATION
L	A	B & C	D
OVER 30"	1/4 OF L	3"	1/6 OF L
30" AND UNDER	1/4 OF L	2"	1/6 OF L

(1) 1" SPACE TO BE OMITTED IF BANDS B & C ARE OF DIFFERENT COLORS.

Figure 3. *Tube type cylinders*

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Table III. Titles and color codes for compressed gas cylinders

Title	Location on cylinder			
	Top A	Band B	Band C	Body
Acetylene	Yellow	Yellow	Yellow	Yellow
Acrolein	Yellow	Brown	Black	Brown
Aerosol insecticide	Buff	Buff	Buff	Buff
Air, compressed, breathing	Black	Green	Black	Black
Air, dry, special purpose	Black	Green	Black	Black
Air, oil-free	Black	Green	Black	Black
Air, oil-tolerant	Black	Green	Green	Black
Alkyl decaborane	Yellow	Brown	Brown	Yellow
Alkyl pentaborane	Yellow	Brown	Brown	Yellow
Ammonia	Brown	Yellow	Orange	Orange
Argon, oil-free	Gray	White	Gray	Gray
Argon, oil-tolerant	Gray	White	White	Gray
Argon-oxygen mixture	Gray	Green	White	Gray
Boron trichloride	Gray	Brown	Gray	Brown
Boron trifluoride	Gray	Brown	Brown	Brown
Bromoacetone	Brown	Black	Black	Brown
Bromochloromethane	Buff	Gray	Buff	Buff
Bromochloromethane (Fire only)	Red	Gray	Red	Red
Bromotrifluoromethane	Orange	White	Gray	Orange
Bromotrifluoromethane (Fire only)	Red	White	Gray	Red
Butadiene	Yellow	White	Buff	Buff
Carbon dioxide	Gray	Gray	Gray	Gray
Carbon dioxide (Fire only)	Red	Red	Red	Red
Carbon monoxide	Yellow	Brown	Brown	Brown
Chloroacetone	Black	Brown	Black	Brown
Chlorine	Brown	Brown	Brown	Brown
Chlorine trifluoride	Brown	Green	Brown	Brown
Chloropicrin	Brown	Orange	Orange	Brown
Cyanogen	Yellow	Brown	Yellow	Brown
Cyclopropane, medical	Orange	Yellow	Blue	Blue
Cyclopropane, medical	Orange	Chromium plated		
Diborane	Yellow	Brown	Brown	Yellow
Dibromodifluoromethane	Buff	White	Buff	Buff
Dibromodifluoromethane (Fire only)	Red	White	Red	Red
Difluorochloroethane	Gray	Yellow	Yellow	Orange
Difluoroethane	Gray	Yellow	Orange	Orange
Dihydrotetraborane	Yellow	Brown	Brown	Yellow
Dimethylamine, anhydrous	Yellow	Blue	White	Buff
Dimethylether	Yellow	Brown	Buff	Buff

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Table III. Titles and color codes for compressed gas cylinders (continued)

Title	Location on cylinder			
	Top A	Band B	Band C	Body
Dispersant, dichlorodifluoromethane-difluoroethane mixture	Buff	Gray	Gray	Buff
Ethane	Yellow	Blue	Yellow	Yellow
Ethyl chloride	Buff	Blue	Yellow	Buff
Ethyl nitrite	Yellow	Buff	Buff	Buff
Ethylamine, anhydrous	Yellow	Blue	Blue	Buff
Ethylene, industrial	Blue	Yellow	Buff	Buff
Ethylene, medical	Yellow	Blue	Blue	Blue
Ethylene oxide	Yellow	Blue	Buff	Buff
Fluorine	Brown	Green	Green	Brown
Fumigant, carbon dioxide-ethylene oxide mixture	Buff	Blue	Buff	Buff
Fumigant, ethylene oxide-dichlorodifluoromethane mixture	Buff	Buff	Buff	Buff
Helium, oil-free or medical	Buff	Gray	Gray	Gray
Helium, oil-tolerant	Gray	Orange	Gray	Gray
Helium-oxygen mixture	Buff*	White**	Green	Green
Hydrogen	Yellow	Black	Yellow	Yellow
Hydrogen bromide	Black	Brown	Brown	Brown
Hydrogen chloride, anhydrous	Brown	White	Brown	Brown
Hydrogen cyanide, anhydrous	Yellow	Brown	White	Brown
Hydrogen fluoride, anhydrous	Green	Brown	Brown	Brown
Hydrogen sulfide	Brown	Yellow	Brown	Brown
Krypton, oil-free	Gray	Buff	Gray	Gray
Krypton, oil-tolerant	Gray	Buff	Buff	Gray
Manufactured gas: coal, oil, water, producer, etc.	Brown	Yellow	Yellow	Yellow
Methane	Yellow	White	Yellow	Yellow
Methyl acetylene propadiene (MAPP) mixture	Yellow	Orange	Yellow	Yellow
Methylamine	Yellow	Brown	Yellow	Buff
Methyl bromide	Brown	Black	Brown	Brown
Methyl bromide (Fire only)	Red	Brown	Red	Red
Methyl chloride	Yellow	Brown	Orange	Orange
Methyl mercaptan	Brown	Yellow	Yellow	Brown
Methyl sulfide	Yellow	Brown	Buff	Brown
Methylene chloride	Gray	Blue	Orange	Orange

*A' or A'' (see figure 2) for medical gas mixtures.
**B' or B'' (see figure 2) for medical gas mixtures.

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Table III. Titles and color codes for compressed gas cylinders (continued)

Title	Location on cylinder			
	Top A	Band B	Band C	Body
Natural gas	Yellow	Brown	Yellow	Yellow
Neon, oil-free	White	Buff	Buff	Gray
Neon, oil-tolerant	White	Buff	Gray	Gray
Nickel carbonyl	Yellow	White	Yellow	Brown
Nitric oxide	Brown	Buff	Brown	Brown
Nitrogen, oil-free	Gray	Black	Black	Gray
Nitrogen, oil-tolerant	Gray	Black	Gray	Gray
Nitrogen dioxide	Brown	Buff	Buff	Brown
Nitrogen-helium mixture	Gray	Black	Orange	Gray
Nitrogen-oxygen mixture	Black	White	Green	Green
Nitrosyl chloride	Brown	White	White	Brown
Nitrous oxide	Blue	Blue	Blue	Blue
Oxygen	Green	Green	Green	Green
Oxygen, aviator's	Green	White	Green	Green
Oxygen, electroyltic	Green	White	White	Green
Oxygen, medical	White	Green	Green	Green
Oxygen-carbon dioxide mixture	Gray*	White**	Green	Green
Oxygen fluoride	Green	Brown	Green	Brown
Ozone	Brown	Green	Green	Green
Pentaborane, stable	Yellow	Brown	Brown	Yellow
Petroleum gas: acetogen, butane, butane-propane, butene-1, cyclopropane, isobutane, isobutylene, neopentane, propane, etc.	Yellow	Orange	Yellow	Yellow
Phenylcarbylamine chloride	Brown	Gray	Gray	Brown
Phosgene	Brown	Orange	Brown	Brown
Propylene	Yellow	Gray	Buff	Buff
Propyne	Gray	Yellow	Yellow	Yellow
R-11, Trichlorofluoromethane	Orange	Orange	Orange	Orange
R-12, Dichlorodifluoromethane	Orange	Orange	Orange	Orange
R-13, Chlorotrifluoromethane	Orange	Orange	Orange	Orange
R-21, Dichlorofluoromethane	Orange	Orange	Orange	Orange
R-22, Chlorodifluoromethane	Orange	Orange	Orange	Orange
R-113, Trichlorotrifluoroethane	Orange	Orange	Orange	Orange
R-114, Dichlorotetrafluoroethane	Orange	Orange	Orange	Orange
R-124A, Chlorotetrafluoroethane	Orange	Orange	Orange	Orange
R-500, Dichlorodifluoromethane/ Difluoroethane	Orange	Orange	Orange	Orange
R-502, Monochlorodifluoromethane/ [illegible]entafluoroethane	Orange	Orange	Orange	Orange

*A' or A'' (see figure 2) for medical gas mixtures.
**B' or B'' (see figure 2) for medical gas mixtures.

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Table III. Titles and color codes for compressed gas cylinders (continued)

Title	Location on cylinder			
	Top A	Band B	Band C	Body
Sulfur dioxide	Brown	Gray	Brown	Brown
Sulfur hexafluoride	Gray	White	Black	Gray
Tetrafluoroethylene, inhibited	Buff	White	White	Buff
Trimethylamine, anhydrous	Yellow	Blue	Orange	Buff
Vinyl bromide	Buff	Blue	Blue	Buff
Vinyl chloride	Yellow	Orange	Buff	Buff
Vinyl methyl ether, inhibited	Yellow	Black	Buff	Buff
Xenon, oil-free	White	Black	Gray	Gray
Xenon, oil-tolerant	White	Black	Black	Gray

5.2.5 Additional information.

5.2.5.1 Commercial-owned cylinders. Commerical-owned cylinders are those not owned by or procured for the U.S. Government. Commercial-owned cylinders are contractor-owned or supplier-owned cylinders in which compressed gas is supplied to the Government. When Department of Defense activities procure compressed gases in commercial-owned cylinders, it is not mandatory that the cylinders be color coded in accordance with this standard. When such commercial-owned cylinders are not color coded in accordance with this standard, they shall be marked in accordance with Department of Transportation regulations and American National Standard Z48.1. If the using Department of Defense activity requires that this standard apply to commercial-owned cylinders, the bottom and lower portion of the cylinder body opposite the valve end may be used for commercial identification. In this area, which shall not exceed one-sixth of the overall length of the cylinder, the use of a solid color other than the body color will not be permitted.

5.2.5.2 Decalcomanias. Two decalcomanias may be applied on the shoulder of each cylinder diametrically opposite at right angles to titles. They should include the title of the gas, precautions for handling, and use. A background color corresponding to the primary warning color of the contents should be used.

5.2.5.3 Shatterproof designation. Shatterproof cylinders shall be stenciled with the phrase "Non-Shat" longitudinally 90 degrees from the titles. Letters shall be black or white and approximately 1 inch in size.

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5.2.5.4 Service ownership. On cylinders owned by or procured for the Department of Defense, the bottom and the lower portion of the cylinder body opposite the valve end may be used for Service ownership titles.

5.2.5.5 International standardization agreements. This standard shall be used to implement NATO STAGNAG 2121, CENTO STAGNAG 2121, and SEATO STAGNAG 2121, subject: Medical Gas Cylinders.

Custodians:

Army - MU
Navy - SH
Air Force - 68

Review activities:

Army - AV, ME, MI, MU(FA), WC
Navy - AS, MC, MS, SH, YD
Air Force - 12, 43, 68, 70
DSA - CS, GS

User activities:

Navy - CG
Air Force - 19, 71

Preparing activity:

Army - MU(EA)

Project No. 8120-0130

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

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