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ANSI/AIHA Z88.7-2010

Color Coding

of Air-Purifying Respirator Canisters, Cartridges, and Filters

*A Publication by
American Industrial Hygiene Association*



BY THE ANSI/AIHA Z88.7 Subcommittee



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American National Standard — Color Coding of Air-Purifying Respirator Canisters, Cartridges, and Filters

Secretariat

American Industrial Hygiene Association

Approved: June 14, 2010

American National Standards Institute, Inc.

American National Standard

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FOREWORD (This foreword is not part of the American National Standard/AIHA Z88.7–2010)

Manufacturers, users and governmental regulatory agencies will find this standard to be a valuable tool for accurate and rapid identification of selected industrial respiratory protective devices by examination of their respective canisters, cartridges or filters. Readily recognizable colors are specified for canister, cartridge or filter container or labels. Color specification utilizing the Munsell system will result in uniform cartridge, canister, filter container and label colors among respirator manufacturers. American National Standards Committee Z88.7 on Color-Coding of Air-Purifying Respirator canisters, cartridges and filters, under whose jurisdiction this standard was developed, has the following scope:

The requirements of this standard apply to the identification of air-purifying respirator canisters, cartridges and filters used to provide respiratory protection against gases, vapors and/or particles. These requirements apply to cartridges and canisters used in industrial or healthcare facilities, office buildings, mines, ships, confined spaces, wildland fire-fighting or other similar locations. These requirements do not apply to canisters, cartridges or filters used on:

- a) aviation respirators
- b) military respirators

This standard was originally published as American National Standard K13.1-1973. Changes were made in the 2001 revision of this standard to reflect currently available color specifications and to eliminate reference to labeling requirements.

This latest revision incorporates some of the colors used internationally in an attempt to harmonize with current and future European and International standards. It also specifies color for Chemical, Biological, Radiological and Nuclear (CBRN) canisters, not yet developed at the time of the last revision.

New technology and research continues to change this field and it is hoped that future versions of the standard will reflect this growth in knowledge. Suggestions for improvement are welcome. They should be sent to:

Program Manager, Standards
AIHA
2700 Prosperity Ave., Suite 250
Fairfax, VA 22031

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee Z88 on Respiratory Protection. Consensus was reached through a process involving the entire Z88 Committee in a series of reviews and in the final vote of approval. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the Z88 Committee had the following members:

James S. Johnson, PhD, CIH, QEP, Chair
Stephen C. Graham, CIH, CSP, Vice Chair
Mili Mavely, Secretariat Representative

Organization Represented

Name of Representative

3M	C. Colton
American Industrial Hygiene Association	M. Schmoldt
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University of Pittsburgh	J. Schwerha
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U.S. Department of Labor	J. Steelnack
U.S. Department of the Army	S. Graham
Wayne State University	S. Mingela

Individual Members

C. Bien
D. Bevis
T. Nelson
R. Metzler
B. Reinert

Subcommittee Z88.7 for the Color Coding of Air-Purifying Respirator Canisters, Cartridges and Filters, which developed this standard, had the following members:

Bill Newcomb, Subcommittee Chair
Lynn Feiner
Jennifer Sahmel

American National Standard — Color Coding of Air Purifying Respirator Canisters, Cartridges and Filters

1. Purpose

The purpose of this standard is to establish a system of marking air-purifying respirator canisters, cartridges and filter containers by means of colors in order to:

1. Facilitate rapid identification of the canisters, cartridges, and filters by users.
2. Ensure color consistency among respirator manufacturers.

2. Scope

The requirements of this standard apply to the identification of air-purifying respirator canisters, cartridges and filters used to provide respiratory protection against gases, vapors or particles. These requirements apply to canisters, cartridges, and any high efficiency filters, whether encapsulated or un-encapsulated, used as components of air-purifying respirators. These requirements do not apply to and shall not be used to identify canisters, cartridges or filters for:

- a) aviation respirators,
- b) military respirators,
- c) non-high efficiency filters, or
- d) un-encapsulated respirator filters (e.g. filtering facepieces) except for high efficiency filters.

Users of this standard should be aware that regulatory agencies might have requirements that are different from this standard.

3. Application

The manufacturers of air-purifying respirator canisters, cartridges or filters which fall within the scope of this standard shall verify that all of these canisters,

cartridges or filters are properly color-coded according to these requirements before they are delivered into the stream of commerce.

4. Definitions

4.1 Air-purifying element: a filter, sorbent, catalyst or combination thereof, which removes specific contaminants from the air passing through it.

4.2 Air-purifying respirator: A respirator in which ambient air is passed through an air-purifying element(s) that remove(s) the contaminant(s). Air is passed through the air-purifying element(s) by means of the breathing action or by a blower.

4.3 canister/cartridge: A container encapsulating an air-purifying element.

4.4 CMYK: A subtractive color model, often referred to as process color or four color process, used in color printing. **CMYK** refers to the four inks used in most color printing: **C**yan, **M**agenta, **Y**ellow, and **K**ey (black).

4.5 High efficiency filter: A filter with greater than 99.97% efficiency, and suitable for any aerosol.

4.6 Filter: An air-purifying element which removes both solid and liquid aerosols.

4.7 Munsell Notation: A means for specifying the colors of objects.⁽¹⁾

5. Colors

5.1 Each respirator canister, cartridge, filter container or canister or cartridge label shall be a distinctive color as indicated in Table 1.

- 5.2** Where protection is for more than one contaminant class, except CBRN, each of the applicable colors shall be used in readily discernible stripes such that the markings meet the requirement of clause 5.6.
- 5.3** Where respirator canisters, cartridges or filter containers are colored to conform to this standard, each color shall be visible at a distance of one meter.
- 5.4** All colors used shall conform to the Munsell Notation.
- 5.5** Where labels are used to conform to this standard, the canister, cartridge or filter container shall be black, gray, transparent; or may be left in its natural metallic color.
- 5.6** Each color shall be readily visible from a distance of one meter when the respirator using the air-purifying element is worn.
- 5.7** Labels used for color-coding shall be resistance to change such as, but not limited to, peeling, fading, bleaching and blistering. In the event that the color-coded label is separated from the canister, cartridge or filter, evidence shall remain to alert users that the color-coded label is missing.
- 5.8** The color coating or colored material used shall be resistant to change such as, but not limited to, chipping, peeling, scaling, blistering, and fading, and to the effects of ordinary atmospheres to which they may be exposed under normal or ordinary conditions of storage and use.
- 6. Reference**
1. **American Society for Testing and Materials (ASTM): D1535-08, Specifying Color by the Munsell System.** West Conshohocken, PA: ASTM, 1996.

Table 1 — Color Assigned to Air Purifying Elements

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Atmospheric Contaminant Class or Contaminant to be Protected Against	Color Assigned ¹	Munsell Notation ²	CMYK				Typical Contaminants ³
			Cyan	Magenta	Yellow	Black	
Acidic gases	White	N 9.5/	0	0	0	0	Cl, ClO ₂ , H ₂ S, HCl, SO ₂ , HF
Basic gases	Green	2.5G 5/10	75	20	44	24	NH ₃ , CH ₃ NH ₂
Organic vapors	Brown	10YR 3/6	19	32	52	41	A majority of organic vapors
Formaldehyde	Tan	10YR 7/3	20	28	41	4	HCHO
Carbon monoxide gas	Blue	2.5PB 4/10	83	43	20	16	CO
Mercury Vapors	Orange	5YR 7/14	0	42	100	0	Hg
Other vapors and gases not listed above	Olive	7.5Y 5/6	19	24	54	27	NO _x , HCN, CH ₃ Br, (CH ₂) ₂ O, AsH ₃
All aerosols (High Efficiency filter)	Purple	7.5P 4/8	21	39	19	28	Dusts, mists, fumes, droplets, bacteria, viruses, radionuclides
CBRN	Black	N 0.75/	0	0	0	100	See Note 4

1. Multiple contaminant filtering elements, except for CBRN, shall have all the applicable colors.

2. Munsell Color Samples are available from GretagMacbeth™ Co., 617 Little Britain Road, New Windsor, NY 12553-6148.

3. Not all cartridges or canisters are suitable for all contaminants within the contaminant class. See the text on the filtering element labels for specific contaminant designations for which the filtering element is suitable.

4. CBRN canisters are suitable for many of the contaminants within all of the classes listed.

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American National Standard for

**ANSI/AIHA Z88.7–2010 Color Coding of
Air-Purifying Respirator Canisters,
Cartridges, and Filters**

BY THE ANSI/AIHA Z88.7 SUBCOMMITTEE

This standard will assist you in the identification of air-purifying respirator canisters, cartridges, and filters used to provide respiratory protection against gases, vapors or particles. Manufacturers, users, and governmental regulatory agencies will find accurate and rapid identification of selected industrial respiratory protective devices.

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