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LETTER TO ALL INTERESTED PARTIES

SUBJECT: Colors for Respirator Element Labeling

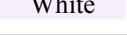
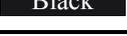
The color coding requirements of labels for canisters and cartridges as a means for secondary identification are referenced in paragraphs 84.113 and 84.193 of 42 CFR 84, respectively. The standard incorporated by reference is ANSI K-13.1 - 1973: American National Standard for identification of air-purifying respirator canisters and cartridges. It has been communicated to NIOSH that standard samples of colors specified for respirator labeling are not available. This letter includes information for the colors specified in 42 CFR 84 relevant to accessing reference colors. Equivalent designations for these colors in several color-defining systems are provided in Tables 1 and 3, as an attachment. Acceptable tolerances for each specified color are also provided in Table 2, as an attachment. Some resources for obtaining standards, reference colors and translation into other color systems are available in the additional notes.

Any questions concerning this letter should be directed to the National Personal Protective Technology Laboratory, Policy and Standards Development Branch at 412-386-5200.

Sincerely,

Jonathan V. Szalajda
Branch Chief, Policy and Standards Development
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Table 1 - Colors Specified for Secondary Designation of Air-Purifying Elements^a

ISCC-NBS colors assigned in ANSI K13.1			Munsell Notations assigned in ANSI/AIHA Z88.7-2001	Equivalent designations for centroid color in other color systems						
Color Assigned	Centroid Color Name	Centroid Color Number		Nearest PANTONE® Color ^b	CIE ^c			RGB ^d		
					Y	x	y	R	G	B
	Vivid red	11	5R 4/14	200 C	11.70	0.5711	0.3057	188	25	55
	Vivid orange	48	5YR 7/14	1375 C	41.99	0.5252	0.4168	255	144	17
	Deep yellowish brown	75	10YR 3/6	1405 C	6.391	0.4842	0.4712	94	67	0
	Vivid yellow	82	2.5Y 8/14	116 C	57.62	0.4842	0.4712	255	189	0
	Light olive	106	7.5Y 5/6	105 C	19.27	0.4199	0.4551	138	121	45
	Vivid green	139	2.5G 5/10	356 C	19.27	0.2565	0.4705	0	140	82
	Strong blue	178	2.5PB 4/10	301 C	11.70	0.1805	0.1888	0	101	170
	Strong purple	218	7.5P 4/8	259 C	11.70	0.3066	0.2228	129	77	136
	White	263	N 9.5/	Cool Gray 1C	87.8	0.3100	0.3150	247	238	252
	Medium gray	265	N 5.5/	423 C	23.95	0.3100	0.3150	138	133	141
	Black	267	N 0.75/	Black C	0.86	0.3100	0.3150	24	23	25

^a Refer to ANSI K13.1-1973 and ANSI Z88.7-2001 for specific designations

^b Values were obtained through “ask a question” at <http://www.pantone.com/pages/pantone/index.aspx>. CIE equivalents for CIE illuminant D50 were also provided and are included in Table 3.

^c Obtained from ASTM D 1535-07 Table 2 for Munsell Notations in column 4. Another source is http://www.cis.rit.edu/mcsl/online/munsell_data/all.dat. Values are for CIE illuminant C-2°.

^d sRGB, scaled to 255, estimates obtained from calculator available at www.easyrgb.com using CIE values in this table.

^e 42 CFR 84.179 (b) (3) states the color, magenta, which is considered equivalent to purple *e.g.* NIOSH TB Respiratory Protection Program in Health Care Facilities, DHHS (NIOSH) Publication No. 99-143 p. 52.

Table 2 - Ranges for Colors specified in ANSI K 13.1—1973

ISCC-NBS colors with ranges in Munsell Notation				
Centroid Color Number	Centroid Munsell Notation ^a	Range ^b		
		Hue	Value	Chroma
11	5R 3.9 /15.4	1-7R	≤ 3.5	≥ 11
		“	3.5 ← ^c 5.5	≥ 13
		“	5.5 ← 6.5	≥ 15
		7R-9R	≤ 3.5	≥ 11
		“	3.5 ← 4.5	≥ 13
48	4.1YR 6.5 /15	2-7YR	≥ 4.5	≥ 14
75	8.8YR 3.1 /5	8YR-1Y	≤ 3.5	≥ 5
82	3.3Y 8 /14.3	1-7Y	≥ 5.5	≥ 11
106	8.2Y 5.1 /5.6	4-7Y	4.5-5.5	≥ 3
		7Y-9Y	4.5-5.5	≥ 3
		“	5.5←6.5	3-5
		9Y-2GY	4.5-5.5	≥ 3
		“	5.5←6.5	3-5
139	3.2G 4.9 /11.1	3-9G	1.2-8.6	≥ 11
178	2.9PB4.1 /10.4	9B-5PB 5-7PB	3-5.5	9-13
218	6.5P 4.3 /9.2	3-9P	3.5-5.5	9-13
263	2.5PB 9.5 /0.2	all	≥ 8.5	≤ 0.5
265	3.3GY 5.4 /0.1	all	4.5-6.5	≤ 0.5
267	2.5PB 0.8 /0	all	≤ 2.5	≤ 0.5

^a Values were obtained from <http://www.anthus.com/Colors/Cent.html>.

^b Ranges were taken from charts in Chapter 13, Color: Universal Language and Dictionary of Names, by K. L. Kelly and D. B. Judd. National Bureau of Standards, Spec. Publ. 440, Dec. 1976.

^c An arrowhead indicates boundary not included in range: *i.e.* 3.5 < value ≤ 5.5.

Table 3 - CIE Equivalentents for Pantone® Colors given in Table 1

Nearest PANTONE® Color	CIE		
	Y D50	x D50	y D50
200 C	12.36	0.5985	0.3179
1375 C	44.12	0.5387	0.4198
1405 C	6.69	0.5039	0.4384
116 C	60.36	0.4957	0.4705
105 C	20.09	0.4405	0.4680
356 C	19.84	0.2785	0.5107
301 C	11.51	0.1988	0.2347
259 C	11.87	0.3500	0.2623
Cool Gray 1C	87.80	0.3457	0.3585
423 C	23.98	0.3457	0.3585
Black C	0.86	0.3457	0.3585