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Panel for Visual Examination of Shade Cards for Printing
of IS 5 CHD 20: P1

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भारतीय मानक
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(छठा पुनरीक्षण)

Indian Standard

COLOURS FOR

READY MIXED PAINTS AND ENAMELS

(Sixth Revision)

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of hue, value and chroma. The colourimetric values (chromaticity co-ordinates and luminance factor) expressed in terms of the trichromatic system for colourimetry, which constitute a permanent record of the standard colours obtained from spectrophotometric measurements are also given in Table 1 for guidance. The 'Munsell' system of colours is briefly explained in Annex A.

ANNEX A

(Foreword, Clauses 2 and 4)

GLOSSARY OF COLOUR TERMS AND THE 'MUNSELL' SYSTEM

A-1 DEFINITIONS

A-1.1 Achromatic Sensations — Visual sensations devoid of the attribute of hue.

A-1.2 Additive Mixture — The mixture of light stimuli in such a manner that they enter the eye simultaneously or in rapid succession and are incident on the same area of the retina, or enter in the form of a mosaic which the eye cannot resolve.

A-1.3 Black

A-1.3.1 A visual sensation arising from some portion of a luminous field of extremely low luminosity.

A-1.3.2 As defined in A-1.3.1, but applied to a secondary source which is completely absorbing at all visible wavelengths.

NOTE — The terms 'white' and 'black' are not always used in the strict sense defined above. It is usual to apply them to greys and neutrals, the luminance factor of which is nearly unity or nearly zero respectively.

A-1.4 Black Content — The subjectively estimated amount of blackness seen in the visual sensation arising from a surface colour.

A-1.5 Brightness — That colour quality, a decrease in which is associated with the residual degradation which would result from the addition of a small quantity of neutral grey to the colouring material when the strength of the mixture has been readjusted to the original strength (comparison brighter).

A-1.6 Colour

A-1.6.1 That characteristic of visual sensation which enables the observer to distinguish differences in the quality of the sensation of the kind which can be

caused by differences in the spectral composition of the light.

A-1.6.2 That characteristic of the light stimulus, light source or object, which gives rise to the visual sensation in a red light, a white light, a red face, etc.

A-1.6.3 As defined in A-1.6.1 or A-1.6.2, but restricted to the appearance of redness, greenness, etc. or as distinct from whiteness, greyness or blackness; that is, chromatic colour in contra-distinction to achromatic colour.

A-1.7 Complementary Colours

A-1.7.1 Additive — Any two colours which, by additive mixture, can be made to match a specified achromatic colour.

A-1.7.2 Subtractive — Any two absorbing media which, by subtractive mixture, can be made to match specified achromatic colour.

A-1.8 Colour Content — The subjectively estimated amount of colourfulness seen in the visual sensation arising from a surface colour. Similar to chroma.

A-1.9 Cleaner — A difference apparently due to the presence of less black than in the original sample.

A-1.10 Cool Colours — Green or blue, or colours which exhibit a predominance of these.

A-1.11 Chromatic Sensations — Visual sensations possessing the attribute of hue.

A-1.12 Dichroism — A phenomenon in which a secondary source shows a marked change in hue with change in the observing conditions. Instances are: (a) change in colour temperature of the illuminant, (b) change in concentration of an absorbing material, (c) change in thickness of an absorbing layer, (d) change in direction of illumination or viewing, and (e) change in condition of polarization.

A-1.13 Dullness — That colour quality, an increase in which is associated with the residual degradation which would result from the addition of a small quantity of neutral grey to the colouring material when the strength of the mixture has been readjusted to the original strength (comparison duller).

A-1.14 Deeper — A difference apparently due to the presence of less white than in the original sample.

A-1.15 Dirtier/Duller — A difference apparently due to the presence of more black than in the original sample.

A-1.16 Full Colour — Surface colours which are produced with the maximum colourfulness obtainable.

A-1.17 Grey

A-1.17.1 Any achromatic sensation of luminosity intermediate between black and white.

A-1.17.2 As defined in A-1.17.1, but applied to a secondary source which is partially absorbing at some or all visible wavelengths but from which the reflected or transmitted light has the same colour as that of the incident light.

A-1.18 Hue — Attribute of visual sensation which has given rise to colour names, such as, blue, green, yellow, red and purple.

A-1.19 Light — Radiant power (energy flux) capable of stimulating the eye to produce visual sensation.

A-1.20 Minus Colours — Colours in which only the spectral components associated with the colour named are not present to any substantial extent, for example, minus red.

A-1.21 'Munsell' Chroma — The estimated pure chromatic colour content of a surface colour on a scale of equal sensation intervals extending from grey (Chroma = 0), as specified objectively by the sample of the 'Munsell' Atlas (see Note).

NOTE — The 'Munsell' System presents the closest attempt at representing the colour solid of surface colours by samples, spaced at equal sensation intervals and, therefore, the closest *correlation* with the subjective variable, which are chroma, lightness (called value) and hue.

A-1.22 'Munsell' Value — The estimated lightness of any surface colour on a scale of 10 equal sensation intervals extending from ideal black (value = 0) to ideal white (value = 10), as specified objectively for values from 1 to 9 in the 'Munsell' Atlas (see Note under A-1.21).

A-1.23 'Munsell' Hue — The hue of a surface colour on a scale of 100 equal sensation intervals round a colour circle of constant chroma, a specified objectively by the samples of the 'Munsell' Atlas (see Note under A-1.21).

A-1.24 Masstone — The colour by reflected light of a bulk of undiluted pigment.

A-1.25 Neutral Grey — Applied to a secondary source which is equally absorbing at all visible wavelengths.

A-1.26 Primary Light Source — A body or object emitting light by virtue of transformation of energy into radiant energy within itself.

A-1.27 Shade — A colour of the same hue and saturation but lower luminosity.

A-1.28 Shadow Series

A-1.28.1 Subjective — A series of colours of varying luminosity but constant hue and saturation.

A-1.28.2 Objective — A series of colours of varying luminance but constant chromaticity.

A-1.29 Strength — That colour quality, an increase in which is associated with an increase in the concentration of the colouring material present, all other conditions (viewing, etc) remaining the same (comparisons stronger, weaker).

A-1.30 Stronger — A difference apparently due to the presence of more colour than in the original sample.

A-1.31 Subtractive Mixture — The mixture of absorbing media or the superposition of filters so that the composition of the light stimulus passing through the combination is determined by the simultaneous or successive absorption of parts of the spectrum by each medium present.

A-1.32 Secondary Light Source — A body or object transmitting or reflecting light falling on it from any other source, whether primary or secondary.

A-1.33 Tint — The weak colour resulting from the addition to white of a small amount of colouring matter.

A-1.34 Tings — A trace of added colour.

A-1.35 Tone — A slight variant of a colour.

A-1.36 Undertone — The colour of a pigment when it is used in very thin layers or greatly extended with white, the hue of which may often differ from that of the masstone.

A-1.37 Warm Colour — Red, orange or yellow, or colours which exhibit a predominance of these.

A-1.38 Weaker — A difference apparently due to the presence of less colour than in the original sample.

A-1.39 White

A-1.39.1 An achromatic sensation of relatively high luminosity.

A-1.39.2 As defined in A-1.39.1, but applied to a secondary source which is non-absorbing at all visible wavelengths.

A-1.40 White Content — The subjectively estimated amount of whiteness seen in the visual sensation arising from a surface colour.

A-1.41 Whiter — A difference apparently due to the presence of more white than in the original sample.

A-2 THE 'MUNSELL' SYSTEM

A-2.1 In the 'Munsell' system, the colours are specified in terms of hue, value and chroma.

A-2.1.1 Hue — It distinguishes red from blue, green from yellow, etc and is denoted by letter (for example, R for red, BG for blue-green) with prefix numbers, namely, 2.5, 7.5, or 10. If, for example, the R (red) number is greater than 5, the colour inclines, to the yellow-red (YR), and if the R number is less than 5, the colour inclines to red-purple (RP), and so on round the hue circle.

A-2.1.2 Value — It is related to lightness or darkness of a colour and is quoted as ranging from 0 to 10; the low figures represent the darker colours and finally black (0), the high figures represent the light colours and finally white (10). A rough estimate of the reflectance as a percentage is given by the formula $V/(V-1)$, where V is the 'value'. Thus, colours of similar values have similar reflectance.

A-2.1.3 Chroma — Attribute of a visual sensation which permits a judgement to be made in the amount of pure chromatic colour present, irrespective of the amount of a chromatic colour.

It is strength of colour and is based on a scale from neutral grey (—/0) towards full strength at any given 'value' level. Steps are denoted numerically at even intervals.

A-2.1.4 Chromaticity Coordinates — Ratio of each of the three tristimulus values to their sum. It indicates the colour quality of the sample and recommended symbols are x , y and z in the CIE 1931 standard Colourimetric System and x_{10} , y_{10} and z_{10} in the CIE 1964 Supplementary Colourimetric System.

$$x = \frac{X}{X + Y + Z}$$

$$x_{10} = \frac{X_{10}}{X_{10} + Y_{10} + Z_{10}}$$

$$y = \frac{Y}{X + Y + Z}$$

$$y_{10} = \frac{Y_{10}}{X_{10} + Y_{10} + Z_{10}}$$

$$z = \frac{Z}{X + Y + Z}$$

$$z_{10} = \frac{Z_{10}}{X_{10} + Y_{10} + Z_{10}}$$

X , Y and Z are the tristimulus values in the CIE 1931 Standard Colourimetric System and X_{10} , Y_{10} and Z_{10} in the CIE 1964 Supplementary Colourimetric System.

$$x + y + z = 1 \text{ and } x_{10} + y_{10} + z_{10} = 1$$

Illuminant D65—Average north sky daylight with colour temperature 6 500 K. 'L', 'a', 'b', — Three dimensions of uniform CIE colour space, 'L' stands for lightness, 'a' denotes redness/greenness and 'b' indicates yellowness/blueness.

10 degree observer — Standard CIE observer recommended wherever colour matching conditions exceeds 4 Deg. Field of view.

A-2.1.5 Tristimulus Value — Amounts of the three reference or matching stimuli required to give a match with the colour stimulus considered, in a given trichromatic system.

The symbols recommended for the tristimulus values are X , Y and Z in the CIE 1931 Standard Colourimetric System and X_{10} , Y_{10} and Z_{10} in the CIE 1964 Standard Colourimetric System.

A-2.1.6 Luminance Value — The emission by matter of electromagnetic radiation which for certain wavelengths or restricted regions of the spectrum is in excess of that 'due to the thermal radiation from the material at the same temperature is defined as Luminance.

The ratio of the luminance of a body while illuminated and observed under certain conditions to that of perfect defuser under the same conditions.

A-2.1.7 Method of Determination of Chromaticity Coordinates — The value of reflectance is measured for the sample over a circular area of 8 mm in dia over a wavelength range of 360 to 740 nm at 10 nm interval. The "Minolta CM 3220 D" colour matching system is used for determining the reflectance values.

A-2.2 A complete 'Munsell' reference for a colour, for example, 7.5 R, 9/2 means:

- Hue of 7.5 R denoting a red inclined towards yellow-red,
- Value 9 denoting a very light colour, and
- Chroma 2 indicating that the strength of the colour is low.

A broad description of the colour would, therefore, be 'pale-pink'.

A-2.3 It should be noted, however, that neutral greys, having no hue or chroma, are denoted by the value figure prefixed by 'N', for example, 'N6' or 'N8'

A-2.4 In the design of the colour range 'Munsell' references provide the means of defining the various categories of colour required.

Table 1 Approximate 'Munsell' References and Colourimetric Values (Foreword and Clause 4)

SI No.	Indian Standard Colour (ISC) No.	Name of Colour Shade	Chromaticity Coordinates		Approximate Munsell Value		Luminance Value		
			X	Y	Hue	Value/ Chroma	L	a	b
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1.	101	Sky Blue	0.2949	0.3567	8.3G	6.09/2.86	62.69	-15.16	4.19
2.	102	Turquoise Blue	0.2655	0.3494	4.5BG	5.26/4.22	54.79	-21.69	-1.08
3.	103	Peacock Blue	0.2544	0.3231	0.8B	3.96/3.28	41.47	-14.86	-6.76
4.	104	Azure Blue	0.2388	0.2674	3.8PB	3.47/4.48	36.7	-4.5	-18.02
5.	105	Oxford Blue	0.2644	0.2804	5.7PB	2.82/2.56	29.5	-0.37	-11.61
6.	106	Navy Blue	0.2933	0.3083	6.2PB	2.61/0.95	26.91	0.22	-4.73
7.	108	Aircraft Blue	0.2349	0.2564	5.0PB	3.28/4.82	34.77	-2.47	-19.91
8.	166	French Blue	0.2279	0.2569	3.8PB	4/6.13	42.45	-5.52	-23.37
9.	169	Traffic Blue	0.25	0.31	4.7B	3.96/3.4	41.65	-13.04	-9.71
10.	174	Oriental Blue	0.2513	0.3357	8.1BG	5.48/4.9	57.3	-23.92	-5.88
11.	176	Phirozi	0.2112	0.2748	8.5B	4.92/7.38	52.54	-19.95	-24.04
12.	177	Satin Blue	0.2789	0.3274	2.8B	7.43/1.7	76.04	-13.9	-6.15
13.	216	Eau-de-Nil	0.3499	0.4035	5.7GY	6.89/4.22	69.71	-10.83	25.29
14.	217	Sea Green	0.3615	0.4445	6.2GY	6.12/6.15	61.93	-16.75	34.83
15.	218	Grass Green	0.3393	0.4442	8.2GY	4.65/5.52	47.41	-19.01	25.28
16.	219	Sage Green	0.3604	0.4083	3.5GY	4.58/3.37	46.64	-6.36	20.72
17.	220	Olive Green	0.3349	0.3828	6.0GY	3.44/2.17	35.05	-5.83	10.35
18.	221	Brilliant Green	0.3164	0.4421	0.3G	4.16/5.42	42.71	-22.66	20.41
19.	222	Light Bronze	0.3698	0.4072	1.3GY	4.18/3.09	42.43	-3.58	20.23
20.	223	Middle Bronze	0.3332	0.3709	5.3GY	3.29/1.66	33.54	-3.81	8.03
21.	224	Deep Bronze Green	0.3205	0.3606	7.7GY	3.11/1.36	31.87	-4.4	5.15
22.	225	Light Brunswick Green	0.3211	0.414	9.8GY	3.88/4.01	39.66	-15.55	15.19
23.	226	Middle Brunswick Green	0.304	0.3911	1.8G	3.21/3.13	32.99	-13.54	8.53
24.	227	Deep Brunswick Green	0.3042	0.3585	3.8G	2.91/1.74	29.81	-7.16	3.38
25.	267	Traffic Green	0.2985	0.3951	2.5G	3.73/3.79	38.37	-17.07	9.61
26.	275	Opaline Green	0.3183	0.3886	0.5G	6.43/4	65.6	-16.73	15.59
27.	276	Lincoln Green	0.3159	0.3863	0.3G	3.53/2.81	36.18	-10.82	9.39
28.	277	Cypress Green	0.3319	0.4048	7.7GY	3.64/3.22	37.13	-10.81	14.08
29.	278	Light Olive Green	0.3533	0.407	4.9GY	5.07/3.6	51.77	-8.47	21.19
30.	279	Steel Furniture Green	0.3314	0.3546	9.9Y	3.16/0.85	32.31	-1.01	5.17

Table 1 - Continued

SI No.	Indian Standard Colour (ISC) No.	Name of Colour Shade	Chromaticity Coordinates		Approximate Munsell Value		Luminance Value		
			X	Y	Hue	Value/ Chroma	L	a	b
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
31.	280	Verdigris Green	0.2967	0.4053	2.9G	5.4/5.57	55.51	-25.47	14.6
32.	281	Apple Green	0.3266	0.4113	9.4GY	5.76/4.79	58.81	-18.52	20.56
33.	282	Forest Green	0.3116	0.392	0.9G	3.59/3.13	36.83	-12.99	10.03
34.	283	Aircraft Grey	0.3339	0.3741	5.8GY	5.07/2.16	51.92	-5.85	11.79
35.	284	India Green	0.2941	0.4114	2.4G	3.76/4.55	38.79	-21.22	11.93
36.	294	Scamic	0.3324	0.3643	3.8GY	3.55/1.33	36.37	-2.87	7.33
37.	298	Olive Drab	0.3393	0.3638	0.2GY	3.37/1.25	34.39	-1.2	7.58
38.	299	Bus Green	0.2734	0.4053	5.4G	3.6/4.86	37.38	-24.68	8.83
39.	309	Canary Yellow	0.462	0.4645	4.8Y	7.89/11.02	78.18	6.54	76.58
40.	352	Pale Cream	0.3895	0.4002	3.7Y	7.99/5.12	80.08	3.63	35.07
41.	353	Deep Cream	0.4144	0.4107	2.4Y	8.01/6.73	79.9	8.68	43.84
42.	354	Primrose	0.4261	0.4371	4.7Y	7.41/7.57	74.16	3.63	52.35
43.	355	Lemon	0.4824	0.4505	2.0Y	7.49/11.54	74.16	16.08	74.99
44.	356	Golden Yellow	0.4926	0.4376	9.9YR	7.06/11.42	70.04	21.83	69.78
45.	358	Light Buff	0.4191	0.3994	9.7YR	7/6.15	70.26	12.8	37.02
46.	359	Middle Buff	0.4379	0.4079	9.4YR	6.34/6.77	63.72	14.55	40.37
47.	360	Deep Buff	0.423	0.3871	7.2YR	5.7/5.43	57.63	15.37	29.15
48.	361	Light Stone	0.3894	0.3836	10.0YR	6.76/4.26	68.27	8.37	26.15
49.	362	Middle Stone	0.4176	0.3933	9.0YR	5.35/4.84	54.19	11.64	28.41
50.	363	Dark Stone	0.4119	0.3865	8.4YR	5.1/4.4	51.75	11.62	24.96
51.	364	Portland Stone	0.3627	0.3807	4.8Y	7.61/3.16	76.77	0.68	22.96
52.	365	Vellum	0.3553	0.3721	4.0Y	8.01/2.73	80.77	0.96	19.94
53.	368	Traffic Yellow	0.4928	0.3998	4.8YR	6.21/10.05	62.09	30.77	49.77
54.	384	Light Straw	0.3702	0.3811	3.1Y	7.46/3.49	75.22	3.21	24.02
55.	385	Light Biscuit	0.3866	0.395	2.9Y	8.15/4.9	81.71	4.47	33.4
56.	386	Champagne	0.3847	0.3839	0.8Y	7.61/4.4	76.5	7.44	27.91
57.	387	Sunshine	0.3735	0.3822	2.9Y	7.02/3.49	70.86	3.81	23.74
58.	388	Beige	0.3771	0.3783	0.9Y	7.2/3.73	72.61	6.43	23.76
59.	397	Jasmine Yellow	0.4177	0.4305	4.6Y	8.27/7.53	82.44	3.27	52.63
60.	410	Light Brown	0.4184	0.384	7.2YR	4.77/4.44	48.27	13.14	24.07
61.	411	Middle Brown	0.4018	0.3678	5.3YR	3.84/3.14	38.98	11.46	15.58
62.	412	Dark Brown	0.3646	0.3426	0.7YR	3.23/1.75	32.9	8.27	6.16
63.	413	Nut Brown	0.3425	0.3412	4.5YR	2.97/0.83	30.26	3.82	3.79
64.	414	Golden Brown	0.4413	0.38	4.6YR	4.54/5.41	45.88	18.68	25.64
65.	415	India Brown	0.3954	0.3565	2.7YR	3.76/3.02	38.18	12.54	12.55
66.	439	Orange Brown	0.4272	0.3512	9.7R	3.78/4.68	38.29	20.27	15.18
67.	442	Light Salmon Pink	0.3939	0.3799	8.1YR	7.71/5.09	77.48	12.23	28.72

Table 1 - Concluded

Sl No.	Indian Standard Colour (ISC) No.	Name of Colour Shade	Chromaticity Coordinates		Approximate Munsell Value		Luminance Value		
			X	Y	Hue	Value/ Chroma	L	a	b
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
68.	443	Salmon Pink	0.3925	0.36	2.5YR	6.31/4.7	64	16.45	19.01
69.	444	Terra Cotta	0.4396	0.3416	7.0R	4.16/6.32	42.2	26.88	15.85
70.	445	Venetian Red	0.4294	0.3404	7.1R	3.63/5.15	36.78	22.72	12.96
71.	446	Red Oxide	0.4151	0.3409	7.6R	3.38/4.1	34.23	18.84	10.93
72.	448	Deep Indian Red	0.3748	0.3328	4.9R	3.17/2.59	32.31	12.29	5.38
73.	449	Light Purple Brown	0.3619	0.3285	3.2R	3.07/2.14	31.36	10.48	3.45
74.	451	Chocolate	0.3365	0.3385	3.5YR	2.82/0.67	28.77	3.07	2.8
75.	473	Gulf Red	0.3925	0.3317	4.8R	3.25/3.45	33.07	16.2	6.9
76.	489	Leaf Brown	0.4091	0.3639	3.3YR	4.02/3.65	40.79	14.29	16.19
77.	490	Beech Brown	0.3777	0.3492	2.3YR	3.31/2.15	33.65	9.61	8.56
78.	499	Service Brown	0.3516	0.3497	7.7YR	3.19/1.14	32.45	4.12	6.12
79.	536	Fire Red	0.5378	0.3402	7.0R	4.6/12.51	46.29	49.87	32.88
80.	537	Signal Red	0.512	0.3306	5.4R	4.23/11.16	42.76	45.02	24.04
81.	538	Post Office Red	0.4757	0.3231	4.2R	3.55/8.39	35.85	35.33	14.83
82.	540	Crimson	0.3975	0.3223	2.9R	2.95/3.96	29.87	18.1	5.36
83.	541	Maroon	0.3428	0.3257	1.3R	2.9/1.36	29.69	7	1.37
84.	557	Light Orange	0.5121	0.3822	1.9YR	5.69/10.83	56.99	38.43	45.76
85.	570	Traffic Red	0.4728	0.3504	8.1R	4.41/7.96	44.55	32.58	23.22
86.	574	Indian Saffron	0.4996	0.3537	8.2R	5.21/10.57	52.61	42.01	32.13
87.	591	Deep Orange	0.5076	0.3597	8.9R	5.04/10.38	50.84	40.85	34.52
88.	592	International Orange	0.5221	0.3485	7.8R	4.89/11.54	49.26	46.35	33.53
89.	628	Silver Grey	0.3369	0.364	1.5GY	5.96/1.59	60.95	-2.66	11.29
90.	629	Quaker Grey	0.347	0.366	6.2Y	5.52/1.73	56.38	-0.02	12.39
91.	630	French Grey	0.3341	0.3576	0.4GY	5.91/1.27	60.5	-1.61	9.29
92.	631	Light Grey	0.3129	0.3451	2.0G	5.71/0.96	58.72	-4.77	3.38
93.	632	Dark Admiralty Grey	0.2973	0.3232	8.1B	4.42/1.01	45.73	-2.65	-3.25
94.	633	AF Blue Grey	0.301	0.3252	7.3B	3.32/0.57	34.22	-1.74	-2.01
95.	634	Slate	0.3277	0.3557	4.1GY	4.34/1.11	44.54	-2.48	6.3
96.	635	Lead	0.3106	0.3453	2.8G	3.62/0.96	37.28	-3.98	2.23
97.	671	Middle Graphite	0.3037	0.3249	10.0B	3.66/0.52	37.75	-1.11	-1.97
98.	692	Smoke Grey	0.2773	0.3129	8.5B	5.51/2.78	57.23	-7.02	-8.67
99.	693	Aircraft Grey	0.3111	0.3394	4.7G	5.43/0.67	55.91	-3.45	1.69
100.	694	Dove Grey	0.3133	0.3376	2.3G	5.53/0.48	56.92	-2.23	1.54
101.	695	Dark Blue Grey	0.3073	0.3275	9.2B	2.82/0.25	28.96	-0.68	-1
102.	697	Light Admiralty Grey	0.3051	0.3419	9.4G	7.34/1.35	75.02	-7.84	2
103.	698	Steel Grey	0.3079	0.3309	8.2BG	3.03/0.31	31.16	-1.26	-0.47
104.	796	Dark Violet	0.2977	0.2662	6.1P	3.5/4.27	36.33	12.76	-13.67

Table 1 - Concluded

SI No.	Indian Standard Colour (ISC) No.	Name of Colour Shade	Chromaticity Coordinates		Approximate Munsell Value		Luminance Value		
			X	Y	Hue	Value/ Chroma	L	a	b
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
68.	443	Salmon Pink	0.3925	0.36	2.5YR	6.31/4.7	64	16.45	19.01
69.	444	Terra Cotta	0.4396	0.3416	7.0R	4.16/6.32	42.2	26.88	15.85
70.	445	Venetian Red	0.4294	0.3404	7.1R	3.63/5.15	36.78	22.72	12.96
71.	446	Red Oxide	0.4151	0.3409	7.6R	3.38/4.1	34.23	18.84	10.93
72.	448	Deep Indian Red	0.3748	0.3328	4.9R	3.17/2.59	32.31	12.29	5.38
73.	449	Light Purple Brown	0.3619	0.3285	3.2R	3.07/2.14	31.36	10.48	3.45
74.	451	Chocolate	0.3365	0.3385	3.5YR	2.82/0.67	28.77	3.07	2.8
75.	473	Gulf Red	0.3925	0.3317	4.8R	3.25/3.45	33.07	16.2	6.9
76.	489	Leaf Brown	0.4091	0.3639	3.3YR	4.02/3.65	40.79	14.29	16.19
77.	490	Beech Brown	0.3777	0.3492	2.3YR	3.31/2.15	33.65	9.61	8.56
78.	499	Service Brown	0.3516	0.3497	7.7YR	3.19/1.14	32.45	4.12	6.12
79.	536	Fire Red	0.5378	0.3402	7.0R	4.6/12.51	46.29	49.87	32.88
80.	537	Signal Red	0.512	0.3306	5.4R	4.23/11.16	42.76	45.02	24.04
81.	538	Post Office Red	0.4757	0.3231	4.2R	3.55/8.39	35.85	35.33	14.83
82.	540	Crimson	0.3975	0.3223	2.9R	2.95/3.96	29.87	18.1	5.36
83.	541	Maroon	0.3428	0.3257	1.3R	2.9/1.36	29.69	7	1.37
84.	557	Light Orange	0.5121	0.3822	1.9YR	5.69/10.83	56.99	38.43	45.76
85.	570	Traffic Red	0.4728	0.3504	8.1R	4.41/7.96	44.55	32.58	23.22
86.	574	Indian Saffron	0.4996	0.3537	8.2R	5.21/10.57	52.61	42.01	32.13
87.	591	Deep Orange	0.5076	0.3597	8.9R	5.04/10.38	50.84	40.85	34.52
88.	592	International Orange	0.5221	0.3485	7.8R	4.89/11.54	49.26	46.35	33.53
89.	628	Silver Grey	0.3369	0.364	1.5GY	5.96/1.59	60.95	-2.66	11.29
90.	629	Quaker Grey	0.347	0.366	6.2Y	5.52/1.73	56.38	-0.02	12.39
91.	630	French Grey	0.3341	0.3576	0.4GY	5.91/1.27	60.5	-1.61	9.29
92.	631	Light Grey	0.3129	0.3451	2.0G	5.71/0.96	58.72	-4.77	3.38
93.	632	Dark Admiralty Grey	0.2973	0.3232	8.1B	4.42/1.01	45.73	-2.65	-3.25
94.	633	AF Blue Grey	0.301	0.3252	7.3B	3.32/0.57	34.22	-1.74	-2.01
95.	634	Slate	0.3277	0.3557	4.1GY	4.34/1.41	44.54	-2.48	6.3
96.	635	Lead	0.3106	0.3453	2.8G	3.62/0.96	37.28	-3.98	2.23
97.	671	Middle Graphite	0.3037	0.3249	10.0B	3.66/0.52	37.75	-1.11	-1.97
98.	692	Smoke Grey	0.2773	0.3129	8.5B	5.51/2.78	57.23	-7.02	-8.67
99.	693	Aircraft Grey	0.3111	0.3394	4.7G	5.43/0.67	55.91	-3.45	1.69
100.	694	Dove Grey	0.3133	0.3376	2.3G	5.53/0.48	56.92	-2.23	1.54
101.	695	Dark Blue Grey	0.3073	0.3275	9.2B	2.82/0.25	28.96	-0.68	-1
102.	697	Light Admiralty Grey	0.3051	0.3419	9.4G	7.34/1.35	75.02	-7.84	2
103.	698	Steel Grey	0.3079	0.3309	8.2BG	3.03/0.31	31.16	-1.26	-0.47
104.	796	Dark Violet	0.2977	0.2662	6.1P	3.5/4.27	36.33	12.76	-13.67

BLUE

100 -



No. 101 Sky Blue



No. 108 Aircraft Blue



No. 102 Turquoise Blue



No. 166 French Blue



No. 103 Peacock Blue



No. 169 Traffic Blue



No. 104 Azure Blue



No. 174 Oriental Blue



No. 105 Oxford Blue



No. 176 Phirozi



No. 106 Navy Blue



No. 177 Satin Blue

GREEN

200—



No. 216 Eau-de-Nil



No. 217 Sea Green



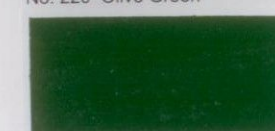
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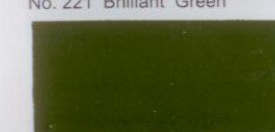
No. 219 Sage Green



No. 220 Olive Green



No. 221 Brilliant Green



No. 222 Light Bronze Green



No. 223 Middle Bronze Green



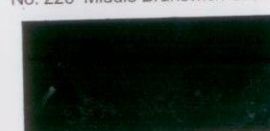
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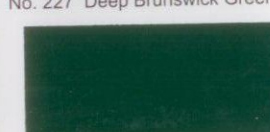
No. 225 Light Brunswick Green



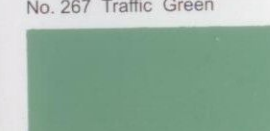
No. 226 Middle Brunswick Green



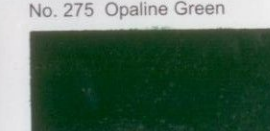
No. 227 Deep Brunswick Green



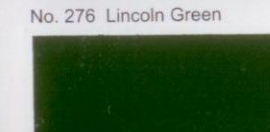
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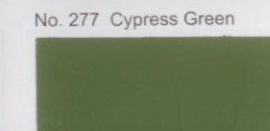
No. 275 Opaline Green



No. 276 Lincoln Green



No. 277 Cypress Green



No. 278 Light Olive Green



No. 279 Steel Furniture Green



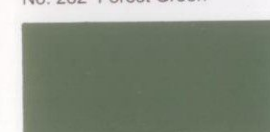
No. 280 Verdigris Green



No. 281 Apple Green



No. 282 Forest Green



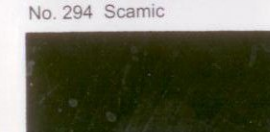
No. 283 Aircraft Grey Green



No. 284 India Green



No. 294 Scamic



No. 298 Olive Drab



No. 299 Bus Green

YELLOW, CREAM AND BUFF

300—



No. 309 Canary Yellow



No. 359 Middle Buff



No. 368 Traffic Yellow



No. 352 Pale Cream



No. 360 Deep Buff



No. 384 Light Straw



No. 353 Deep Cream



No. 361 Light Stone



No. 385 Light Biscuit



No. 354 Primrose



No. 362 Middle Stone



No. 386 Champagne



No. 355 Lemon



No. 363 Dark Stone



No. 387 Sunshine



No. 356 Golden Yellow



No. 364 Portland Stone



No. 388 Beige



No. 358 Light Buff



No. 365 Vellum



No. 397 Jasmine Yellow

BROWN AND PINK

400 —



No. 410 Light Brown



No. 411 Middle Brown



No. 412 Dark Brown



No. 413 Nut Brown



No. 414 Golden Brown



No. 415 India Brown



No. 439 Orange Brown



No. 442 Light Salmon Pink



No. 443 Salmon Pink



No. 444 Terra Cotta



No. 445 Venetian Red



No. 446 Red Oxide



No. 448 Deep Indian Red



No. 449 Light Purple Brown



No. 451 Chocolate



No. 473 Gulf Red



No. 489 Leaf Brown



No. 490 Beech Brown



No. 499 Service Brown

RED AND ORANGE

500 —



No. 536 Fire Red



No. 557 Light Orange



No. 537 Signal Red



No. 570 Traffic Red



No. 538 Post Office Red



No. 574 India Saffron



No. 540 Crimson



No. 591 Deep Orange



No. 541 Maroon



No. 592 International Orange

GREY
600—



No. 628 Silver Grey



No. 629 Quaker Grey



No. 630 French Grey



No. 631 Light Grey



No. 632 Dark Admiralty Grey



No. 633 AF Blue-Grey



No. 634 Slate



No. 635 Lead



No. 671 Middle Graphite



No. 692 Smoke Grey



No. 693 Aircraft Grey



No. 694 Dove Grey



No. 695 Dark Blue-Grey



No. 697 Light Admiralty Grey

VIOLET
700—



No. 796 Dark Violet



No. 698 Steel Grey

ANNEX B
(Foreword)

COMMITTEE COMPOSITION

Paints, Varnishes and Related Products Sectional Committee, CHD 20

<i>Organizations</i>	<i>Representative(s)</i>
In personal capacity, (14 Orion, Omer Park Bhulabhai Desai Road, Mumbai 400026)	SHRI RAVI MARPHATIA (Chairman)
Akzo Nobel Coatings India Pvt Ltd, Bangalore	SHRI DEEPAK VERMA
Asian Paints Ltd, Mumbai	DR R. D. KHANOLKAR DR B. P. MALIK (Alternate)
Berger Paints India Ltd, Howrah	SHRI B. BERA SHRI N. K. RAY (Alternate)
Bharat Heavy Electricals Ltd, Tiruchirappalli	SHRI M. SOMU SHRI L. GRAGORI (Alternate)
Central Building Research Institute, Roorkee	DR L. K. AGARWAL DR K. K. ASTHANA (Alternate)
Central Public Works Department, New Delhi	SHRI VIJAY MOTWANI SHRI R. K. KANOJIA (Alternate)
Clariant Chemicals (India) Ltd, New Delhi	SHRI ASIT RAY
Consumer Unity & Trust Society (CUTS), Jaipur	SHRI R. K. SHARMA
Directorate of Naval Architecture, New Delhi	SHRI VIJAY SINGH (Alternate)
Engineers India Limited, New Delhi	REPRESENTATIVE DR G SAHA
Indian Institute of Chemical Technology, Hyderabad	SMT NIVEDITA BHATTACHARYA (Alternate)
Indian Institute of Technology Bombay, Mumbai	DR K. V. S. N. RAJU
Indian Paints Association, Kolkata	DR A. S. KHANNA
Kansai Nerolac Paints Ltd, Mumbai	DR M. B. GUHA
Kerala Minerals and Metals Ltd, Kolkata	SHRI V. M. NATU (Alternate)
Maruti Udyog Ltd, Gurgaon	SHRI S. V. PORWAL
Ministry of Defence (DGQA), Kanpur	SHRI A. V. GADGIL (Alternate)
Ministry of Industry, New Delhi	SHRI E. J. ANTO SHRI T. K. BANERJEE
National Test House (ER), Kolkata	DR A. K. MUKHOPADHYAY SHRI V. N. SOHANI (Alternate)
Naval Materials Research Laboratory, Ambernath	SHRI P. K. JAIN SHRI N. C. TIWARI (Alternate)
Office of the Development Commissioner (SSI), New Delhi	DR SUNIL KUMAR SAHA SMT R. DEY SARKAR (Alternate) SHRI DHIRENDRA KUMAR SHRI V. R. MORE (Alternate) SHRI A. K. JAIN