Gernot Hoffmann

The Digital Munsell

Glossy version
Colors by Lab numbers
Illuminant D50

Out-of-gamut distances
for sRGB and ISOCoated

October 20 / 2013

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Contents

Introduction

The Munsell color system was created by the artist A.H.Munsell in 1905 and then improved over the years by scientists (Munsell renotation 1943).
The colors are arranged so, that the perceptual difference between two neighbours is constant, concerning the hue (M. Hue or H in degrees), the lightness (M.Value V) and eventually the chroma (M.Chroma C). Good descriptions can be found in text books [1],[2], [3], [5] and in the publication [19].
Munsell samples are available as chips [29]. The perceptual balance requires viewing under light similar to illuminant C [6]. Such an illumination is hardly anywhere found outside laboratories.

This document *The Digital Munsell* is based on the appearance of glossy Munsell chips under illumination D50. Light booths for D50 are available, either with fluorescent tubes or with *Solux* tungsten halogen bulbs [26]. There was no attempt to simulate the original appearance under illuminant C .

The author is most grateful to *Roger Breton* for interesting discussions, for supplying CIELab reference data (originally from X-Rite's ColorMunki) and for measured data. Reference data for some colors were missing. The gaps could be filled by Roger's measured data (under D50) for the complete set. The lightness of the Neutrals in ColorMunki [30] was too large. The CIELab data were replaced by Roger's measured data. One totally wrong set 2.5B_6/10 was ignored.

Data sets from the Munsell Color Science Laboratory [18] cannot be used, because they are valid for illuminant C. There are two versions: the real Munsells and the extrapolated Munsells. Real Munsell chromas are not larger than 16, whereas extrapolated Munsells can have chromas almost double as large. This is important for understanding some illustrations in [19] and for the interpretation of data in [1].

This doc shows a subset of about 1600 real Munsell colors, as existing in chip sets. It can be printed by a PostScript printer. All colors patches are programmed by CIELab numbers.

The printer should work in PostScript mode ‚Archive Format' instead of ‚Optimized for speed'. Otherwise some elements might get lost.
Some printers cannot reproduce CIELab correctly. In such a case the CIELab values in the PDF should be converted by Acrobat Professional into ProPhotoRGB, and the printer should use this wide gamut space as input space.

The Munsell nomenclature is interpreted for instance like this:
10R 5/8 means H=18°, V=5 and C=8.

The Munsell Hue is defined by a name. The table contains the assigned angle in degrees.
Planes of constant H are made for multiples of 9°. Planes of constant V are made for all available hues.
Values V reach here from 0 to 10, including the ideal absorber and the ideal diffuser.
Chroma C is usually shown by steps of 2 (2 steps C should be perceptually equivalent to 1 step V).
Available data with C=1 are ignored.

Each page for a plane of constant H contains in fact two hues:
H1 and H2 = H1+180°.

Each page has a partner page which contains CIELab values L*,a*,b* and gamma encoded values R,G,B for sRGB (written without apostroph) .

If a color is out-of-gamut for sRGB, then the estimated out-of-gamut distance is indicated bottom right in CIELab units.

If a color is out-of-gamut for the specified CMYK space, which is at present ISO-Coated_v2_eci.icc, then the estimated distance is indicated bottom left in each field.
The underlying algorithms are described in [24].

Planes of constant V in CIELab contain gamut boundaries for sRGB and for the CMYK space. The lightness L* was calculated as mean value of all colors in each diagram.

Used Hues by name and angle
Step dH=9°

2.5R	351
5R	0
7.5R	9
10R	18
2.5YR	27
5YR	36
7.5YR	45
10YR	54
2.5Y	63
5Y	72
7.5Y	81
10Y	90
2.5GY	99
5GY	108
7.5GY	117
10GY	126
2.5G	135
5G	144
7.5G	153
10G	162
2.5BG	171
5BG	180
7.5BG	189
10BG	198
2.5B	207
5B	216
7.5B	225
10B	234
2.5PB	243
5PB	252
7.5PB	261
10PB	270
2.5P	279
5P	288
7.5P	297
10P	306
2.5RP	315
5RP	324
7.5RP	333
10RP	342

Used Neutrals
Step dV=1

N=0,1,...9,10
Added N=0 and N=10

Unused

1.25YR	22.5
3.75YR	31.5
6.25YR	40.5
8.75YR	49.5
1.25Y	58.5
3.75Y	67.5
6.25Y	76.5
8.75Y	85.5
1.25GY	94.5
3.75GY	103.5
6.25GY	112.5
8.75GY	121.5
1.25G	130.5
3.75G	139.5
6.25G	148.5
8.75G	157.5
1.25PB	238.5
3.75PB	247.5
6.25PB	256.5
8.75PB	265.5
1.25RP	310.5
3.75RP	319.5
6.25RP	328.5
8.75RP	337.5
1.25R	346.5
3.75R	355.5
6.25R	4.5
8.75R	13.5

Patched by measured data

10YR	5/2
10YR	5/4
10B	2/4
7.5Y	8/10
5P	5/10

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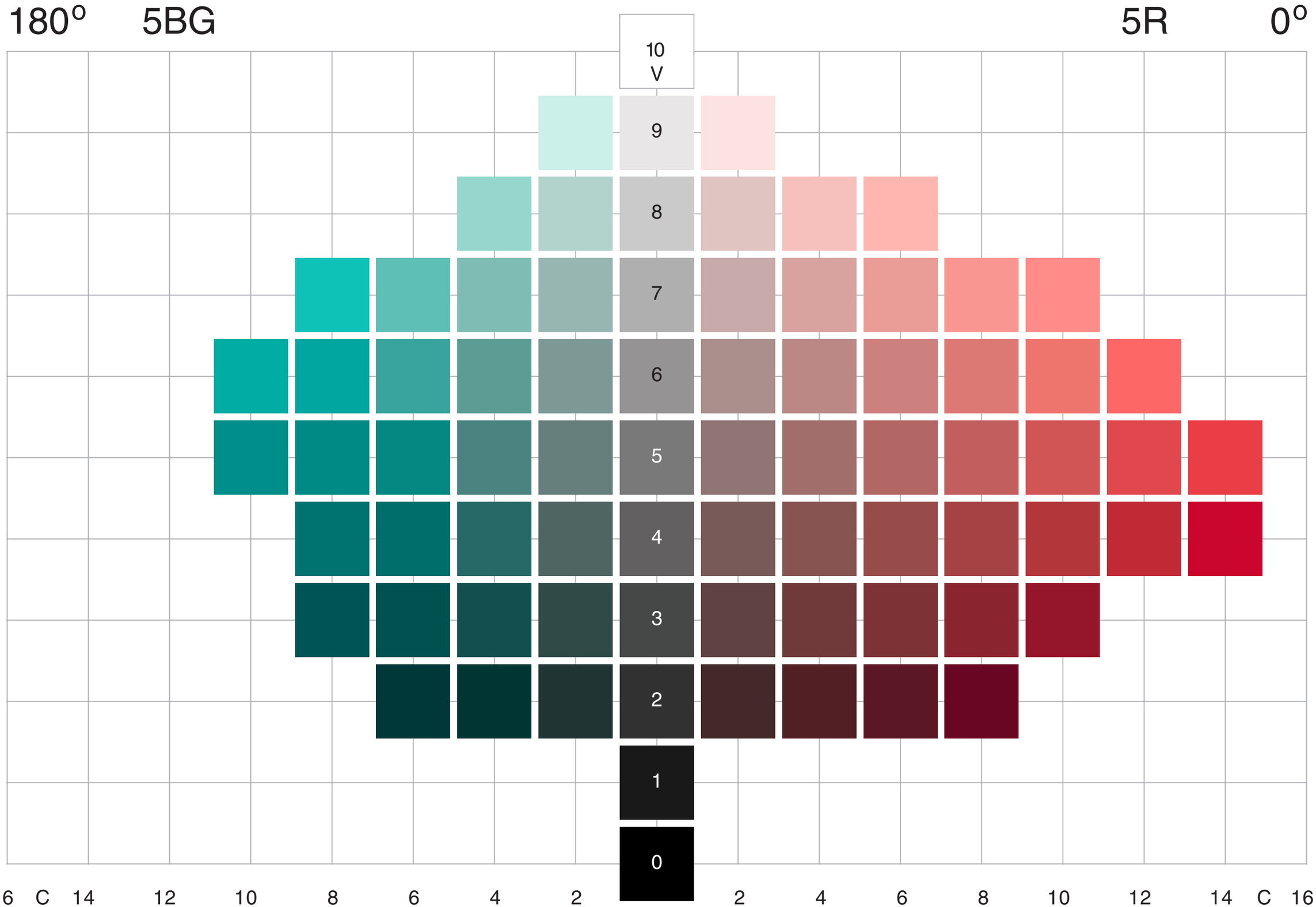

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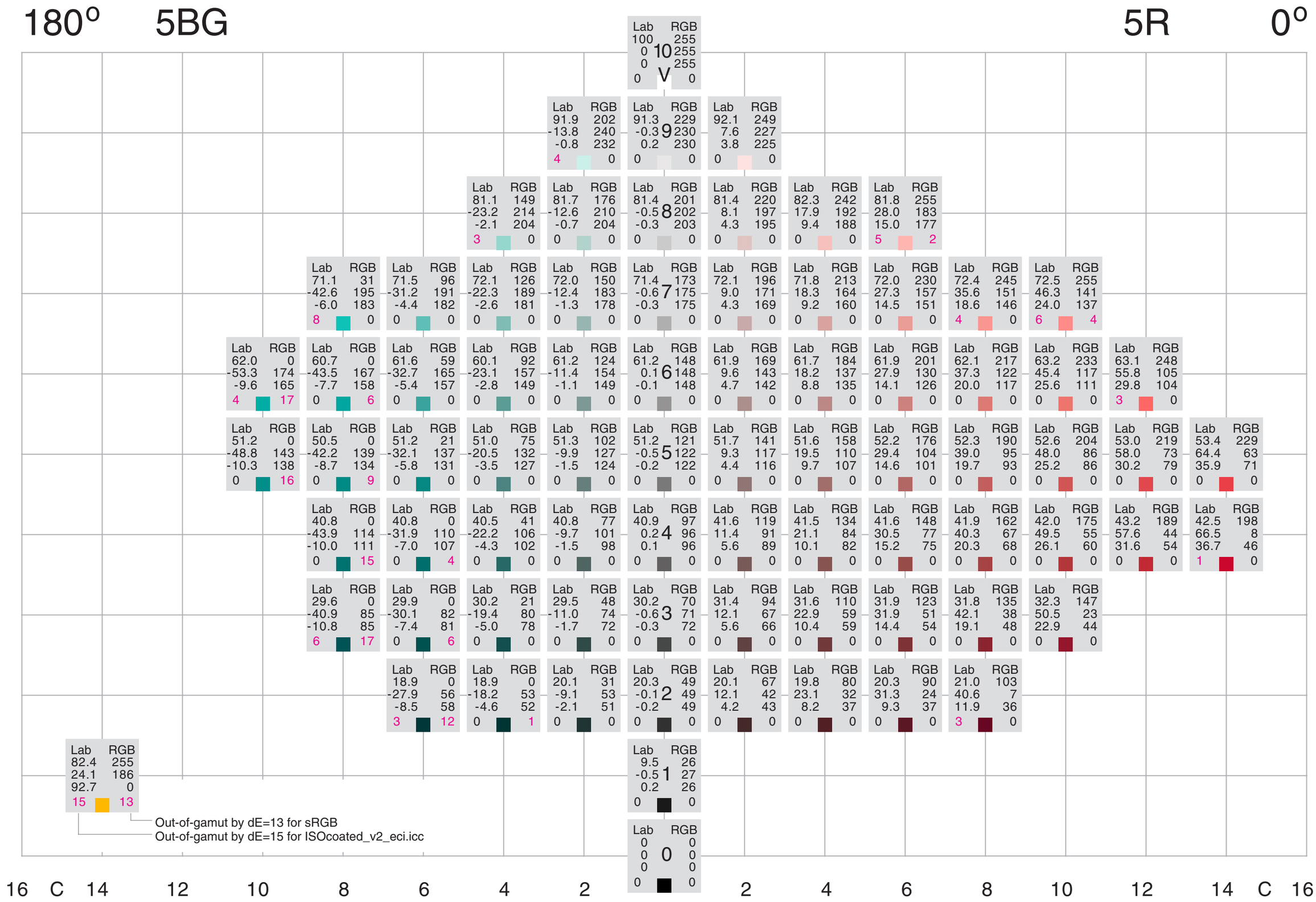

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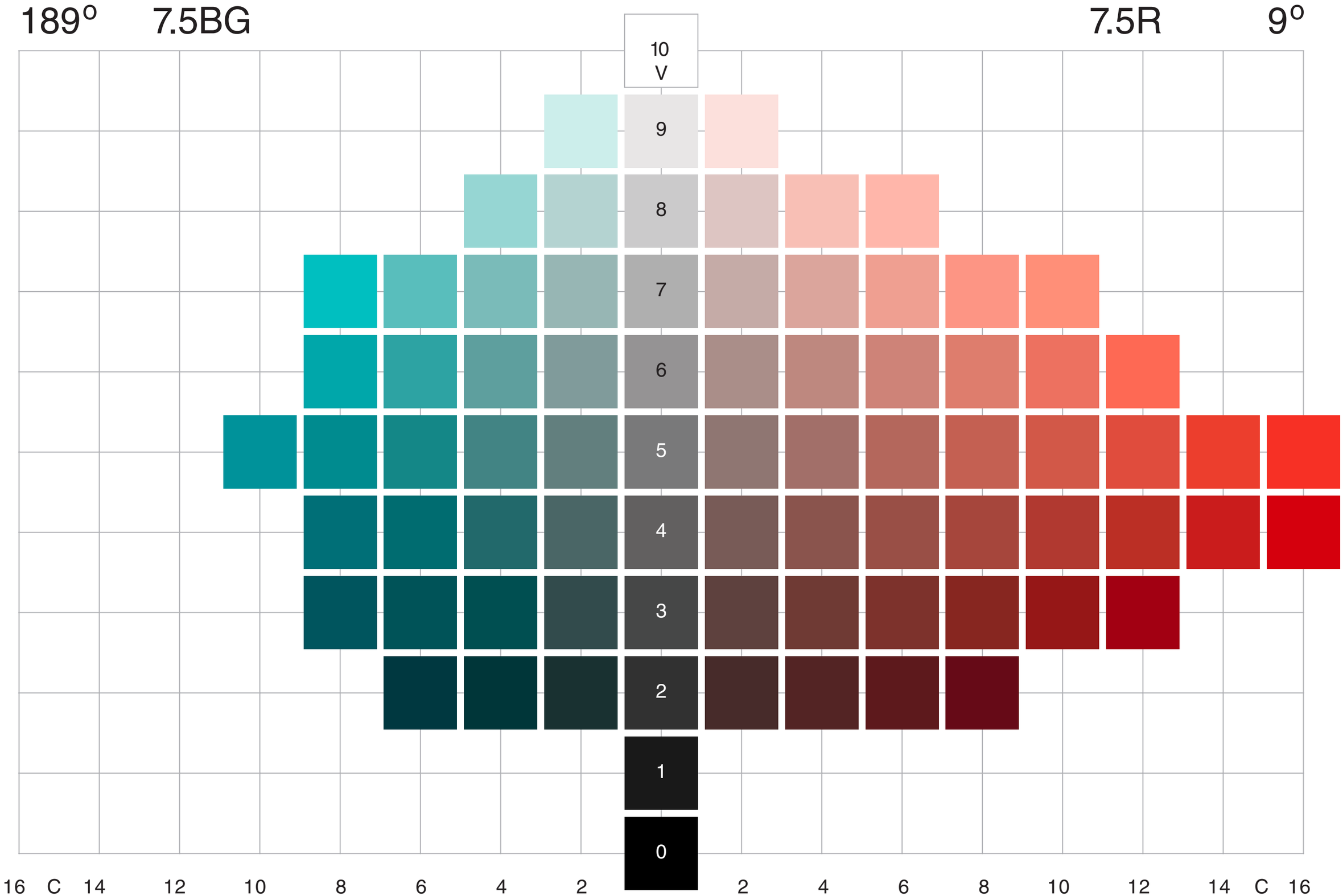

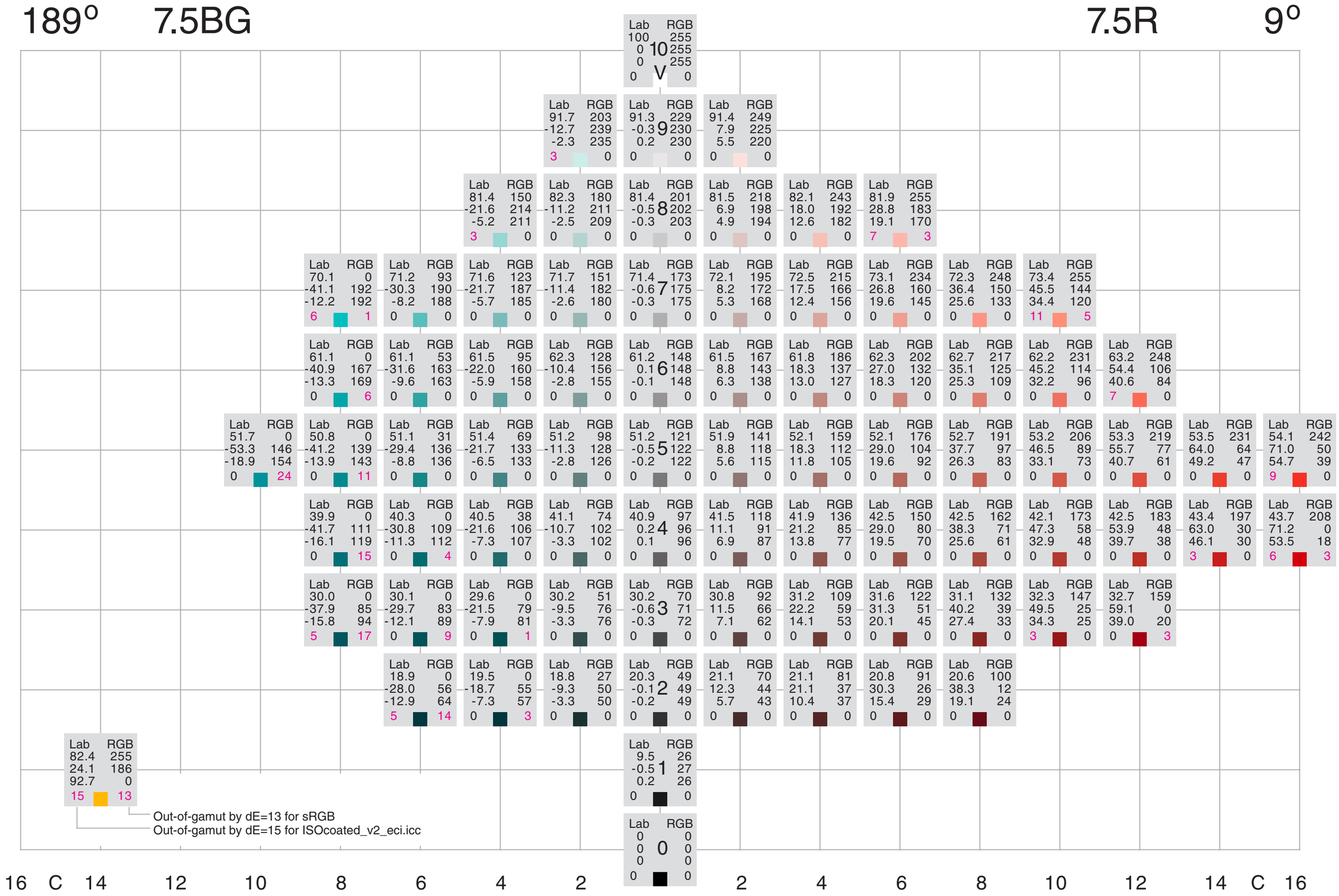
189°
7.5BG
7.5R
9°
Lab 100 0 0 RGB 255 255 255 V 10
Lab 91.7 -12.7 -2.3 3 RGB 203 239 235 0
Lab 91.3 -0.3 0.2 0 RGB 229 230 230 9
Lab 91.4 7.9 5.5 0 RGB 249 225 220 0
Lab 81.4 -21.6 -5.2 3 RGB 150 214 211 0
Lab 82.3 -11.2 -2.5 0 RGB 180 211 209 0
Lab 81.4 -0.5 -0.3 0 RGB 201 202 203 8
Lab 81.5 6.9 4.9 0 RGB 218 198 194 0
Lab 82.1 18.0 12.6 0 RGB 243 192 182 0
Lab 81.9 28.8 19.1 7 RGB 255 183 170 3
Lab 70.1 -41.1 -12.2 6 RGB 0 192 192 1
Lab 71.2 -30.3 -8.2 0 RGB 93 190 188 0
Lab 71.6 -21.7 -5.7 0 RGB 123 187 185 0
Lab 71.7 -11.4 -2.6 0 RGB 151 182 180 0
Lab 71.4 -0.6 -0.3 0 RGB 173 175 175 7
Lab 72.1 8.2 5.3 0 RGB 195 172 168 0
Lab 72.5 17.5 12.4 0 RGB 215 166 156 0
Lab 73.1 26.8 19.6 0 RGB 234 160 145 0
Lab 72.3 36.4 25.6 0 RGB 248 150 133 0
Lab 73.4 45.5 34.4 11 RGB 255 144 120 5
Lab 61.1 -40.9 -13.3 0 RGB 0 167 169 6
Lab 61.1 -31.6 -9.6 0 RGB 53 163 163 0
Lab 61.5 -22.0 -5.9 0 RGB 95 160 158 0
Lab 62.3 -10.4 -2.8 0 RGB 128 156 155 0
Lab 61.2 0.1 -0.1 0 RGB 148 148 148 6
Lab 61.5 8.8 6.3 0 RGB 167 143 138 0
Lab 61.8 18.3 13.0 0 RGB 186 137 127 0
Lab 62.3 27.0 18.3 0 RGB 202 132 120 0
Lab 62.7 35.1 25.3 0 RGB 217 125 109 0
Lab 62.2 45.2 32.2 0 RGB 231 114 96 0
Lab 63.2 54.4 40.6 7 RGB 248 106 84 0
Lab 51.7 -53.3 -18.9 0 RGB 0 146 154 24
Lab 50.8 -41.2 -13.9 0 RGB 0 139 143 11
Lab 51.1 -29.4 -8.8 0 RGB 31 136 136 0
Lab 51.4 -21.7 -6.5 0 RGB 69 133 133 0
Lab 51.2 -11.3 -2.8 0 RGB 98 128 126 0
Lab 51.2 -0.5 -0.2 0 RGB 121 122 122 5
Lab 51.9 8.8 5.6 0 RGB 141 118 115 0
Lab 52.1 18.3 11.8 0 RGB 159 112 105 0
Lab 52.1 29.0 19.6 0 RGB 176 104 92 0
Lab 52.7 37.7 26.3 0 RGB 191 97 83 0
Lab 53.2 46.5 33.1 0 RGB 206 89 73 0
Lab 53.3 55.7 40.7 0 RGB 219 77 61 0
Lab 53.5 64.0 49.2 0 RGB 231 64 47 0
Lab 54.1 71.0 54.7 9 RGB 242 50 39 0
Lab 39.9 -41.7 -16.1 0 RGB 0 111 119 15
Lab 40.3 -30.8 -11.3 0 RGB 0 109 112 4
Lab 40.5 -21.6 -7.3 0 RGB 38 106 107 0
Lab 41.1 -10.7 -3.3 0 RGB 74 102 102 0
Lab 40.9 0.2 0.1 0 RGB 97 96 96 4
Lab 41.5 11.1 6.9 0 RGB 118 91 87 0
Lab 41.9 21.2 13.8 0 RGB 136 85 77 0
Lab 42.5 29.0 19.5 0 RGB 150 80 70 0
Lab 42.5 38.3 25.6 0 RGB 162 71 61 0
Lab 42.1 47.3 32.9 0 RGB 173 58 48 0
Lab 42.5 53.9 39.7 0 RGB 183 48 38 0
Lab 43.4 63.0 46.1 3 RGB 197 30 30 0
Lab 43.7 71.2 53.5 6 RGB 208 0 18 3
Lab 30.0 -37.9 -15.8 5 RGB 0 85 94 17
Lab 30.1 -29.7 -12.1 0 RGB 0 83 89 9
Lab 29.6 -21.5 -7.9 0 RGB 0 79 81 1
Lab 30.2 -9.5 -3.3 0 RGB 51 76 76 0
Lab 30.2 -0.6 -0.3 0 RGB 70 71 72 3
Lab 30.8 11.5 7.1 0 RGB 92 66 62 0
Lab 31.2 22.2 14.1 0 RGB 109 59 53 0
Lab 31.6 31.3 20.1 0 RGB 122 51 45 0
Lab 31.1 40.2 27.4 0 RGB 132 39 33 0
Lab 32.3 49.5 34.3 3 RGB 147 25 25 0
Lab 32.7 59.1 39.0 0 RGB 159 0 20 3
Lab 18.9 -28.0 -12.9 5 RGB 0 56 64 14
Lab 19.5 -18.7 -7.3 0 RGB 0 55 57 3
Lab 18.8 -9.3 -3.3 0 RGB 27 50 50 0
Lab 20.3 -0.1 -0.2 0 RGB 49 49 49 2
Lab 21.1 12.3 5.7 0 RGB 70 44 43 0
Lab 21.1 21.1 10.4 0 RGB 81 37 37 0
Lab 20.8 30.3 15.4 0 RGB 91 26 29 0
Lab 20.6 38.3 19.1 0 RGB 100 12 24 0
Lab 82.4 24.1 92.7 15 RGB 255 186 0 13
Lab 9.5 -0.5 0.2 0 RGB 26 27 26 1
Lab 0 0 0 0 RGB 0 0 0 0 0
Out-of-gamut by dE=13 for sRGB
Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc
16 C 14 12 10 8 6 4 2
2 4 6 8 10 12 14 C 16

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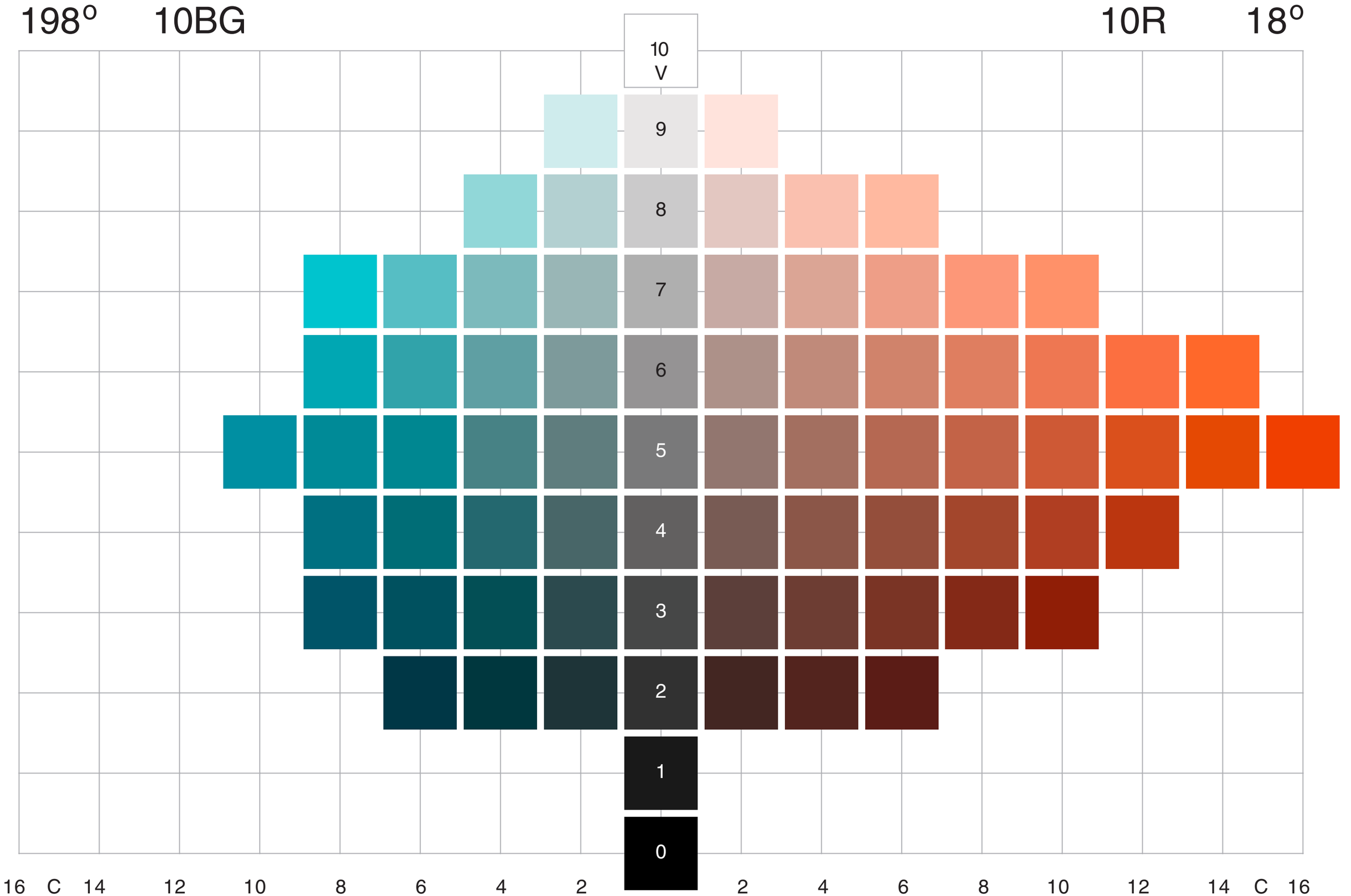

198° 10BG

10R 18°

Lab	RGB
100	255
0	255
0	255
0	0

10 V

Lab	RGB
91.4	206
-10.6	237
-3.3	236
3	0

Lab	RGB
91.3	229
-0.3	230
0.2	230
0	0

9

Lab	RGB
92.6	255
8.7	228
7.5	220
2	1

Lab	RGB
81.6	147
-22.0	215
-7.9	217
4	0

Lab	RGB
81.5	178
-10.7	209
-3.4	208
0	0

Lab	RGB
81.4	201
-0.5	202
-0.3	203
0	0

8

Lab	RGB
82.5	223
7.6	200
6.7	193
0	0

Lab	RGB
82.6	245
17.4	193
16.6	175
0	0

Lab	RGB
82.2	255
25.8	186
24.5	160
6	2

Lab	RGB
71.6	0
-39.9	196
-17.4	206
6	1

Lab	RGB
71.5	92
-29.1	191
-12.0	196
0	0

Lab	RGB
71.5	126
-19.9	186
-7.4	188
0	0

Lab	RGB
72.0	152
-10.7	183
-3.7	183
0	0

Lab	RGB
71.4	173
-0.6	175
-0.3	175
0	0

7

Lab	RGB
72.1	196
8.3	171
7.0	164
0	0

Lab	RGB
72.4	214
16.5	166
15.8	150
0	0

Lab	RGB
72.5	232
25.9	159
23.9	135
0	0

Lab	RGB
72.5	247
33.8	153
32.8	120
0	0

Lab	RGB
73.4	255
43.3	146
42.2	105
10	4

Lab	RGB
61.3	0
-38.3	167
-18.1	179
0	6

Lab	RGB
61.5	59
-29.1	163
-13.2	171
0	0

Lab	RGB
61.8	97
-20.4	160
-8.3	163
0	0

Lab	RGB
61.4	125
-10.5	154
-3.7	154
0	0

Lab	RGB
61.2	148
0.1	145
-0.1	148
0	0

6

Lab	RGB
62.5	171
8.9	145
7.7	138
0	0

Lab	RGB
62.5	188
17.7	139
16.5	123
0	0

Lab	RGB
62.2	202
25.9	132
25.1	107
0	0

Lab	RGB
62.9	218
34.0	127
32.5	96
0	0

Lab	RGB
63.3	232
41.7	121
41.0	82
0	0

Lab	RGB
63.8	246
50.0	113
51.2	65
1	0

Lab	RGB
64.0	255
56.2	106
61.8	44
13	1

Lab	RGB
51.1	0
-48.2	143
-24.4	162
0	21

Lab	RGB
50.8	0
-38.0	138
-18.5	151
0	10

Lab	RGB
51.1	4
-29.3	136
-14.0	145
0	0

Lab	RGB
50.7	74
-18.6	130
-8.0	134
0	0

Lab	RGB
50.1	95
-11.0	125
-4.3	126
0	0

Lab	RGB
51.2	121
-0.5	122
-0.2	122
0	0

5

Lab	RGB
52.1	143
9.2	118
7.9	111
0	0

Lab	RGB
52.1	160
18.1	112
16.8	96
0	0

Lab	RGB
52.4	177
27.4	105
25.8	82
0	0

Lab	RGB
53.0	190
34.9	100
33.1	71
0	0

Lab	RGB
52.4	200
43.2	90
42.9	53
0	0

Lab	RGB
52.7	212
50.6	82
54.8	30
0	0

Lab	RGB
53.4	223
57.2	74
63.0	8
5	0

Lab	RGB
54.1	234
63.9	65
73.2	0
18	12

Lab	RGB
40.7	0
-38.2	112
-21.0	129
0	15

Lab	RGB
40.5	0
-29.4	109
-14.6	118
0	4

Lab	RGB
40.5	42
-19.4	105
-9.8	111
0	0

Lab	RGB
41.1	73
-10.7	102
-4.7	104
0	0

Lab	RGB
40.9	97
0.2	96
0.1	96
0	0

4

Lab	RGB
41.4	119
10.7	91
8.8	84
0	0

Lab	RGB
42.4	136
19.7	87
17.4	72
0	0

Lab	RGB
41.3	145
27.1	78
24.1	59
0	0

Lab	RGB
41.7	159
36.0	71
33.7	45
0	0

Lab	RGB
42.7	172
44.1	64
41.3	34
0	0

Lab	RGB
43.2	183
50.9	55
50.4	17
3	0

Lab	RGB
29.5	0
-35.6	84
-22.7	104
7	18

Lab	RGB
29.6	0
-28.0	81
-16.7	95
0	9

Lab	RGB
30.2	14
-18.8	80
-9.1	85
0	0

Lab	RGB
29.8	46
-10.6	75
-5.3	78
0	0

Lab	RGB
30.2	70
-0.6	71
-0.3	72
0	0

3

Lab	RGB
29.9	90
11.3	64
8.4	58
0	0

Lab	RGB
31.4	107
19.6	61
15.1	51
0	0

Lab	RGB
31.3	119
28.9	53
23.8	38
0	0

Lab	RGB
30.9	129
37.6	42
31.5	26
0	0

Lab	RGB
31.5	141
45.6	31
41.3	9
9	0

Lab	RGB
18.6	0
-25.2	55
-17.7	71
4	12

Lab	RGB
19.9	0
-16.8	55
-10.1	62
0	3

Lab	RGB
20.3	31
-8.2	53
-5.0	56
0	0

Lab	RGB
20.3	49
-0.1	49
-0.2	49
0	0

2

Lab	RGB
19.2	66
12.4	39
8.5	35
0	0

Lab	RGB
20.9	81
20.9	37
14.3	30
0	0

Lab	RGB
20.8	89
27.7	29
19.3	23
0	0

Lab	RGB
82.4	255
24.1	186
92.7	0
15	13

Lab	RGB
9.5	26
-0.5	27
0.2	26
0	0

1

Lab	RGB
0	0
0	0
0	0
0	0

0

Out-of-gamut by dE=13 for sRGB

Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc

16 C 14 12 10 8 6 4 2 2 4 6 8 10 12 14 C 16

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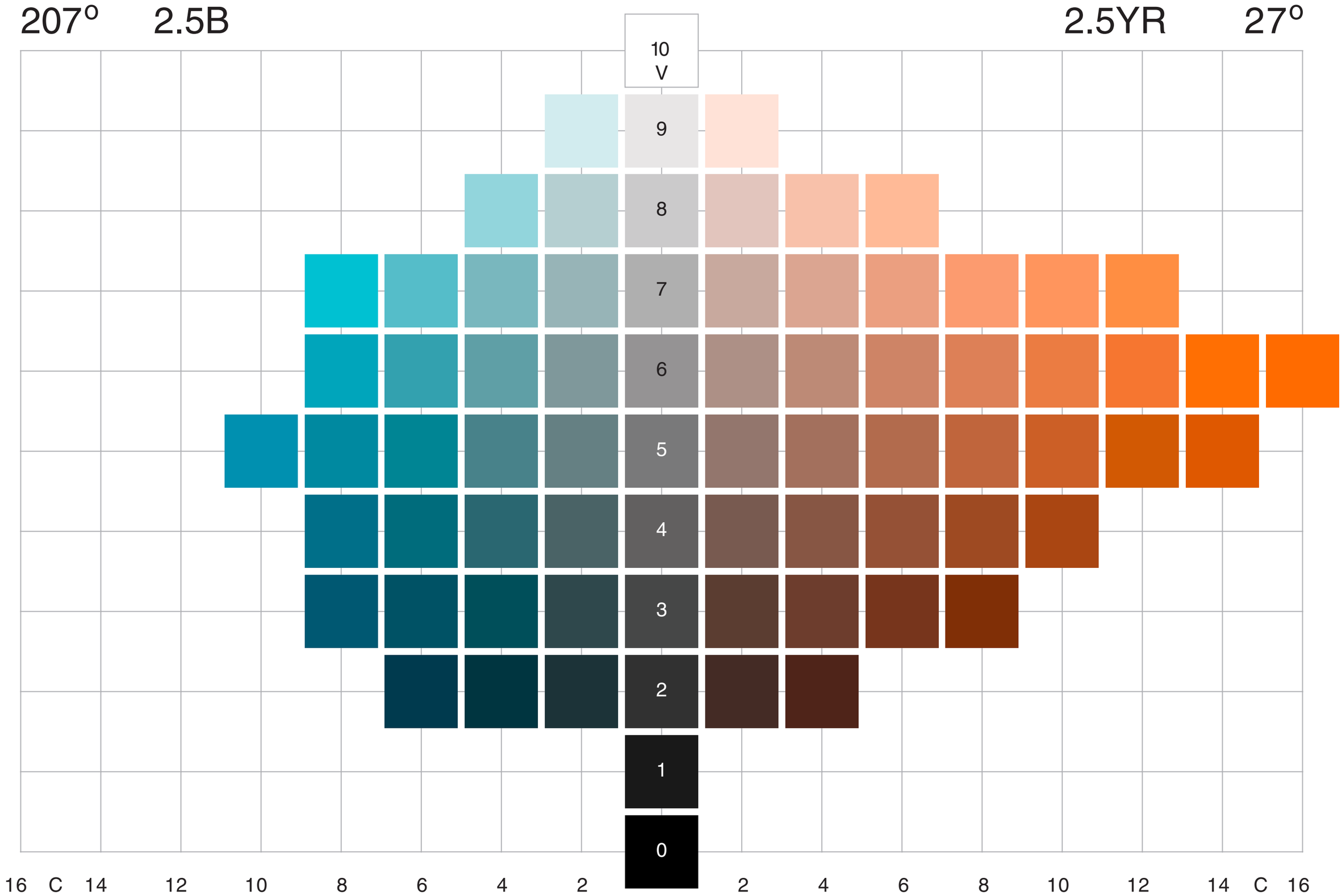

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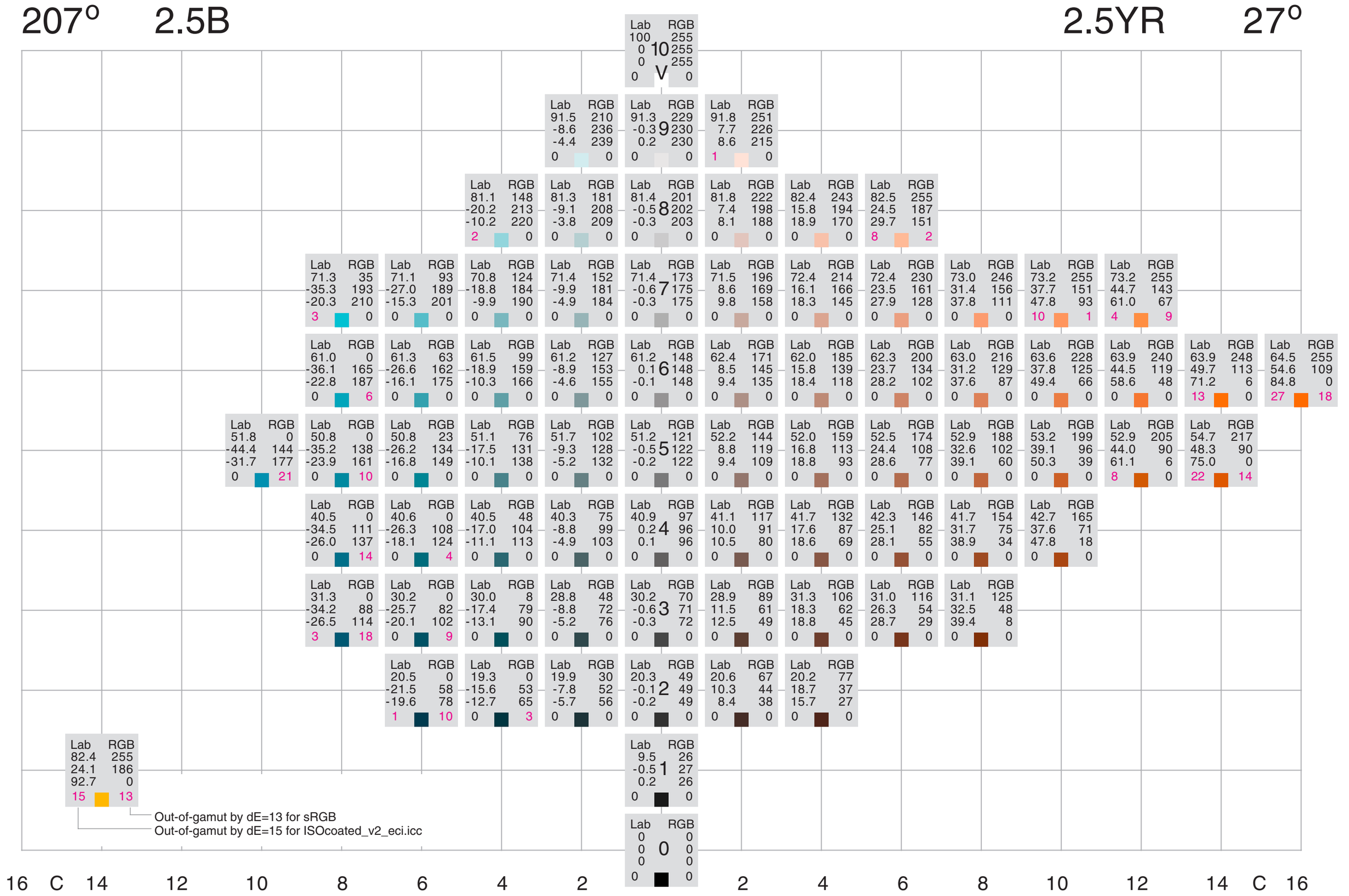

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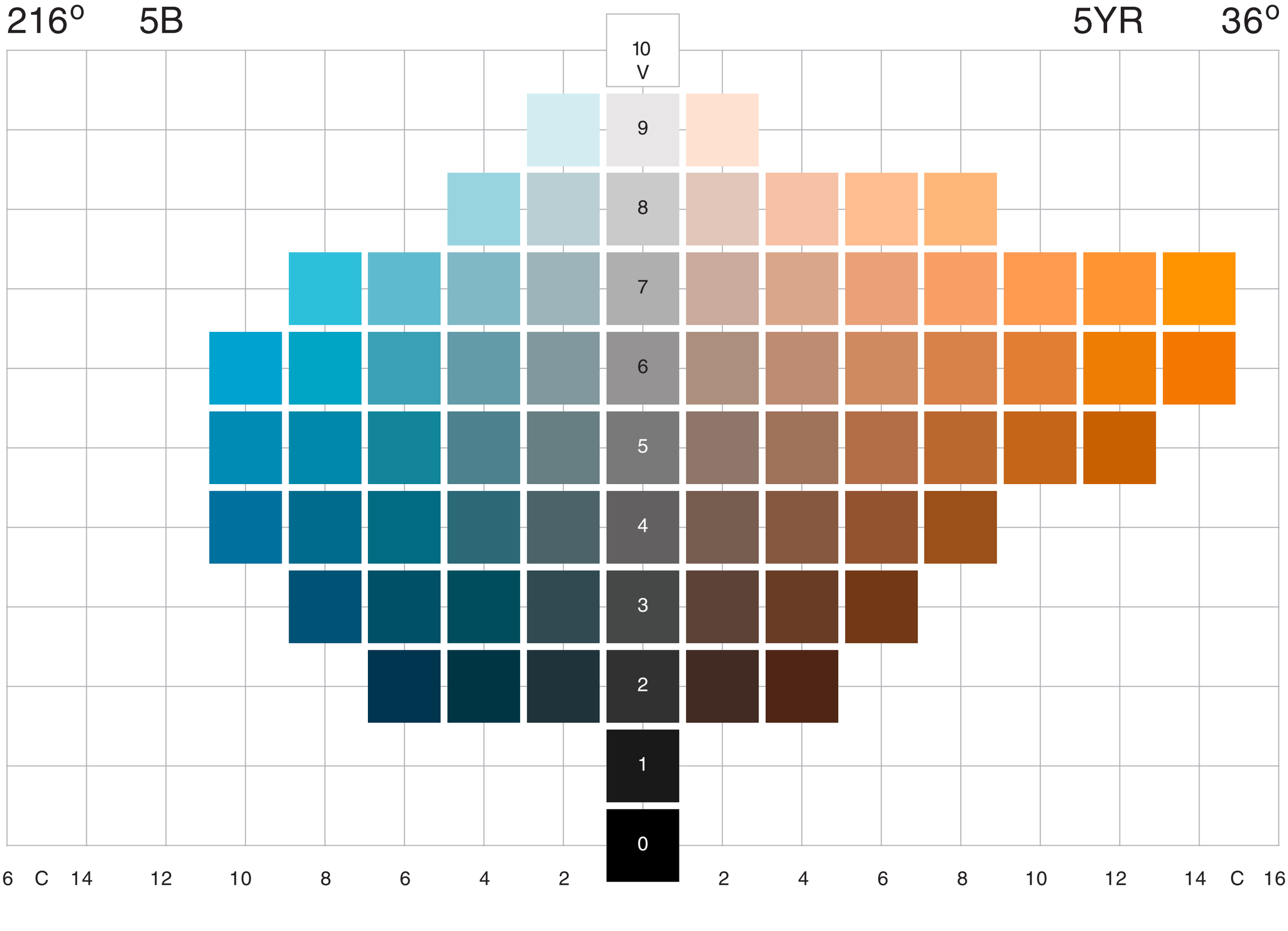

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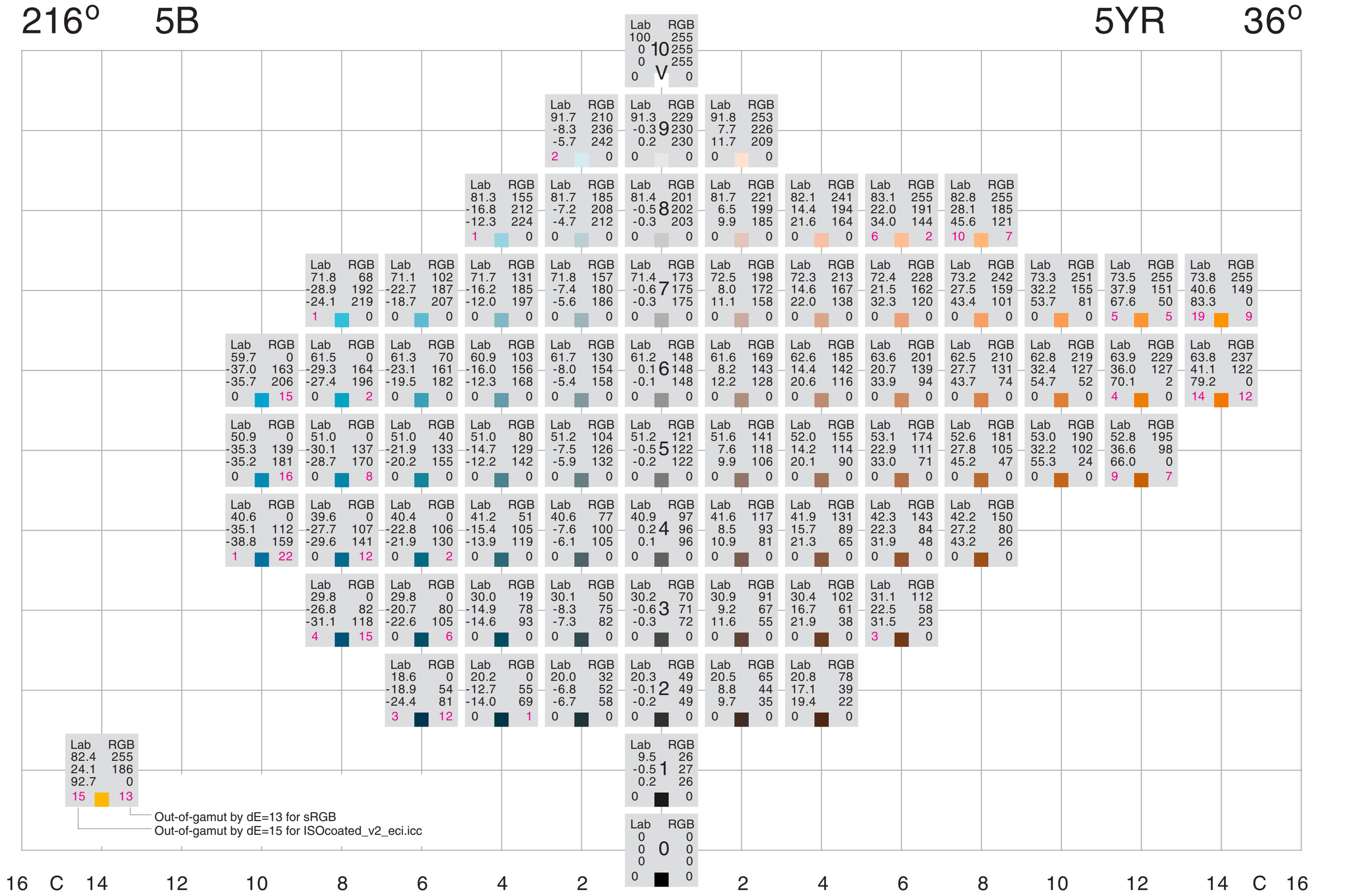

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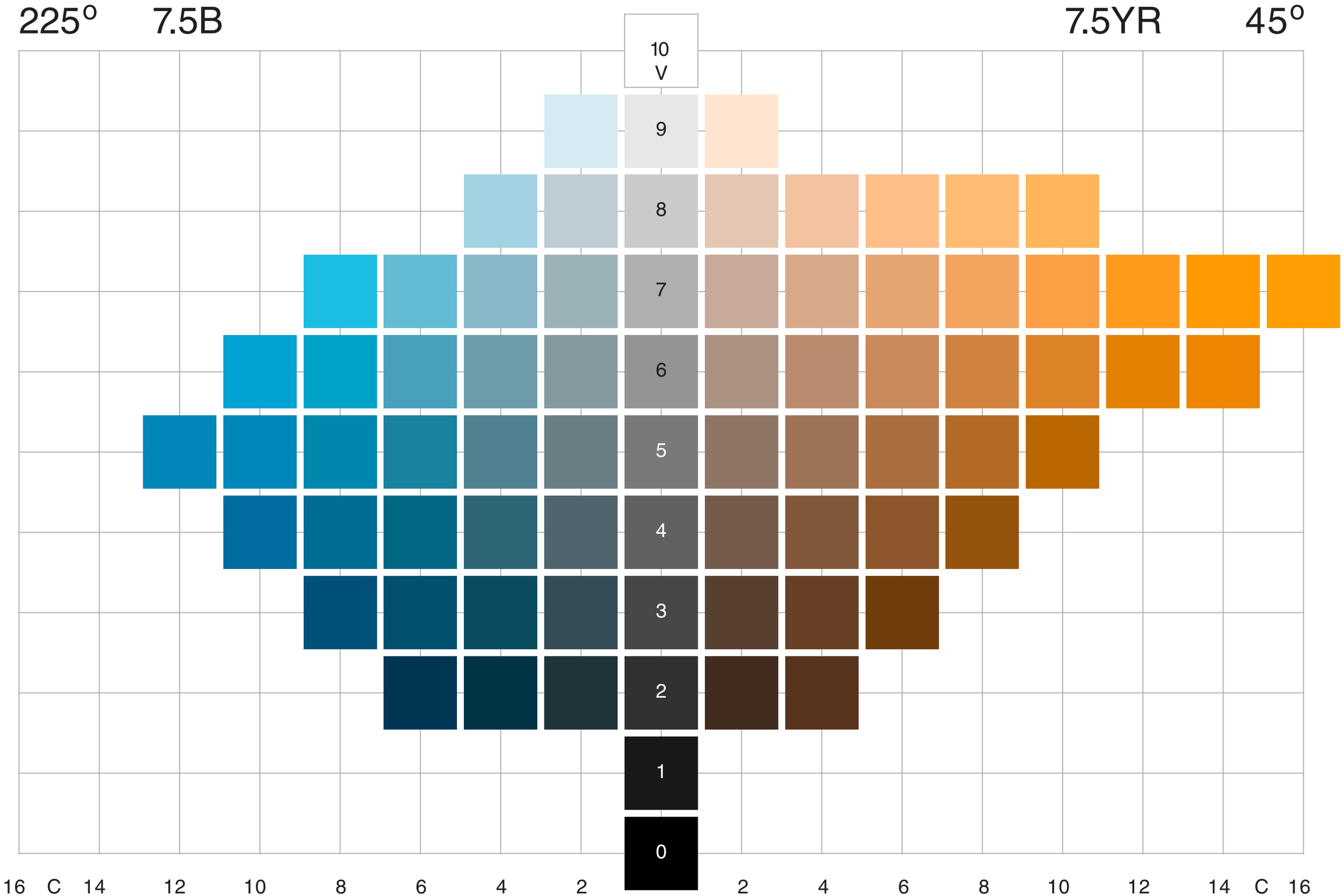

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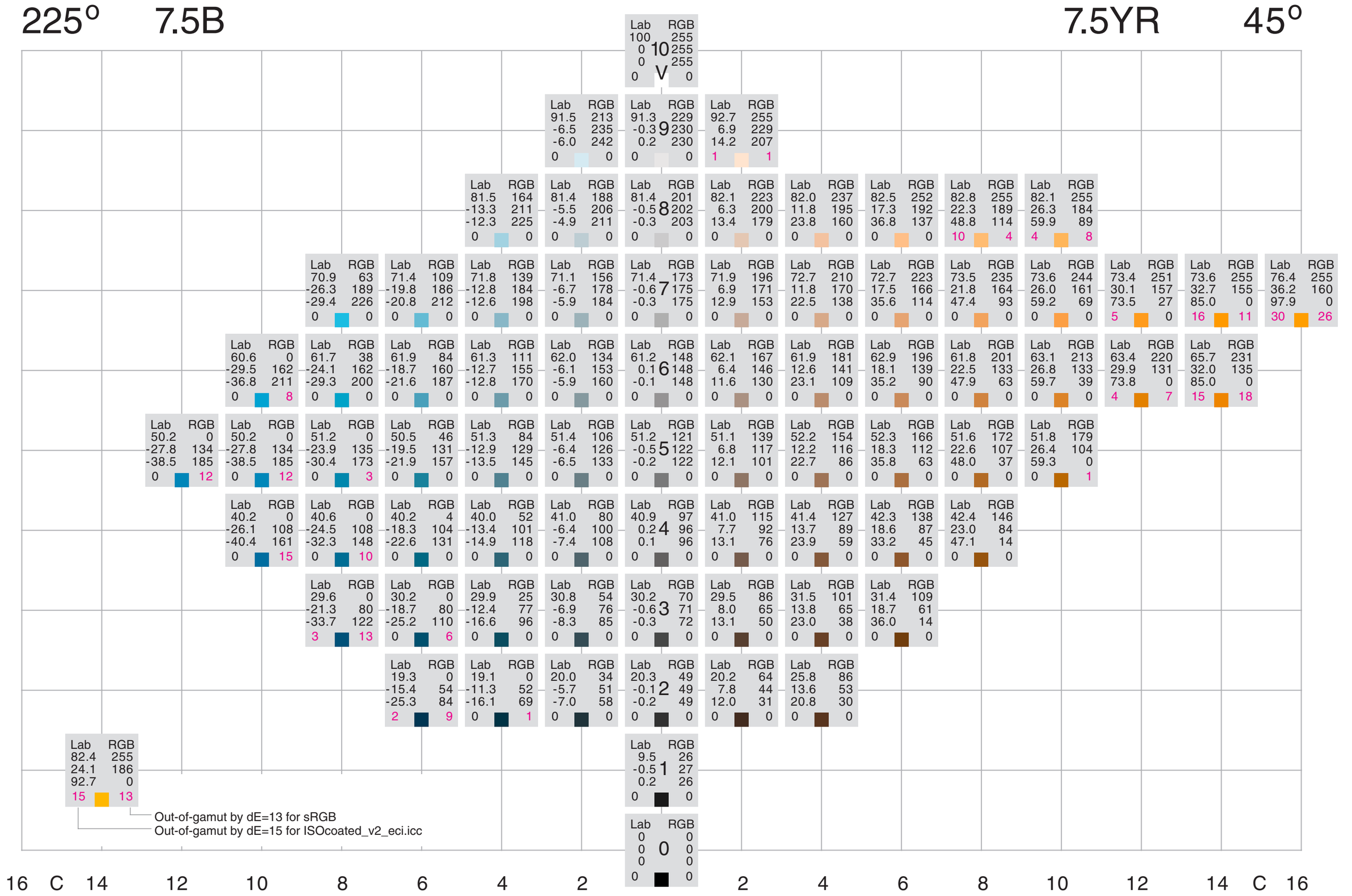

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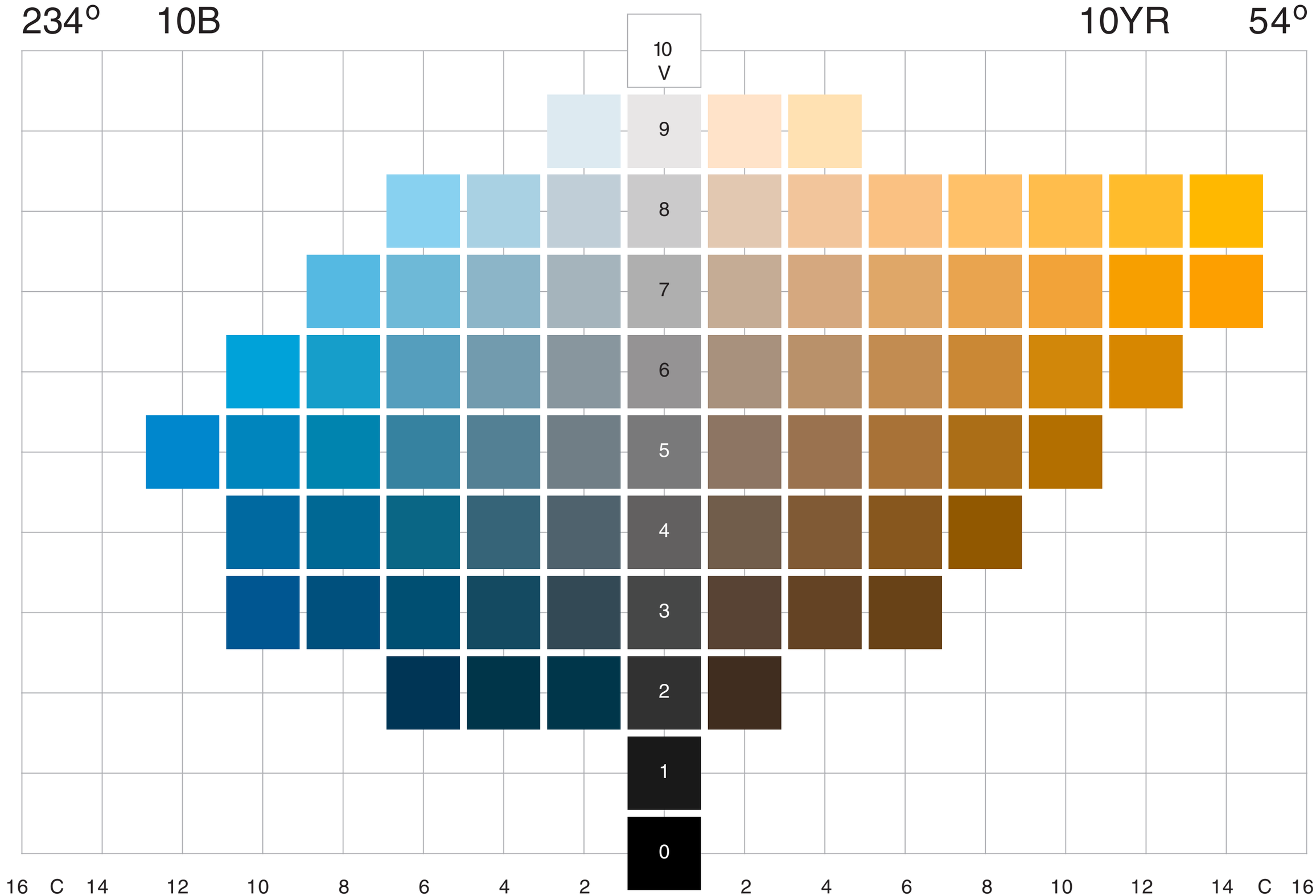
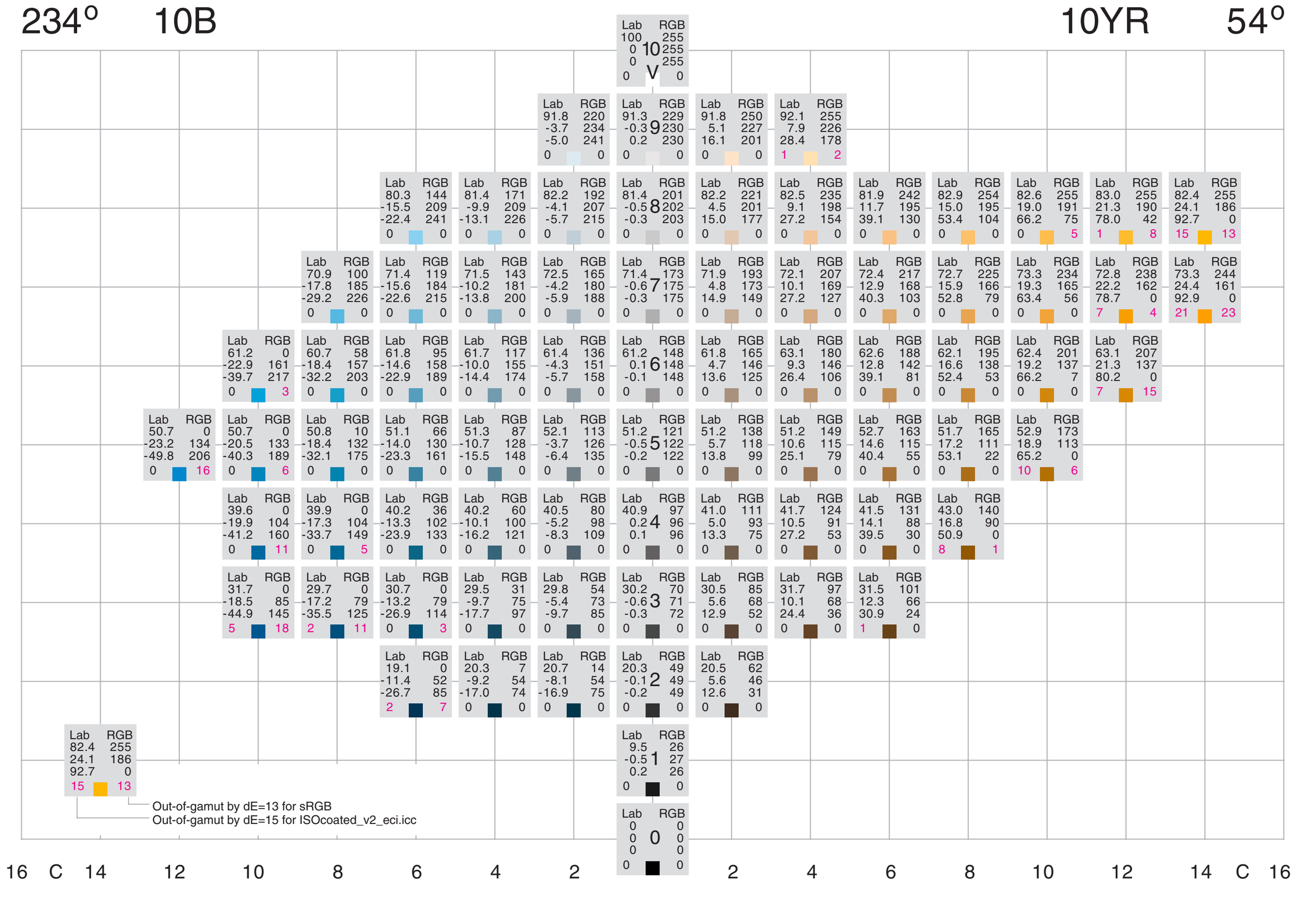
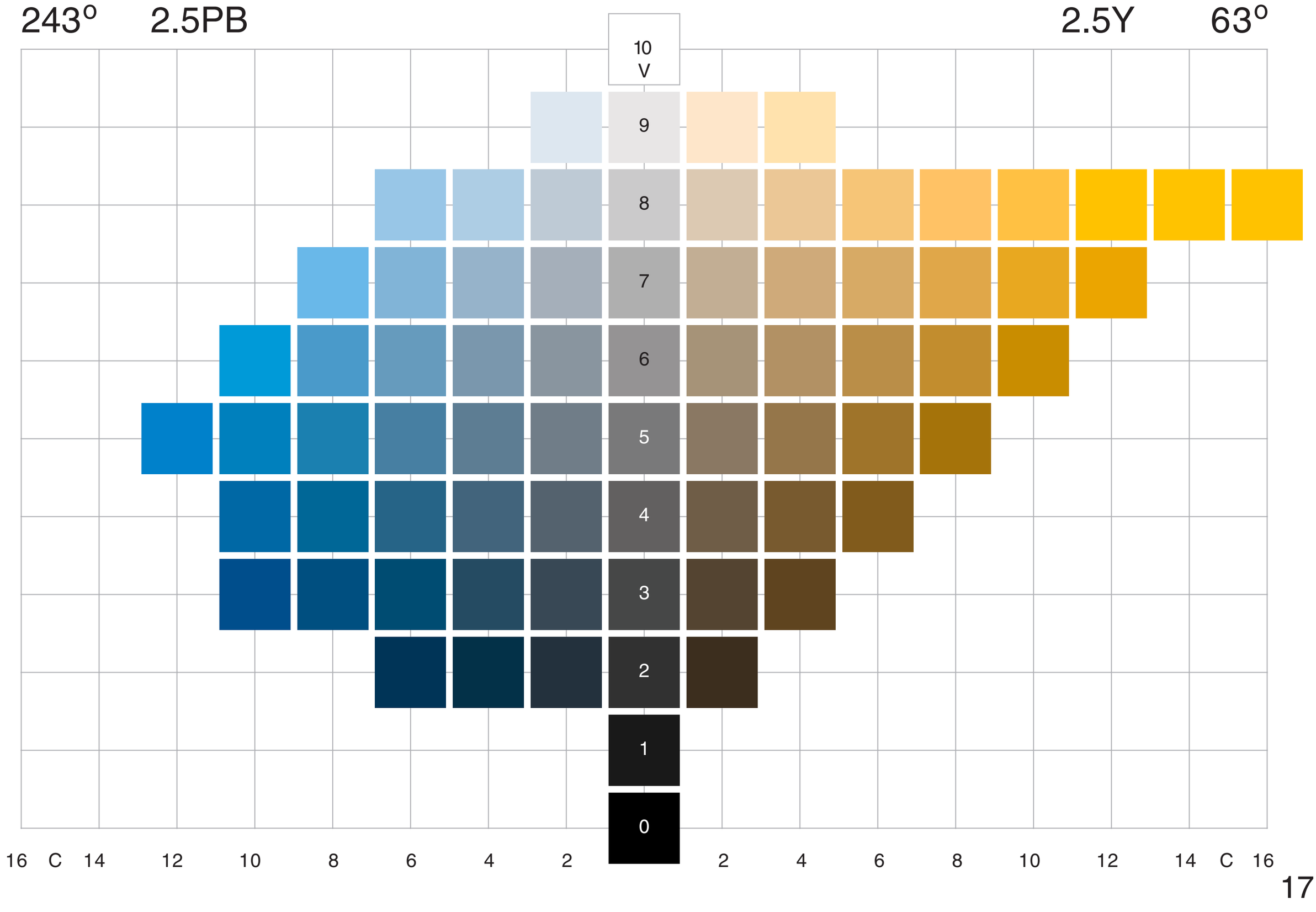



234° 10B
10YR 54°
10 V
9
8
7
6
5
4
3
2
1
0
Out-of-gamut by dE=13 for sRGB
Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc
16 C 14 12 10 8 6 4 2 2 4 6 8 10 12 14 C 16

CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview



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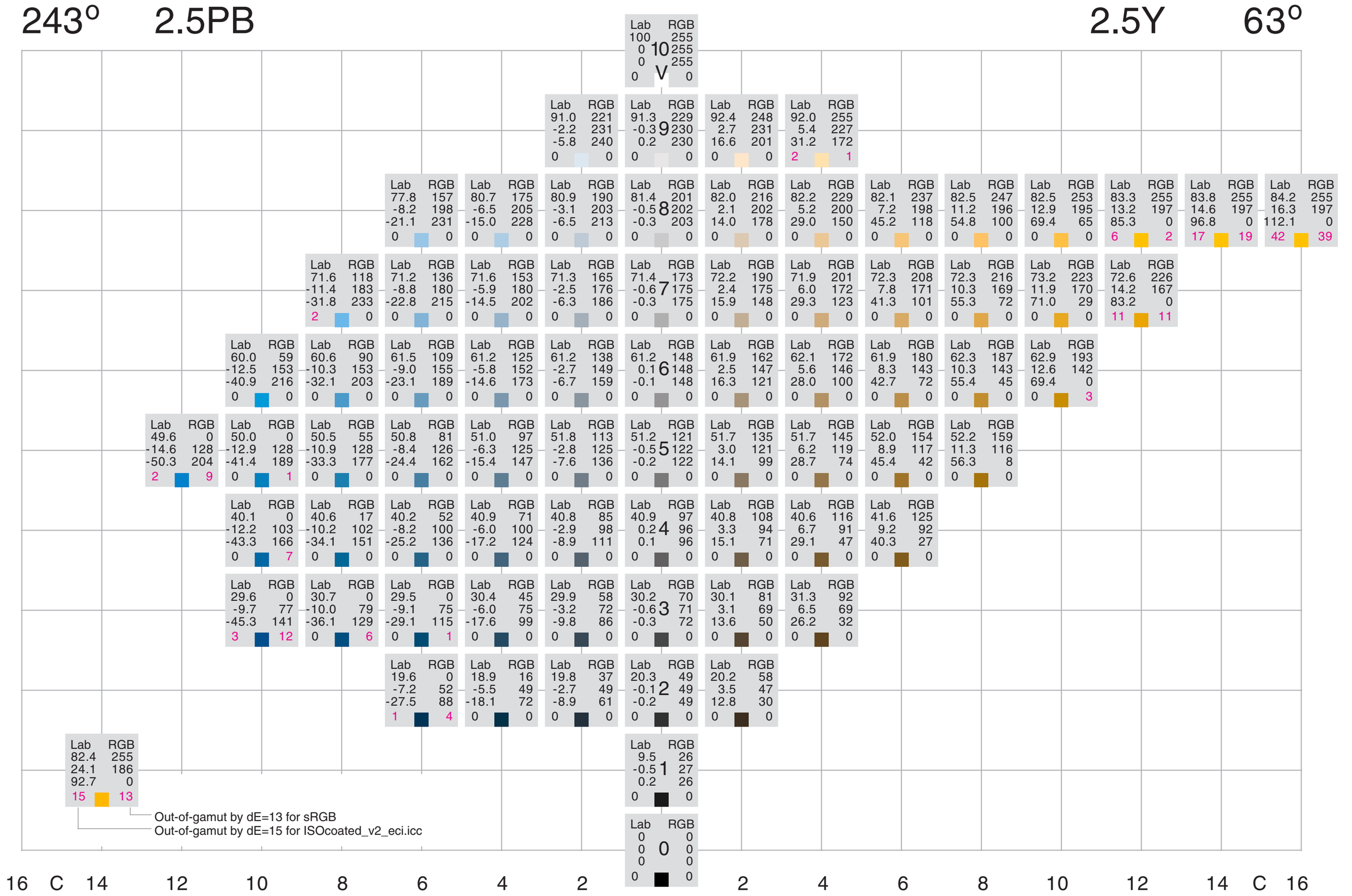

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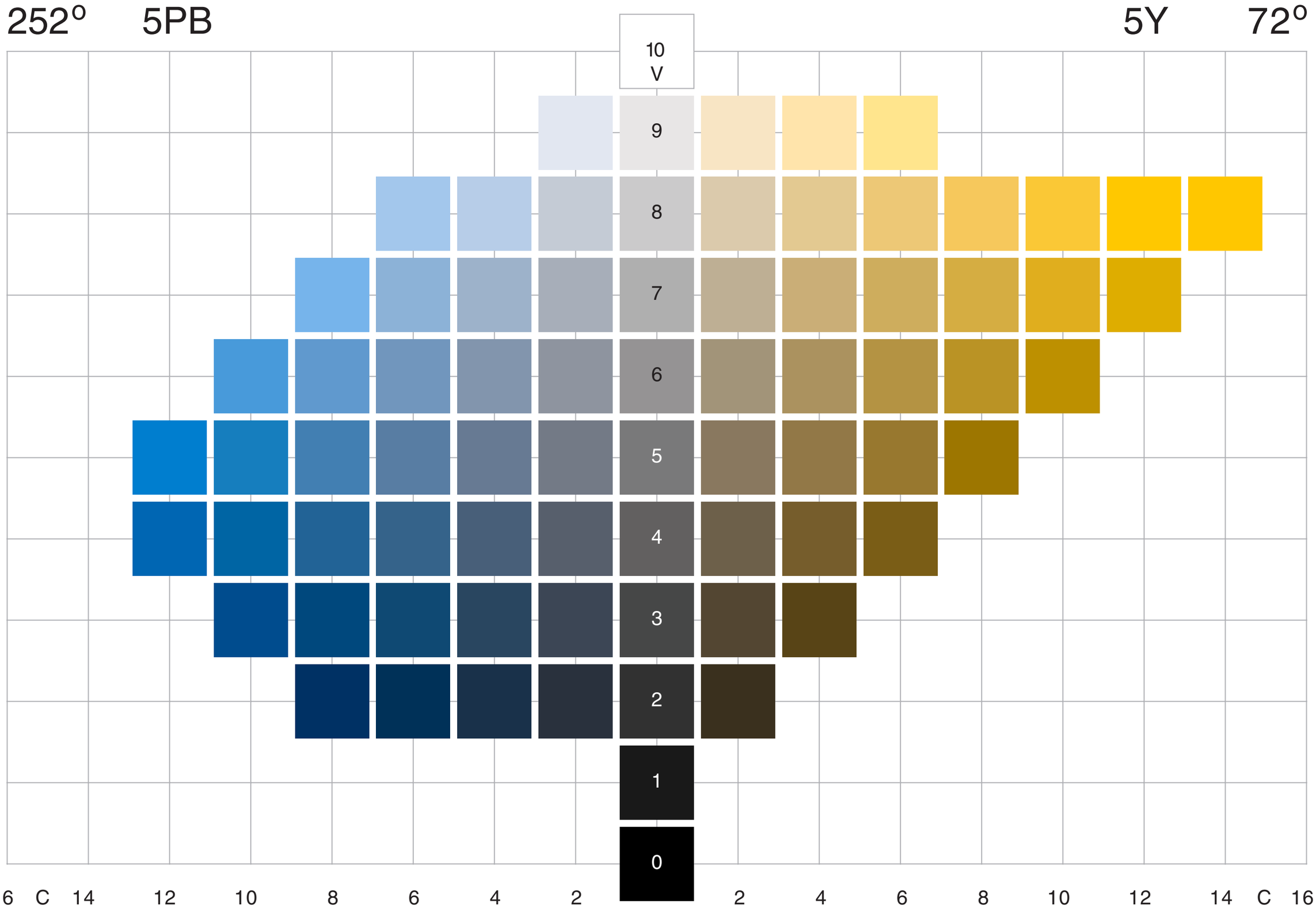
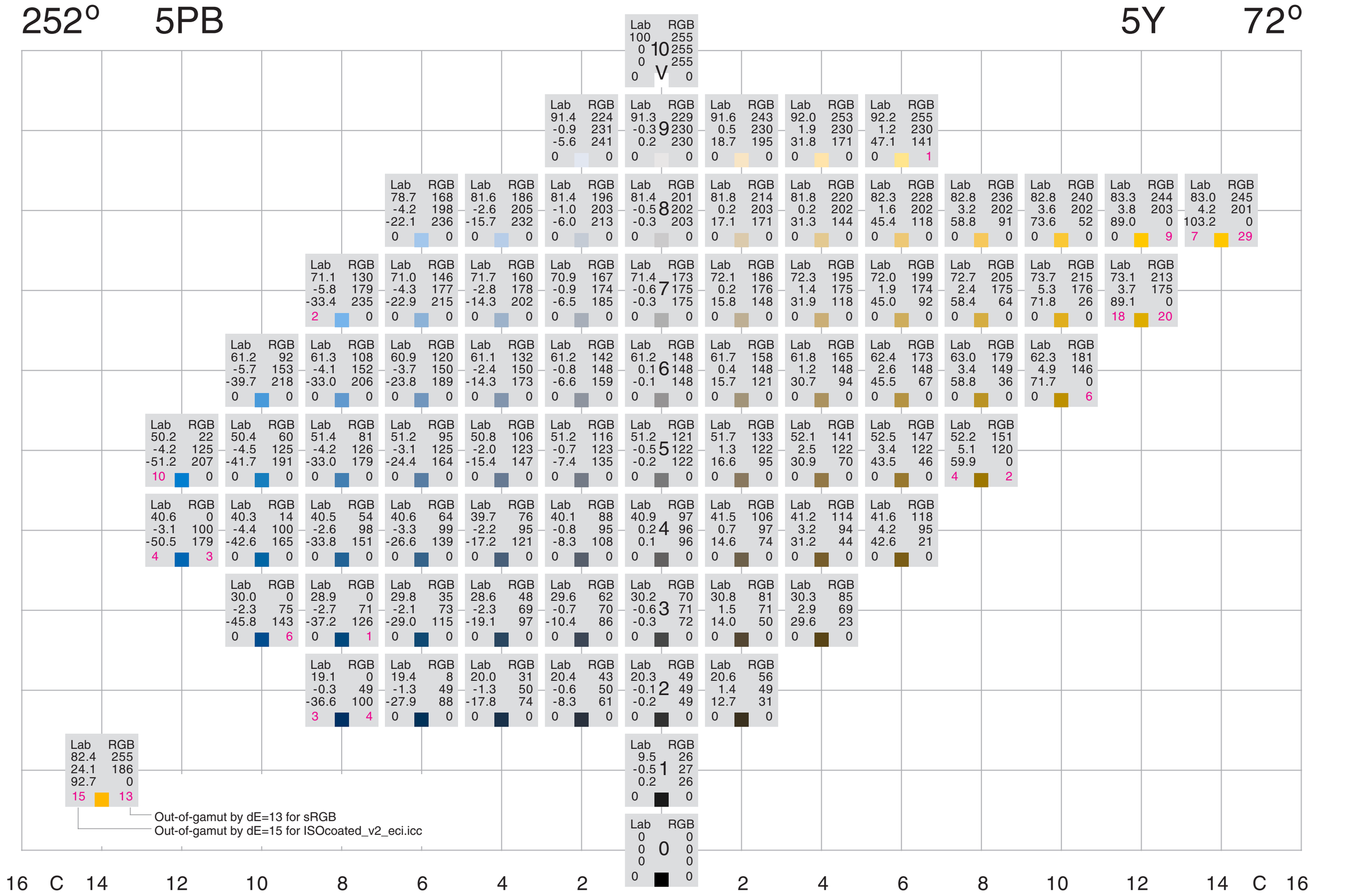
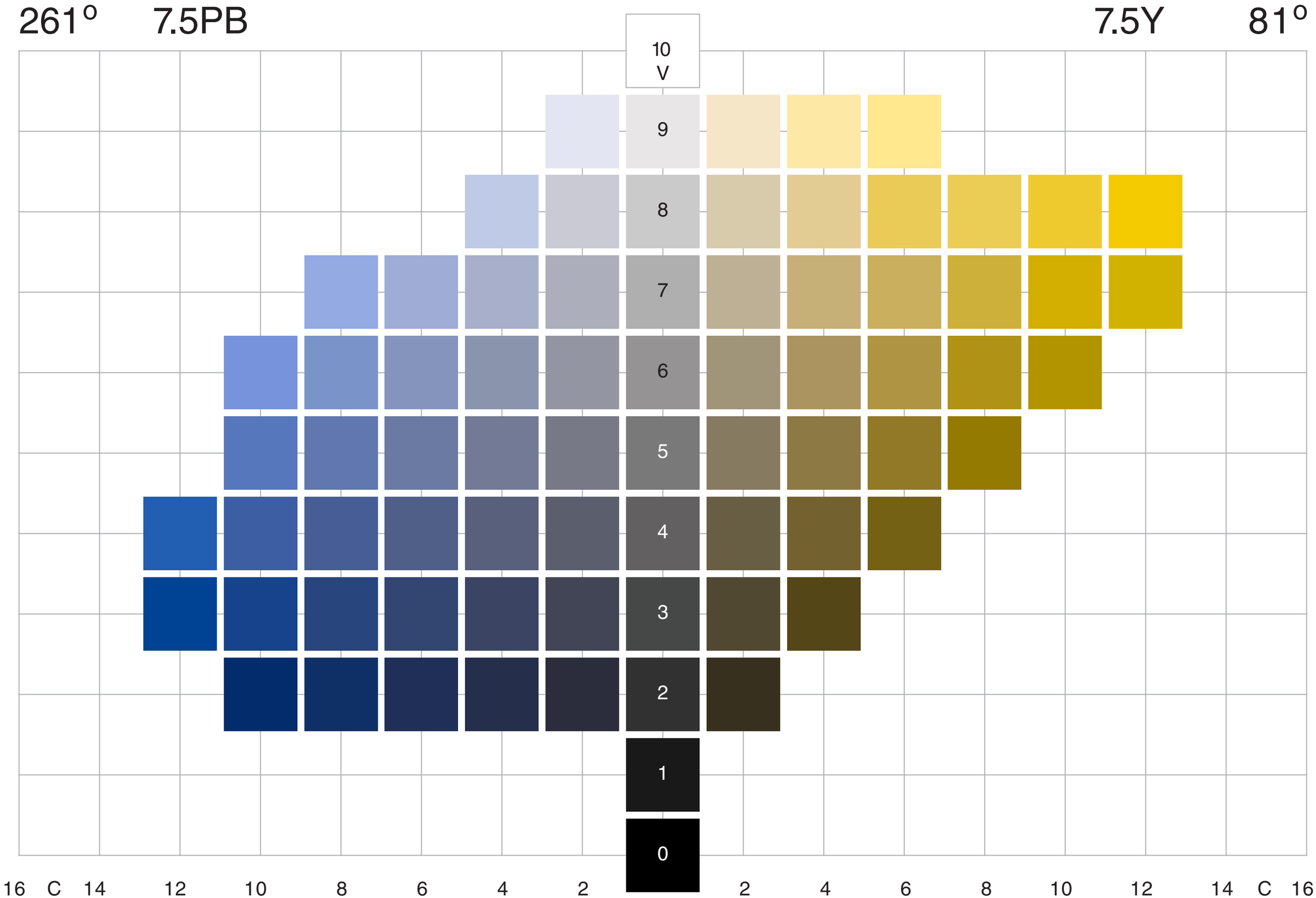


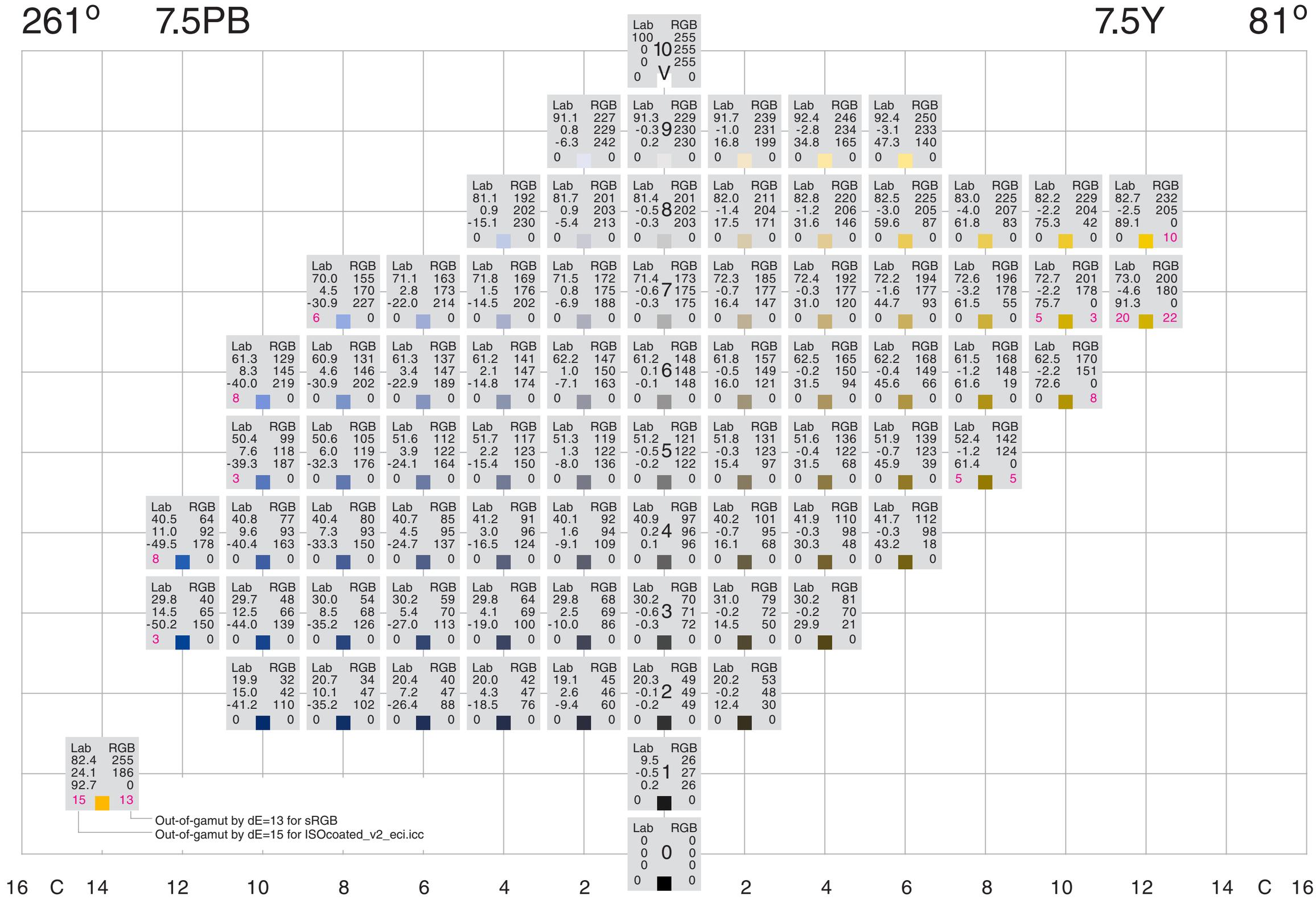
CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview



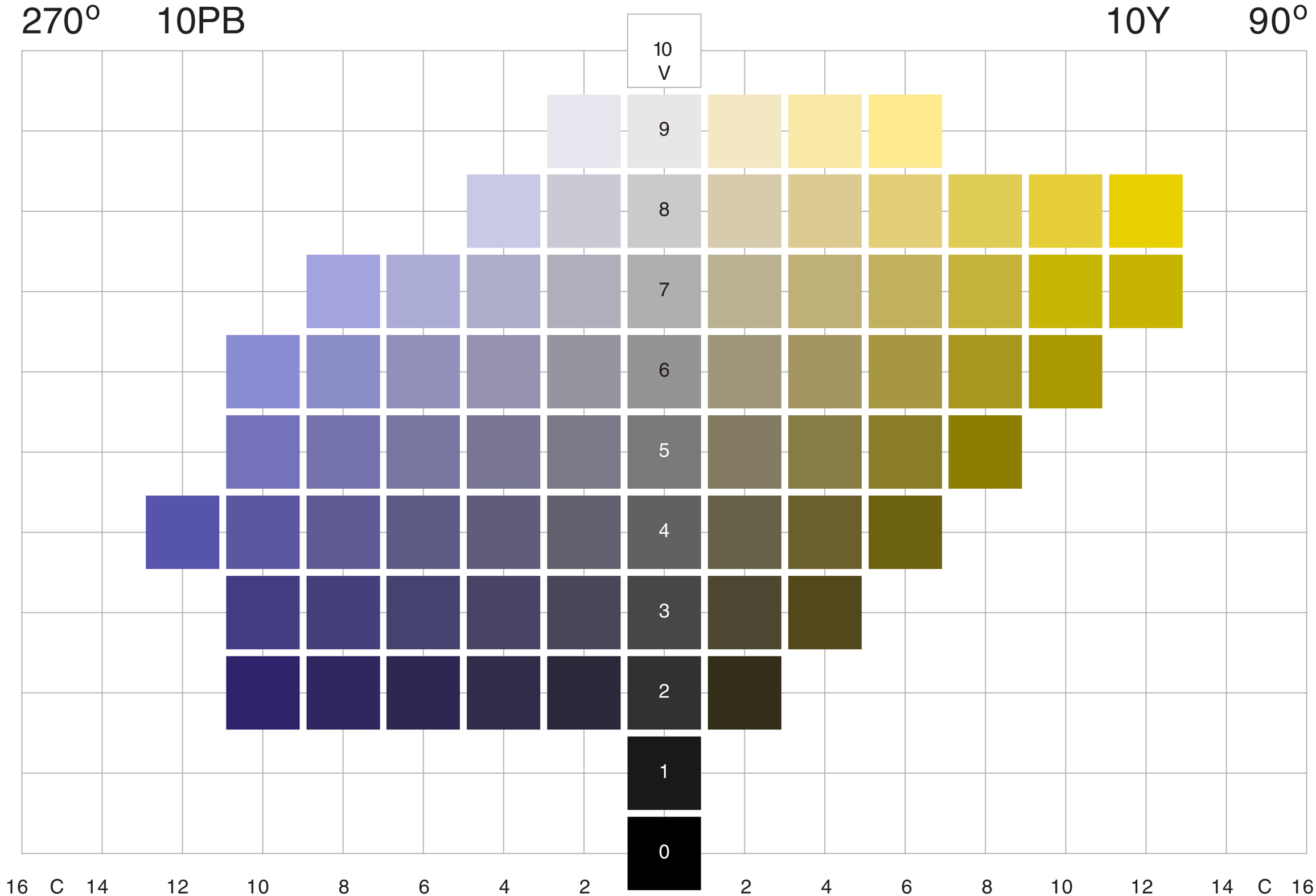
CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview

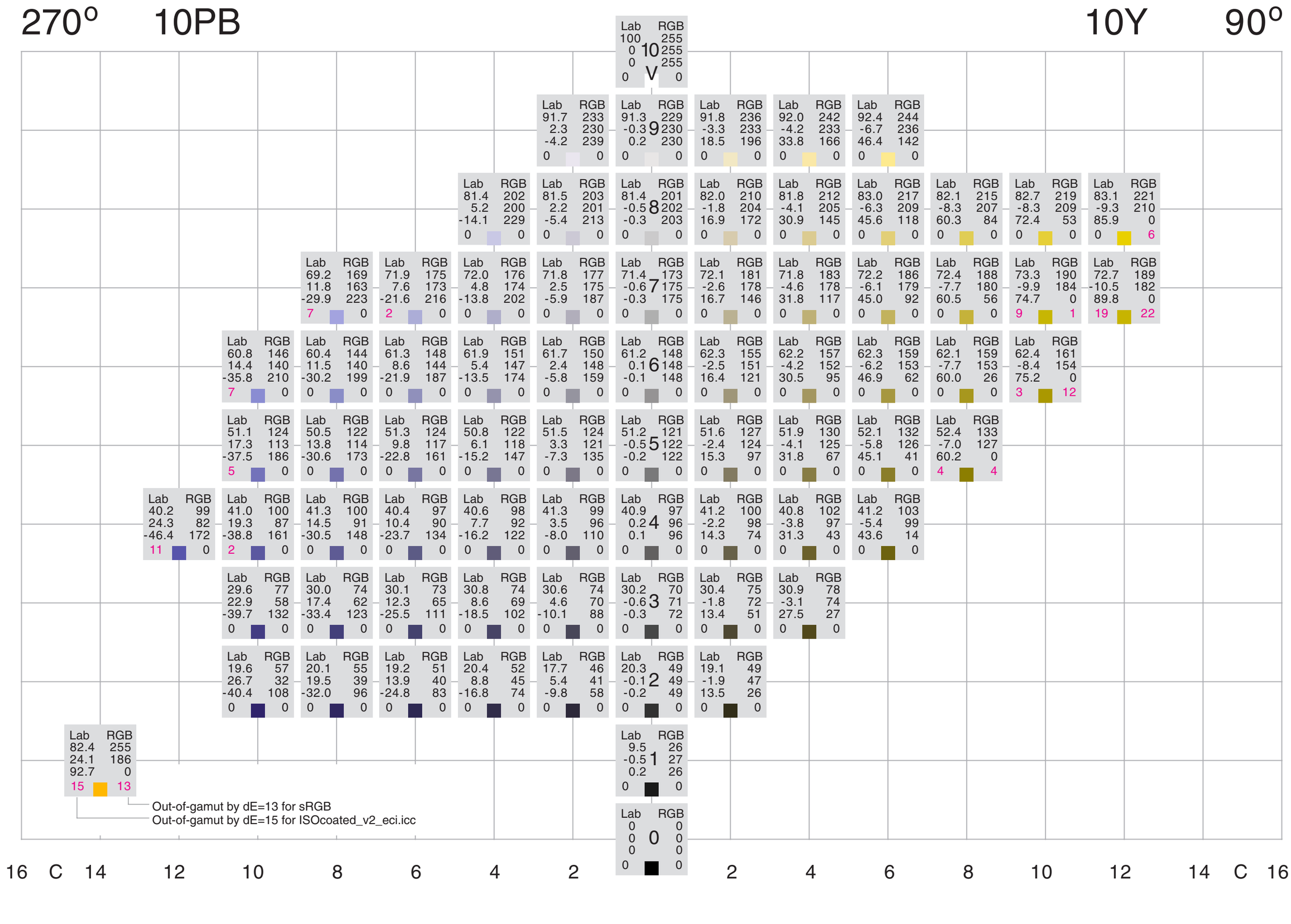


CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview

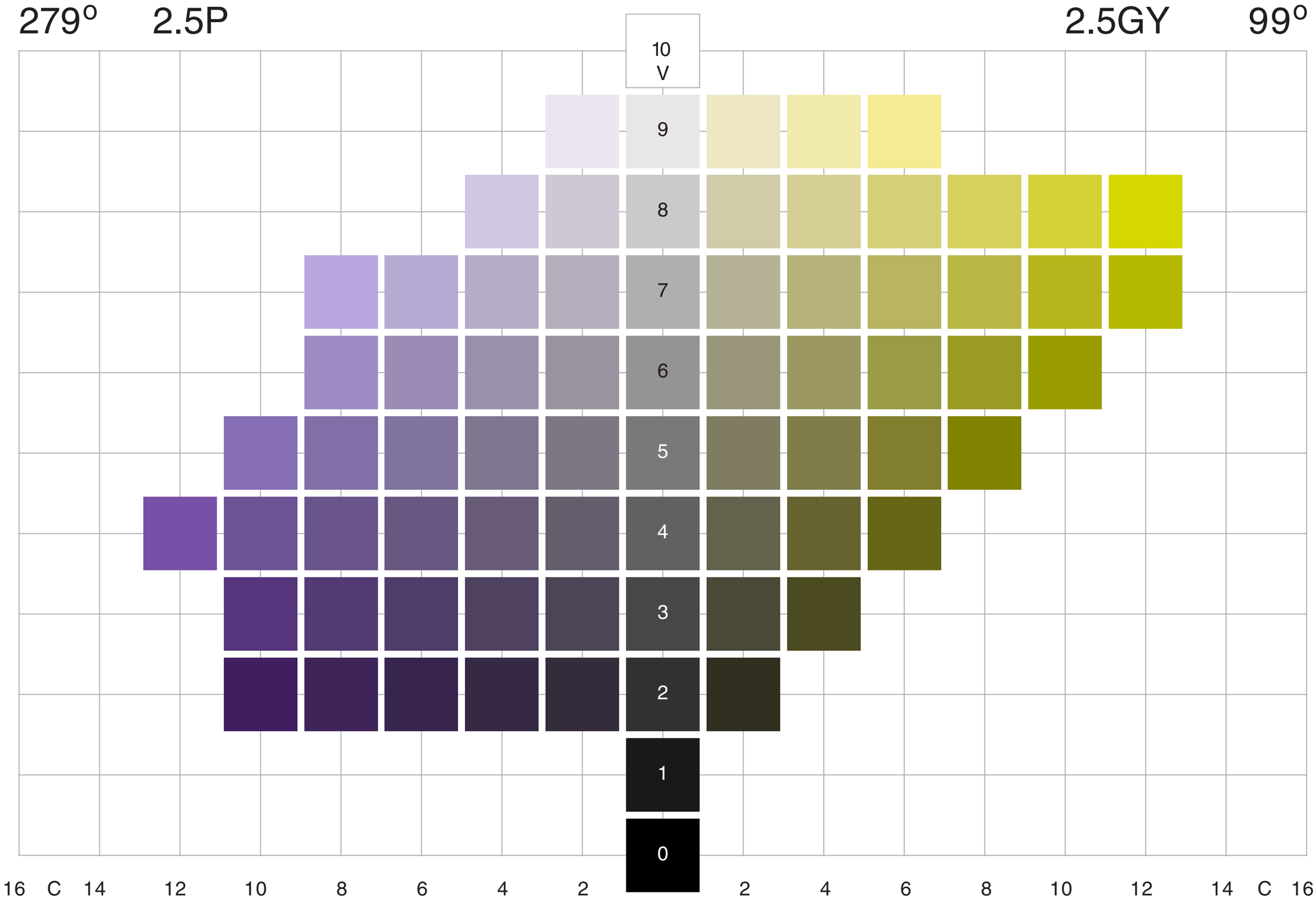


CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview

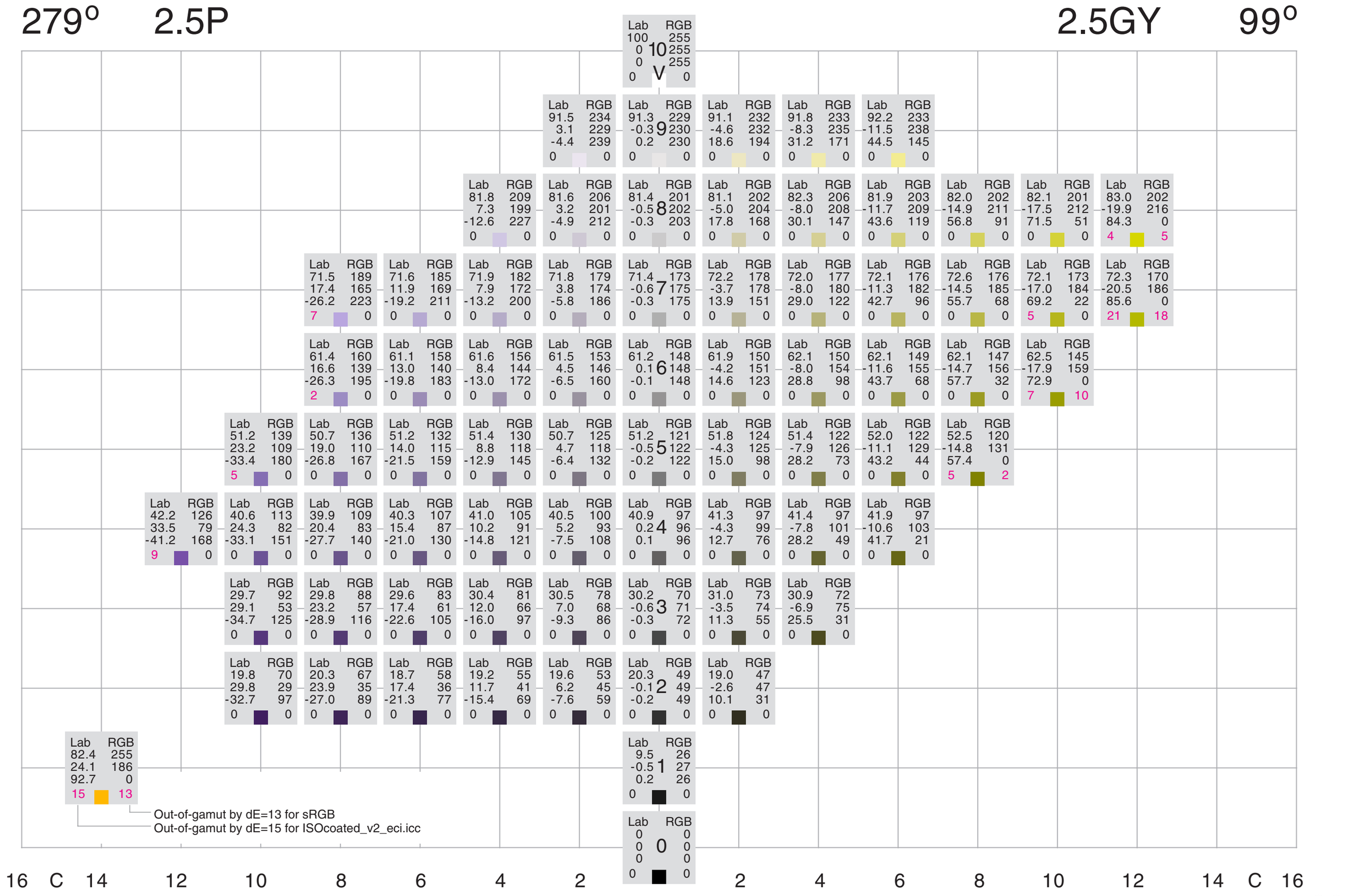



270°
10PB
10Y
90°
16 C 14 12 10 8 6 4 2
2 4 6 8 10 12 14 C 16
10 V
9
8
7
6
5
4
3
2
1
0
Lab 82.4 24.1 92.7 15 RGB 255 186 0 13
Out-of-gamut by dE=13 for sRGB
Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc

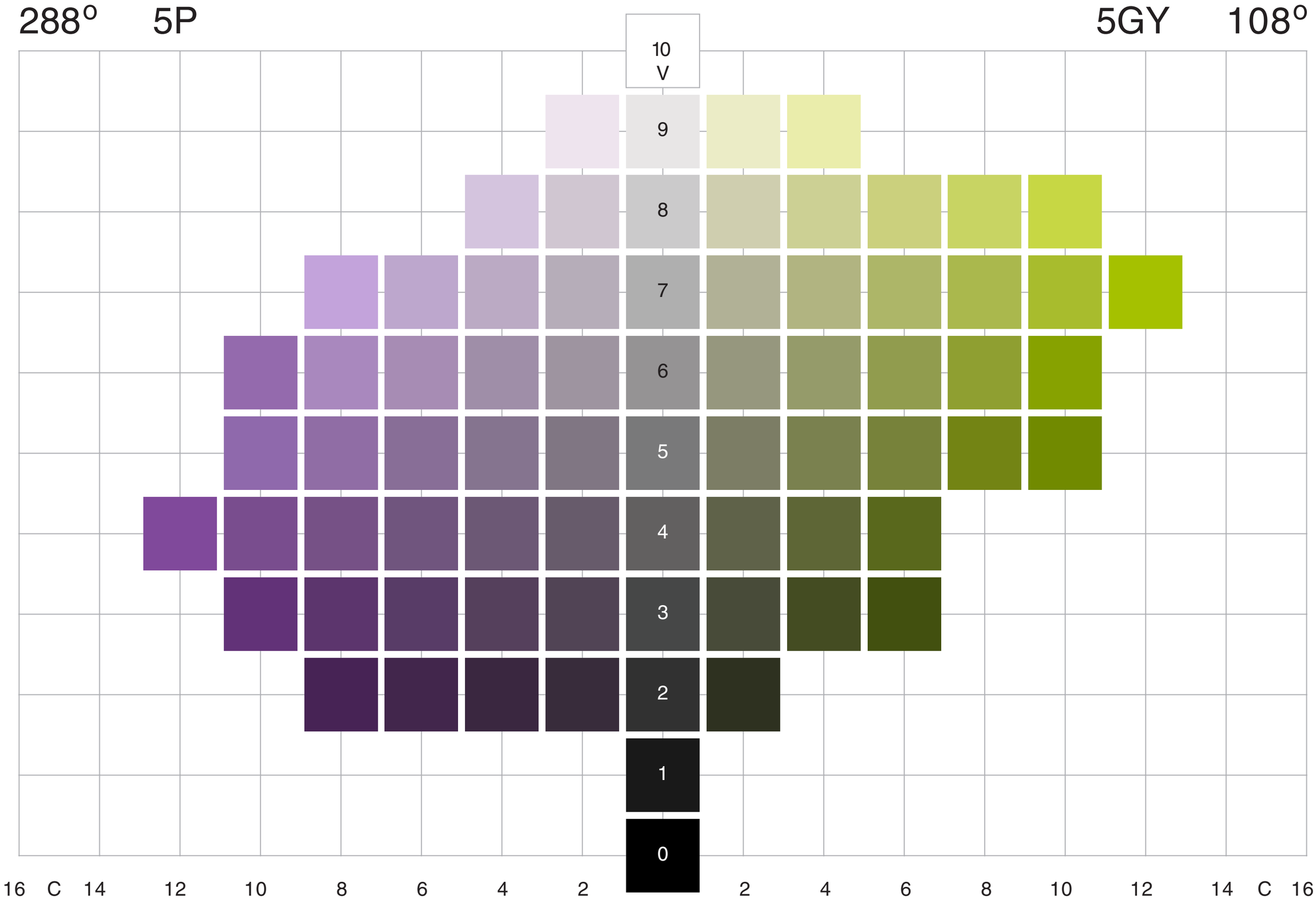
CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview

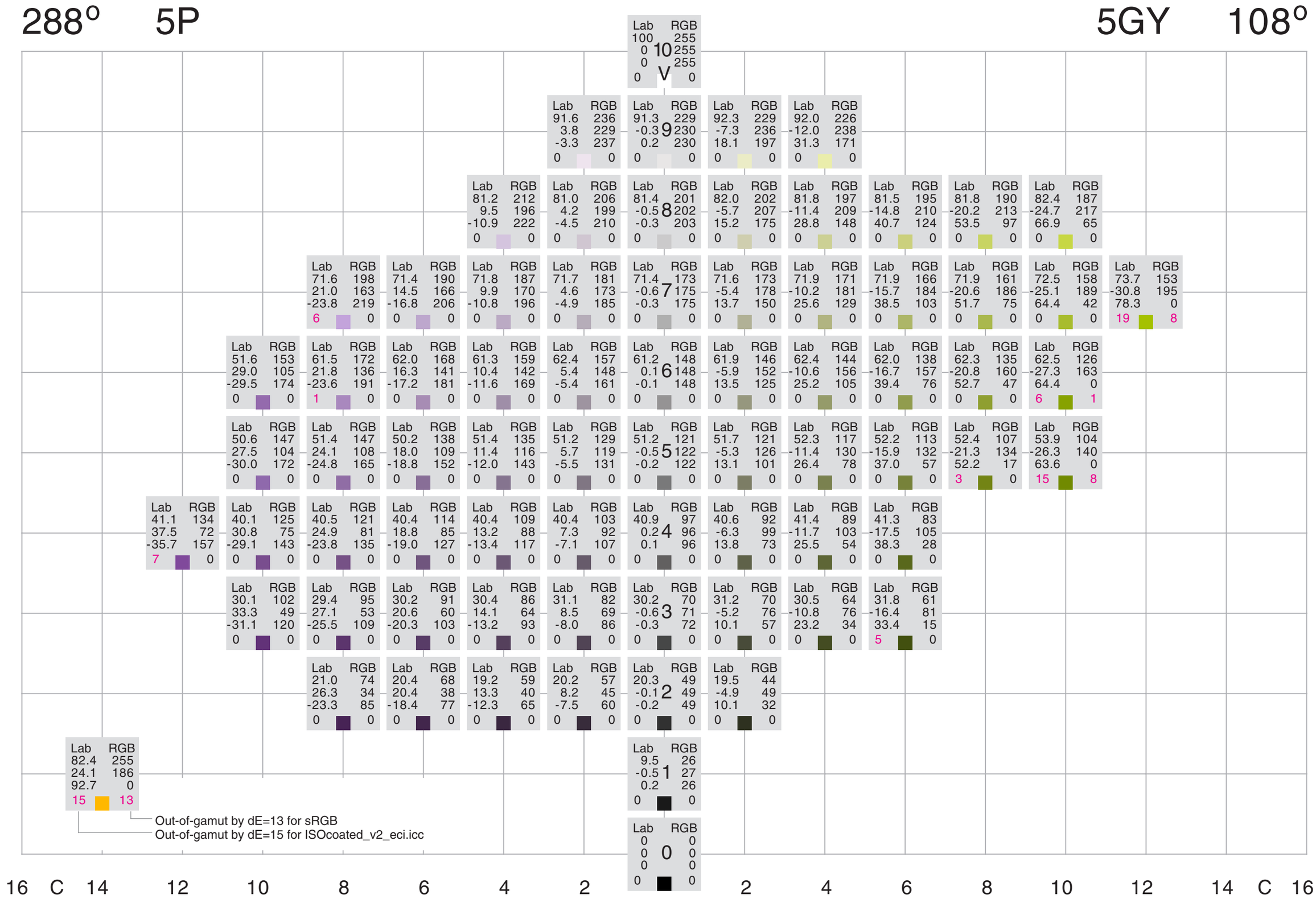


CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview



CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview




288° 5P
5GY 108°
V 10 Lab 100 0 0 RGB 255 255 255
9 Lab 91.3 -0.3 0.2 RGB 229 230 230
Lab 91.6 3.8 -3.3 RGB 236 229 237
Lab 92.3 -7.3 18.1 RGB 229 236 197
Lab 92.0 -12.0 31.3 RGB 226 238 171
8 Lab 81.4 -0.5 -0.3 RGB 201 202 203
Lab 81.2 9.5 -10.9 RGB 212 196 222
Lab 81.0 4.2 -4.5 RGB 206 199 210
Lab 82.0 -5.7 15.2 RGB 202 207 175
Lab 81.8 -11.4 28.8 RGB 197 209 148
Lab 81.5 -14.8 40.7 RGB 195 210 124
Lab 81.8 -20.2 53.5 RGB 190 213 97
Lab 82.4 -24.7 66.9 RGB 187 217 65
7 Lab 71.4 -0.6 -0.3 RGB 173 175 175
Lab 71.6 21.0 -23.8 RGB 198 163 219
Lab 71.4 14.5 -16.8 RGB 190 166 206
Lab 71.8 9.9 -10.8 RGB 187 170 196
Lab 71.7 4.6 -4.9 RGB 181 173 185
Lab 71.6 -5.4 13.7 RGB 173 178 150
Lab 71.9 -10.2 25.6 RGB 171 181 129
Lab 71.9 -15.7 38.5 RGB 166 184 103
Lab 71.9 -20.6 51.7 RGB 161 186 75
Lab 72.5 -25.1 64.4 RGB 158 189 42
Lab 73.7 -30.8 78.3 RGB 153 195 0
6 Lab 61.2 0.1 -0.1 RGB 148 148 148
Lab 51.6 29.0 -29.5 RGB 153 105 174
Lab 61.5 21.8 -23.6 RGB 172 136 191
Lab 62.0 16.3 -17.2 RGB 168 141 181
Lab 61.3 10.4 -11.6 RGB 159 142 169
Lab 62.4 5.4 -5.4 RGB 157 148 161
Lab 61.9 -5.9 13.5 RGB 146 152 125
Lab 62.4 -10.6 25.2 RGB 144 156 105
Lab 62.0 -16.7 39.4 RGB 138 157 76
Lab 62.3 -20.8 52.7 RGB 135 160 47
Lab 62.5 -27.3 64.4 RGB 126 163 0
5 Lab 51.2 -0.5 -0.2 RGB 121 122 122
Lab 50.6 27.5 -30.0 RGB 147 104 172
Lab 51.4 24.1 -24.8 RGB 147 108 165
Lab 50.2 18.0 -18.8 RGB 138 109 152
Lab 51.4 11.4 -12.0 RGB 135 116 143
Lab 51.2 5.7 -5.5 RGB 129 119 131
Lab 51.7 -5.3 13.1 RGB 121 126 101
Lab 52.3 -11.4 26.4 RGB 117 130 78
Lab 52.2 -15.9 37.0 RGB 113 132 57
Lab 52.4 -21.3 52.2 RGB 107 134 17
Lab 53.9 -26.3 63.6 RGB 104 140 0
4 Lab 40.9 0.2 0.1 RGB 97 96 96
Lab 41.1 37.5 -35.7 RGB 134 72 157
Lab 40.1 30.8 -29.1 RGB 125 75 143
Lab 40.5 24.9 -23.8 RGB 121 81 135
Lab 40.4 18.8 -19.0 RGB 114 85 127
Lab 40.4 13.2 -13.4 RGB 109 88 117
Lab 40.4 7.3 -7.1 RGB 103 92 107
Lab 40.6 -6.3 13.8 RGB 92 99 73
Lab 41.4 -11.7 25.5 RGB 89 103 54
Lab 41.3 -17.5 38.3 RGB 83 105 28
3 Lab 30.2 -0.6 -0.3 RGB 70 71 72
Lab 30.1 33.3 -31.1 RGB 102 49 120
Lab 29.4 27.1 -25.5 RGB 95 53 109
Lab 30.2 20.6 -20.3 RGB 91 60 103
Lab 30.4 14.1 -13.2 RGB 86 64 93
Lab 31.1 8.5 -8.0 RGB 82 69 86
Lab 31.2 -5.2 10.1 RGB 70 76 57
Lab 30.5 -10.8 23.2 RGB 64 76 34
Lab 31.8 -16.4 33.4 RGB 61 81 15
2 Lab 20.3 -0.1 -0.2 RGB 49 49 49
Lab 21.0 26.3 -23.3 RGB 74 34 85
Lab 20.4 20.4 -18.4 RGB 68 38 77
Lab 19.2 13.3 -12.3 RGB 59 40 65
Lab 20.2 8.2 -7.5 RGB 57 45 60
Lab 19.5 -4.9 10.1 RGB 44 49 32
1 Lab 9.5 -0.5 0.2 RGB 26 27 26
0 Lab 0 0 0 RGB 0 0 0
Lab 82.4 24.1 92.7 RGB 255 186 0
15 13
Out-of-gamut by dE=13 for sRGB
Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc
16 C 14 12 10 8 6 4 2
2 4 6 8 10 12 14 C 16

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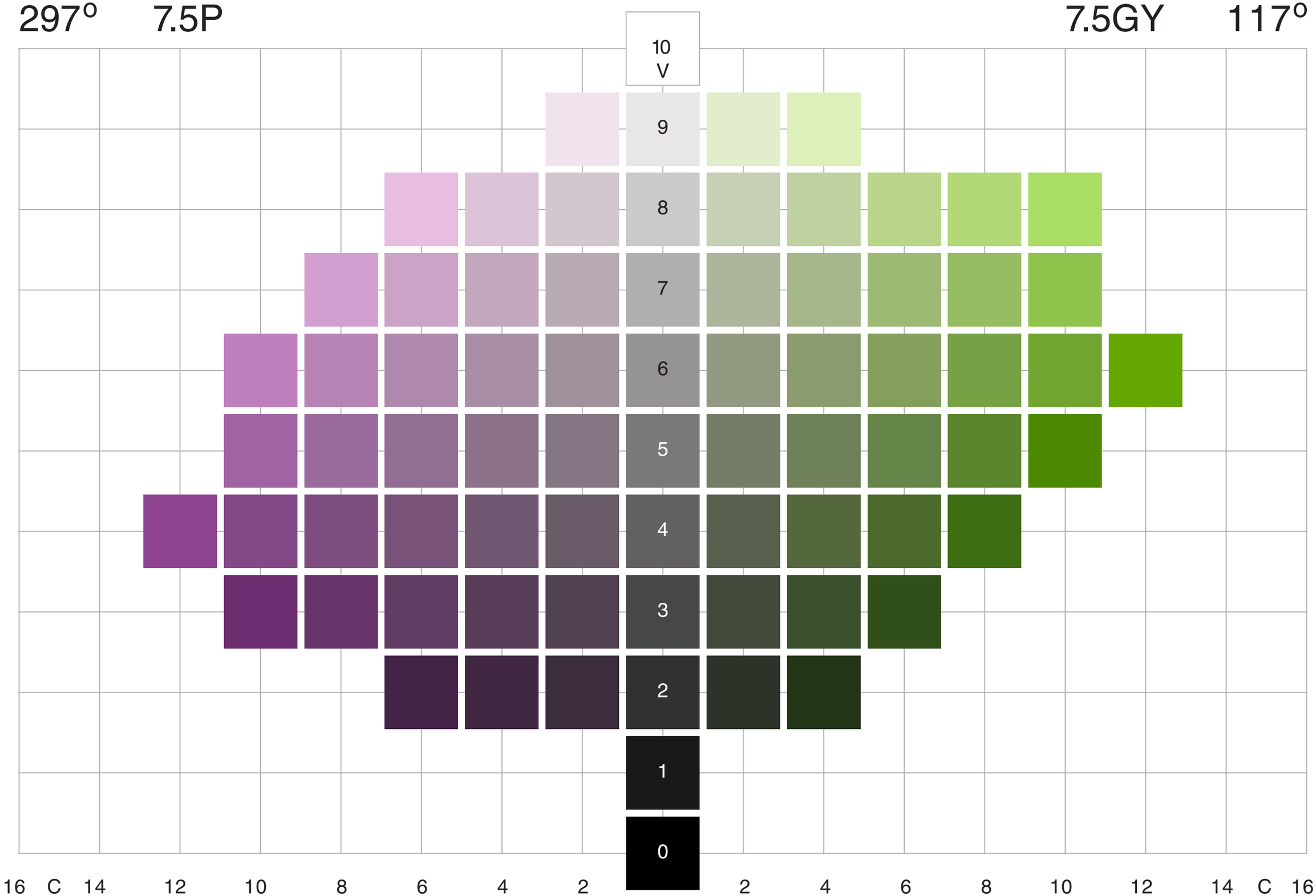
297° 7.5P 7.5GY 117°



297° 7.5P 7.5GY 117°

Lab	RGB
100	255
0	255
0	255
0	0

V 10

Lab	RGB
91.6	239
5.3	228
-2.8	236
0	0

Lab	RGB
91.3	229
-0.3	230
0.2	230
0	0

9

Lab	RGB
91.9	220
-10.6	238
14.8	203
0	0

Lab	RGB
92.3	215
-16.1	241
25.0	184
6	0

Lab	RGB
81.5	231
19.2	190
-11.1	224
1	0

Lab	RGB
81.1	217
11.2	195
-8.1	217
0	0

Lab	RGB
81.3	210
4.9	199
-2.7	207
0	0

Lab	RGB
81.4	201
-0.5	202
-0.3	203
0	0

8

Lab	RGB
81.9	193
-9.2	208
13.0	179
0	0

Lab	RGB
81.6	186
-15.0	210
22.1	160
0	0

Lab	RGB
81.6	176
-23.2	215
34.3	136
0	0

Lab	RGB
81.9	169
-28.8	218
43.3	119
5	0

Lab	RGB
82.3	157
-36.8	223
53.3	97
0	0

Lab	RGB
71.6	211
26.0	159
-17.3	208
2	0

Lab	RGB
71.5	202
19.3	163
-12.9	199
0	0

Lab	RGB
71.6	194
12.9	168
-8.2	191
0	0

Lab	RGB
71.5	184
5.8	172
-3.3	181
0	0

Lab	RGB
71.4	173
-0.6	175
-0.3	175
0	0

7

Lab	RGB
72.1	168
-8.1	181
12.0	154
0	0

Lab	RGB
72.1	161
-14.6	184
21.2	137
0	0

Lab	RGB
72.0	150
-22.5	187
31.8	116
0	0

Lab	RGB
72.2	141
-29.3	191
42.4	95
0	0

Lab	RGB
73.1	132
-36.6	196
53.0	73
0	0

Lab	RGB
61.6	193
34.3	126
-23.4	191
2	0

Lab	RGB
61.3	184
27.5	130
-18.2	181
0	0

Lab	RGB
61.7	175
19.7	137
-13.2	173
0	0

Lab	RGB
61.7	167
13.1	141
-9.2	166
0	0

Lab	RGB
61.6	159
7.0	145
-4.1	156
0	0

Lab	RGB
61.2	148
0.1	148
-0.1	148
0	0

6

Lab	RGB
61.9	142
-7.9	153
11.6	129
0	0

Lab	RGB
62.2	134
-15.2	158
21.5	111
0	0

Lab	RGB
61.8	124
-22.1	160
32.0	90
0	0

Lab	RGB
61.9	109
-31.4	164
42.8	68
0	0

Lab	RGB
62.4	102
-36.5	167
52.3	46
0	0

Lab	RGB
61.8	86
-44.0	168
65.7	0
14	5

Lab	RGB
51.1	163
33.8	99
-23.7	163
0	0

Lab	RGB
51.1	155
26.8	105
-19.4	156
0	0

Lab	RGB
51.0	147
20.2	109
-14.2	146
0	0

Lab	RGB
51.2	140
13.8	114
-9.3	138
0	0

Lab	RGB
51.4	132
7.2	119
-4.4	130
0	0

Lab	RGB
51.2	121
-0.5	122
-0.2	122
0	0

5

Lab	RGB
51.0	114
-7.1	125
9.7	105
0	0

Lab	RGB
51.6	106
-15.1	130
20.2	87
0	0

Lab	RGB
52.4	96
-23.5	135
29.3	72
0	0

Lab	RGB
51.4	84
-30.3	135
41.8	43
0	0

Lab	RGB
51.4	63
-40.4	139
55.4	0
16	3

Lab	RGB
41.2	145
41.8	67
-28.7	145
0	0

Lab	RGB
40.1	134
34.8	71
-25.0	136
0	0

Lab	RGB
40.1	128
28.8	76
-20.3	128
0	0

Lab	RGB
40.4	122
22.2	82
-15.4	121
0	0

Lab	RGB
40.3	113
14.7	87
-11.2	114
0	0

Lab	RGB
40.7	106
8.2	92
-5.6	105
0	0

Lab	RGB
40.9	97
0.2	96
0.1	96
0	0

4

Lab	RGB
39.4	85
-7.8	96
9.9	76
0	0

Lab	RGB
41.4	81
-15.5	104
21.4	61
0	0

Lab	RGB
41.2	69
-23.2	107
30.7	43
0	0

Lab	RGB
41.6	53
-32.3	111
41.1	18
5	0

Lab	RGB
30.1	112
38.5	42
-26.3	113
0	0

Lab	RGB
30.1	105
31.4	50
-22.1	106
0	0

Lab	RGB
31.2	99
23.0	60
-16.9	101
0	0

Lab	RGB
29.6	88
16.7	60
-11.9	88
0	0

Lab	RGB
29.8	81
9.2	65
-6.3	80
0	0

Lab	RGB
30.2	70
-0.6	71
-0.3	72
0	0

3

Lab	RGB
30.3	64
-7.1	74
8.4	58
0	0

Lab	RGB
31.6	55
-16.2	81
18.2	44
0	0

Lab	RGB
30.4	43
-22.6	80
27.7	24
3	0

Lab	RGB
20.0	69
21.1	36
-16.2	72
0	0

Lab	RGB
20.1	65
16.0	40
-12.2	67
0	0

Lab	RGB
20.9	60
8.6	46
-6.4	60
0	0

Lab	RGB
20.3	49
-0.1	49
-0.2	49
0	0

2

Lab	RGB
20.4	43
-5.8	52
5.8	40
0	0

Lab	RGB
19.8	32
-14.1	53
15.6	24
0	0

Lab	RGB
82.4	255
24.1	186
92.7	0
15	13

Out-of-gamut by dE=13 for sRGB
Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc

Lab	RGB
9.5	26
-0.5	27
0.2	26
0	0

1

Lab	RGB
0	0
0	0
0	0
0	0

0

16 C 14 12 10 8 6 4 2 2 4 6 8 10 12 14 C 16

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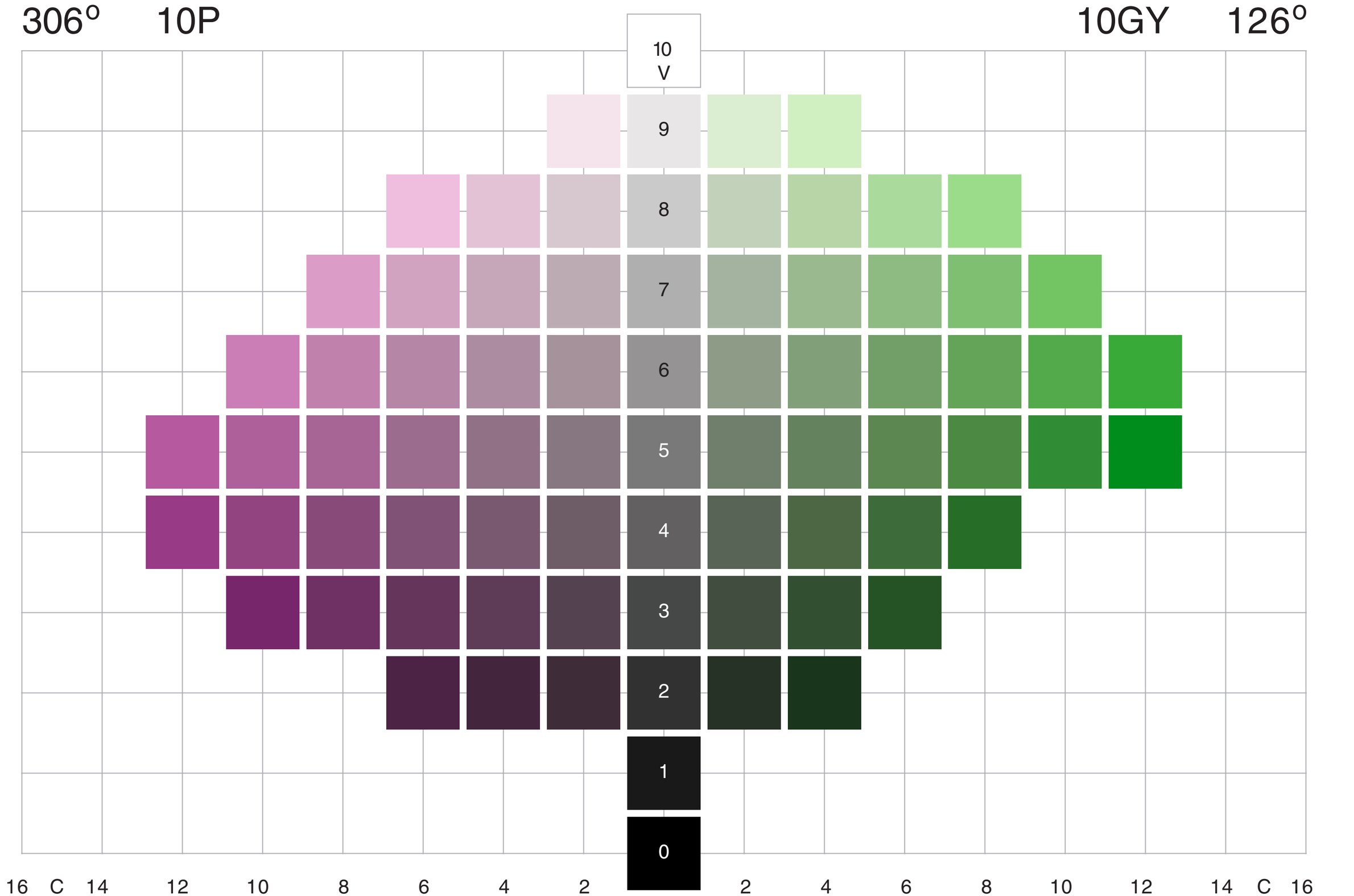


306° 10P 10GY 126°

Lab	RGB
100	255
0	255
0	255
0	0

10 V

Lab	RGB
92.1	245
7.0	228
-2.0	236
0	0

Lab	RGB
91.3	229
-0.3	230
0.2	230
0	0

9

Lab	RGB
92.1	215
-12.5	239
12.0	209
3	0

Lab	RGB
91.4	203
-19.5	241
19.3	192
7	0

Lab	RGB
81.9	238
21.9	189
-9.1	221
2	0

Lab	RGB
81.8	226
14.1	194
-5.0	213
0	0

Lab	RGB
81.7	214
6.0	199
-1.5	206
0	0

Lab	RGB
81.4	201
-0.5	202
-0.3	203
0	0

8

Lab	RGB
82.0	190
-10.3	209
10.0	185
0	0

Lab	RGB
82.1	179
-18.4	214
18.8	168
0	0

Lab	RGB
82.7	163
-28.3	220
25.8	155
8	0

Lab	RGB
81.9	145
-36.7	222
33.5	138
12	0

Lab	RGB
71.8	220
29.7	156
-13.0	201
3	0

Lab	RGB
71.9	210
21.9	162
-9.1	194
0	0

Lab	RGB
71.7	197
13.7	167
-5.6	186
0	0

Lab	RGB
71.8	188
7.1	172
-2.2	180
0	0

Lab	RGB
71.4	173
-0.6	175
-0.3	175
0	0

7

Lab	RGB
71.4	161
-10.0	180
8.8	158
0	0

Lab	RGB
71.9	149
-19.1	186
17.9	142
0	0

Lab	RGB
71.4	134
-27.0	188
24.2	129
0	0

Lab	RGB
71.6	118
-36.3	192
32.3	113
0	0

Lab	RGB
72.1	103
-44.1	197
40.3	98
6	0

Lab	RGB
62.3	203
37.3	125
-16.8	182
1	0

Lab	RGB
61.6	192
30.1	129
-13.0	173
0	0

Lab	RGB
61.7	182
22.7	135
-9.7	167
0	0

Lab	RGB
61.9	171
14.5	141
-6.2	161
0	0

Lab	RGB
62.4	164
8.3	146
-2.7	156
0	0

Lab	RGB
61.2	148
0.1	148
-0.1	148
0	0

6

Lab	RGB
62.5	138
-9.7	156
8.7	135
0	0

Lab	RGB
62.3	125
-18.2	160
16.7	120
0	0

Lab	RGB
61.3	108
-27.0	161
24.0	104
0	0

Lab	RGB
61.8	90
-36.9	166
33.2	87
0	0

Lab	RGB
62.7	70
-46.0	172
40.7	73
0	0

Lab	RGB
61.7	31
-54.6	172
47.6	54
10	0

Lab	RGB
51.5	183
45.7	88
-21.0	160
1	0

Lab	RGB
51.5	174
38.7	95
-17.8	154
0	0

Lab	RGB
51.5	166
32.1	101
-14.6	149
0	0

Lab	RGB
51.4	156
23.9	107
-11.0	142
0	0

Lab	RGB
51.3	144
15.3	113
-7.0	135
0	0

Lab	RGB
51.8	135
7.5	119
-3.0	129
0	0

Lab	RGB
51.2	121
-0.5	122
-0.2	122
0	0

5

Lab	RGB
51.5	110
-9.7	127
8.4	108
0	0

Lab	RGB
51.4	97
-18.1	131
15.9	94
0	0

Lab	RGB
52.1	86
-26.2	136
24.1	81
0	0

Lab	RGB
52.1	67
-35.4	140
31.5	67
0	0

Lab	RGB
51.6	32
-45.4	142
37.2	53
0	0

Lab	RGB
50.8	0
-56.5	143
46.7	25
13	10

Lab	RGB
40.4	153
47.3	57
-22.9	134
0	0

Lab	RGB
41.2	147
40.0	68
-19.1	130
0	0

Lab	RGB
40.8	137
32.2	74
-15.4	122
0	0

Lab	RGB
41.1	129
24.6	82
-12.3	118
0	0

Lab	RGB
41.9	121
16.9	89
-7.8	112
0	0

Lab	RGB
41.2	110
9.2	92
-3.7	104
0	0

Lab	RGB
40.9	97
0.2	96
0.1	96
0	0

4

Lab	RGB
41.0	86
-8.4	101
7.3	84
0	0

Lab	RGB
41.0	73
-17.9	104
16.4	69
0	0

Lab	RGB
41.0	56
-26.9	108
22.8	57
0	0

Lab	RGB
40.6	25
-37.8	110
31.9	38
1	0

Lab	RGB
30.7	121
42.9	37
-22.5	108
0	0

Lab	RGB
30.7	113
34.6	48
-17.7	101
0	0

Lab	RGB
29.7	102
26.9	53
-13.4	92
0	0

Lab	RGB
30.0	94
19.5	59
-9.9	87
0	0

Lab	RGB
30.4	85
10.4	66
-5.4	80
0	0

Lab	RGB
30.2	70
-0.6	71
-0.3	72
0	0

3

Lab	RGB
31.4	63
-8.5	78
7.0	63
0	0

Lab	RGB
30.5	47
-17.9	79
14.2	49
0	0

Lab	RGB
31.3	32
-26.3	84
21.1	38
0	0

Lab	RGB
20.8	77
24.6	34
-13.1	70
0	0

Lab	RGB
19.6	67
17.9	37
-9.6	62
0	0

Lab	RGB
20.6	62
10.5	44
-5.3	58
0	0

Lab	RGB
20.3	49
-0.1	49
-0.2	49
0	0

2

Lab	RGB
19.7	37
-8.6	51
6.5	38
0	0

Lab	RGB
19.7	23
-17.4	54
12.8	28
0	0

Lab	RGB
82.4	255
24.1	186
92.7	0
15	13

Out-of-gamut by dE=13 for sRGB
Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc

Lab	RGB
9.5	26
-0.5	27
0.2	26
0	0

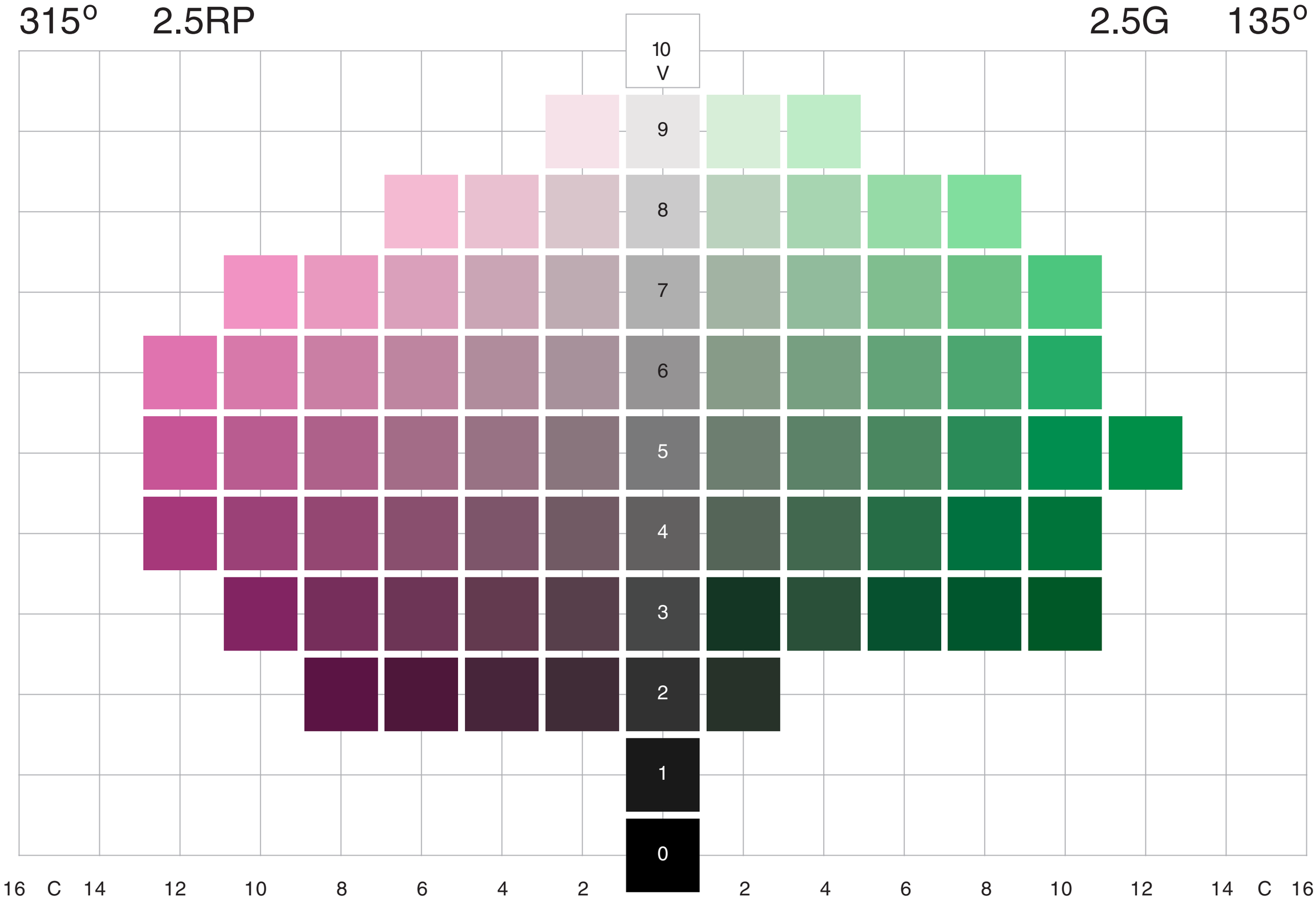
1

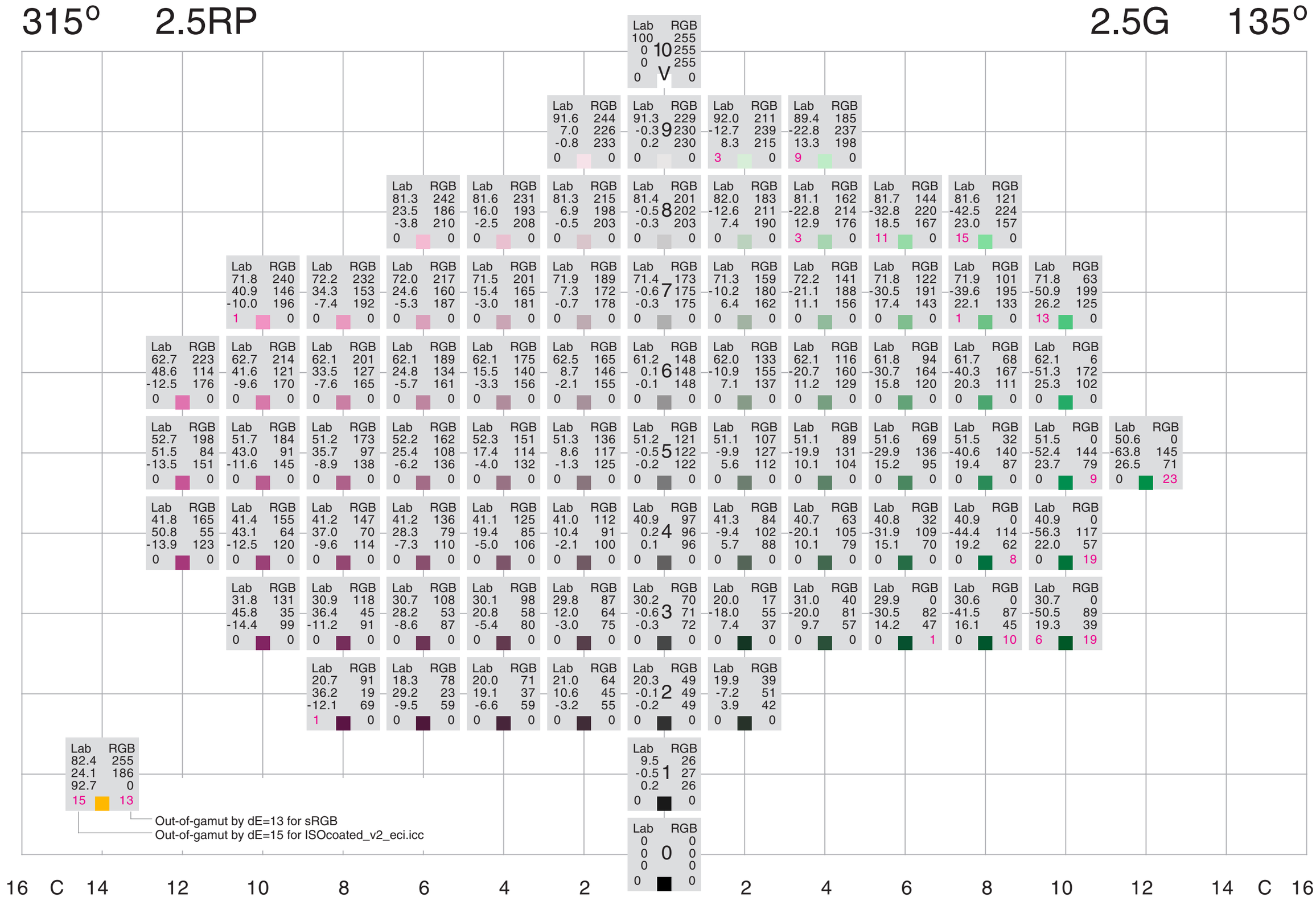
Lab	RGB
0	0
0	0
0	0
0	0

0

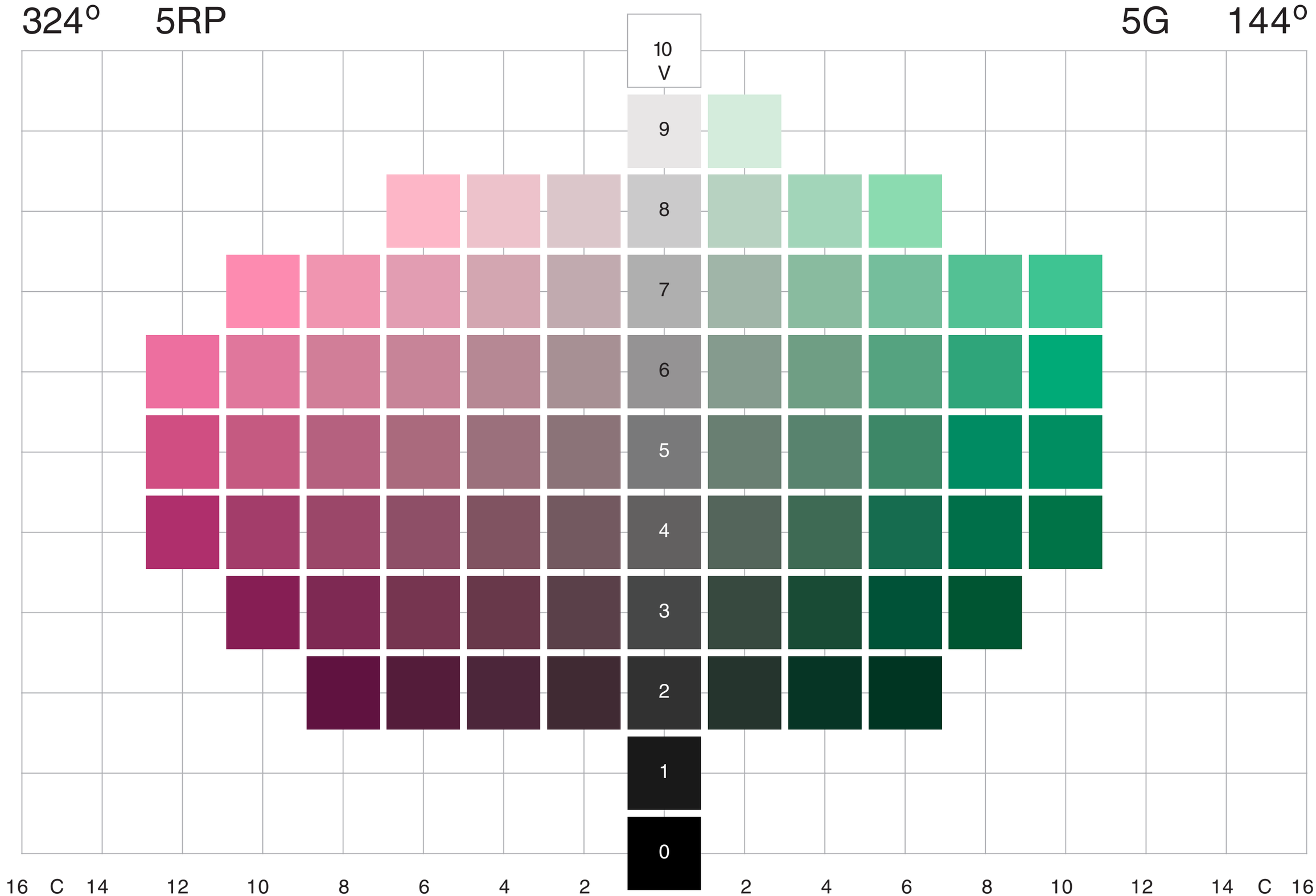
16 C 14 12 10 8 6 4 2 2 4 6 8 10 12 14 C 16

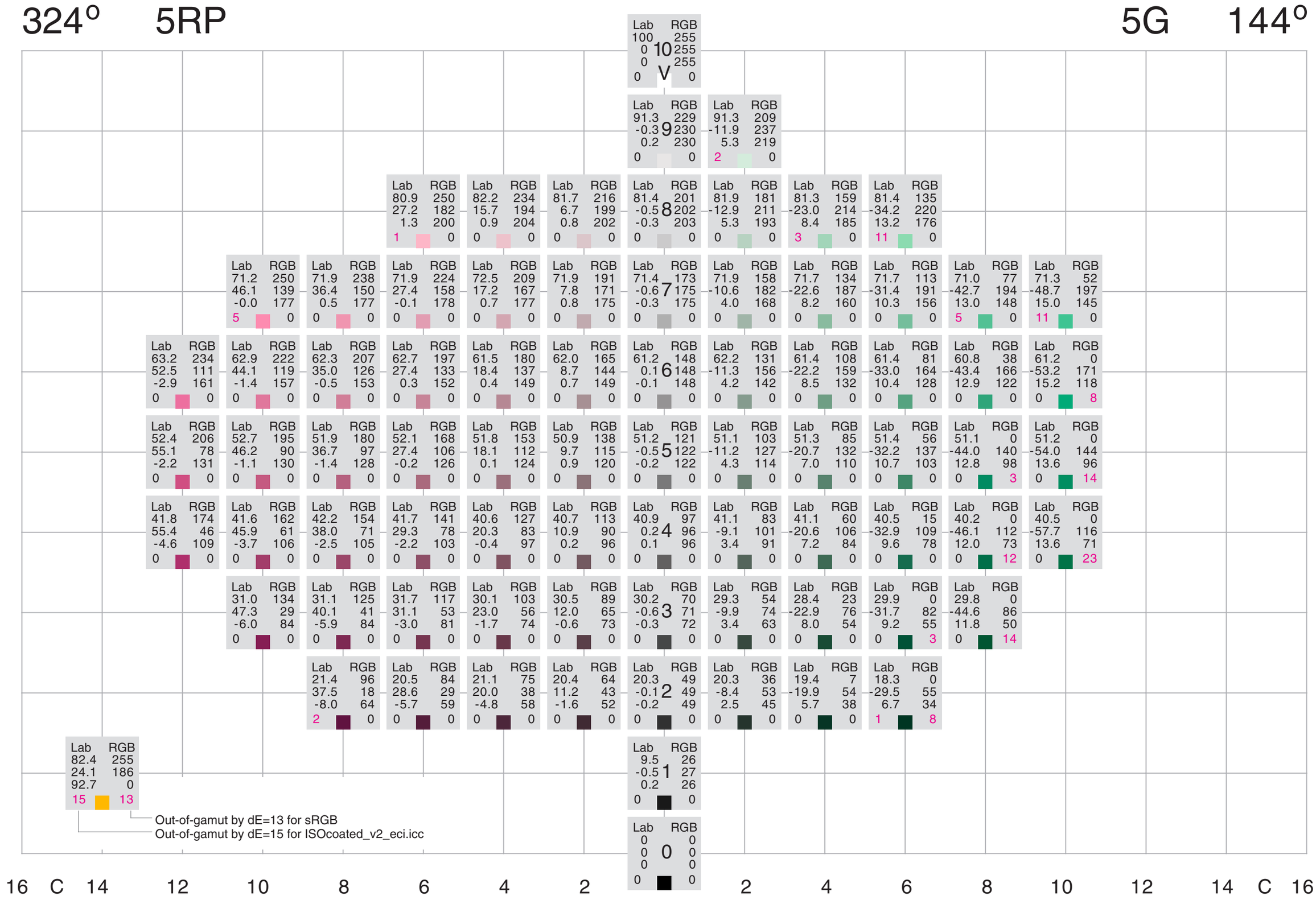
CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview



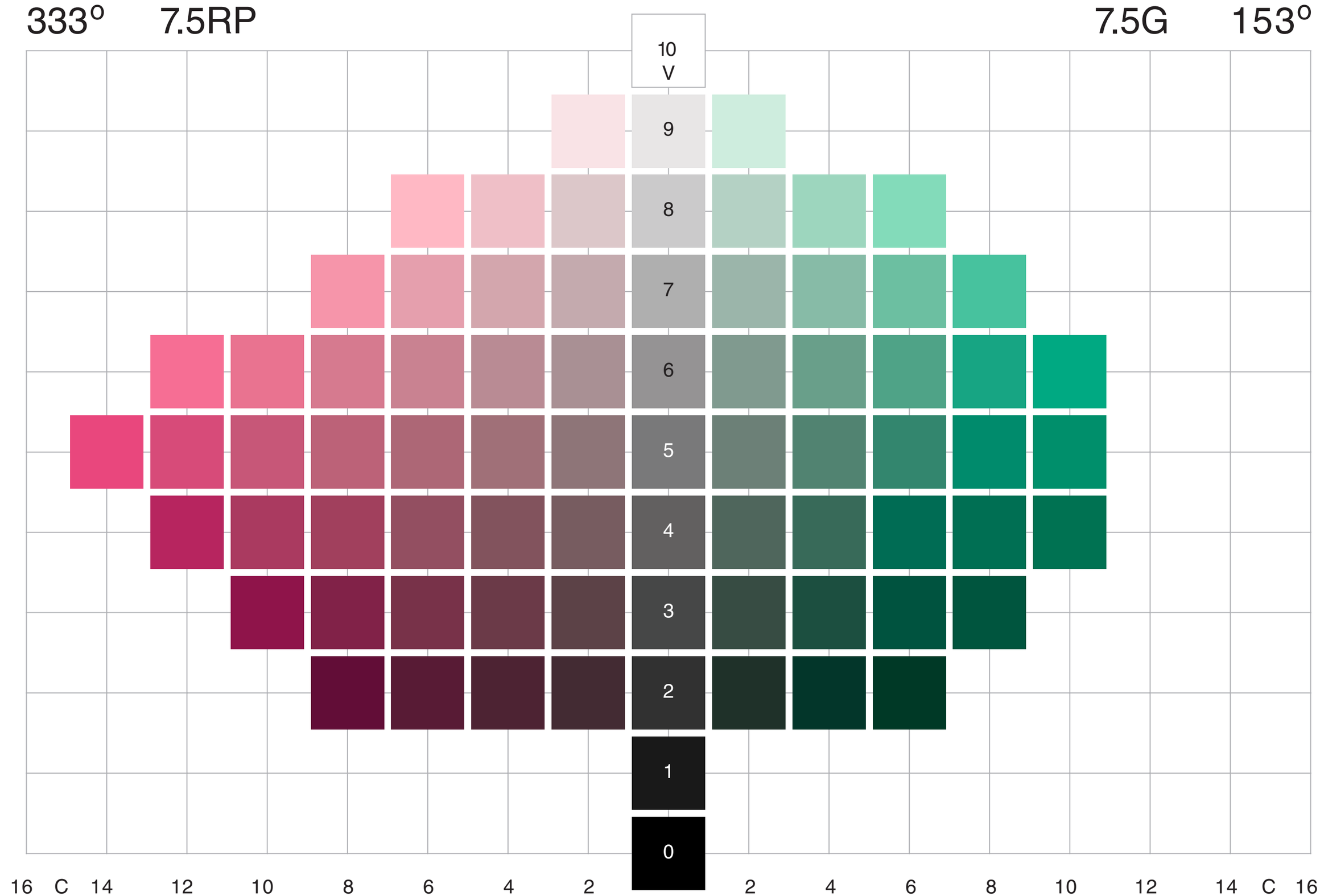

315° 2.5RP
2.5G 135°
10 V
9
8
7
6
5
4
3
2
1
0
Out-of-gamut by dE=13 for sRGB
Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc
16 C 14 12 10 8 6 4 2
2 4 6 8 10 12 14 C 16

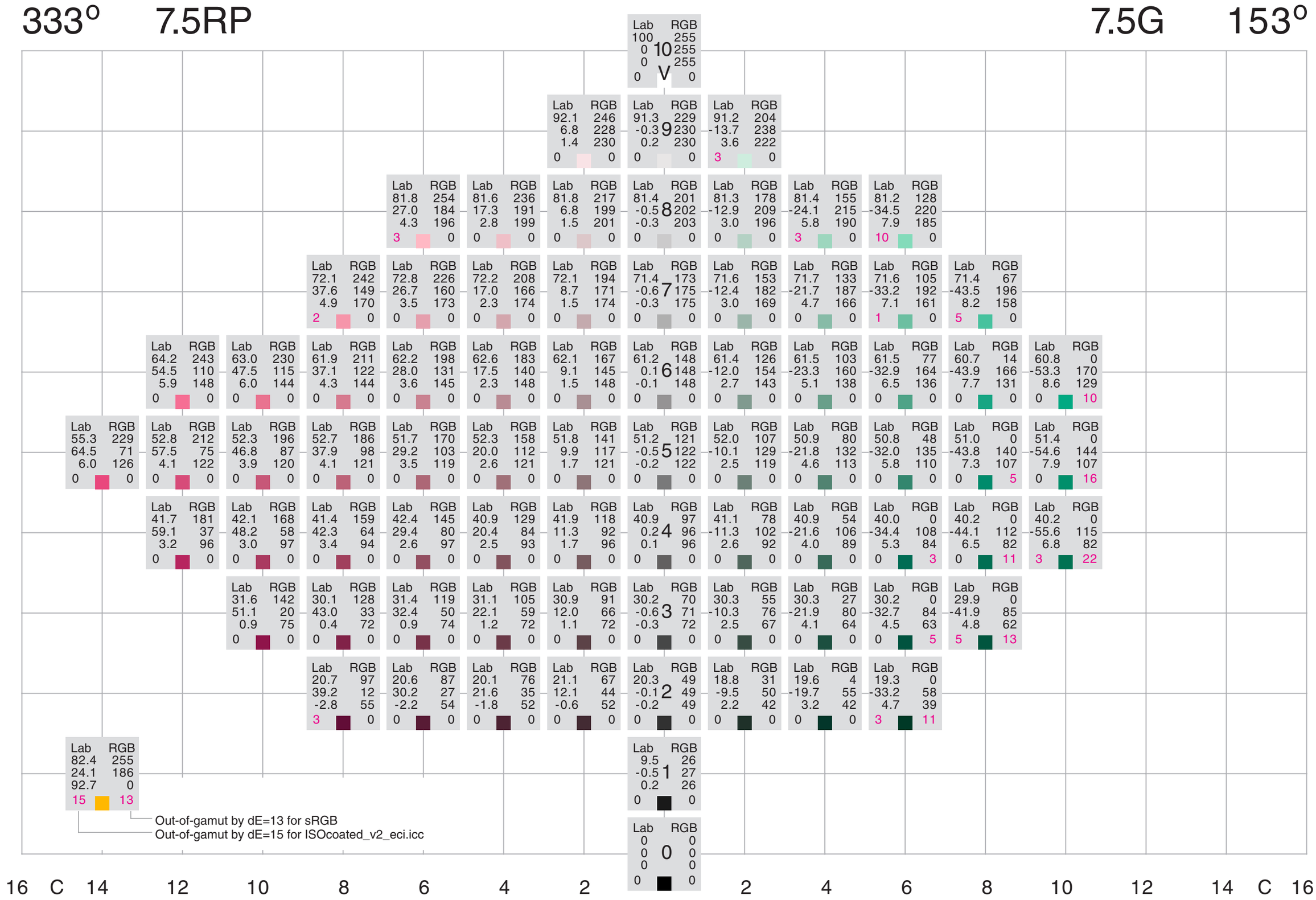
CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview



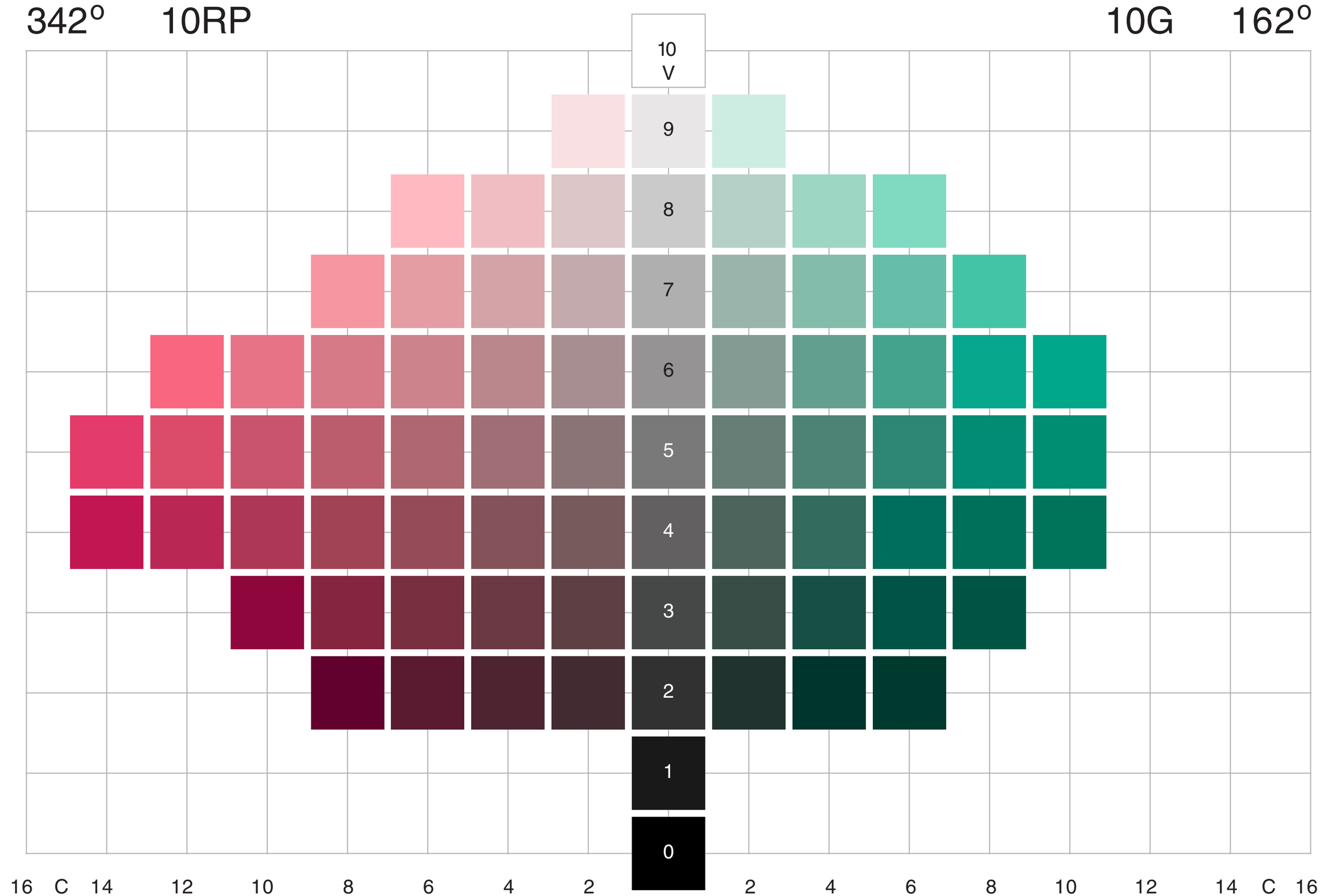

324°
5RP
5G
144°
V
10
9
8
7
6
5
4
3
2
1
0
Out-of-gamut by dE=13 for sRGB
Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc
16 C 14 12 10 8 6 4 2
2 4 6 8 10 12 14 C 16

CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview




333° 7.5RP
7.5G 153°
10 V
9
8
7
6
5
4
3
2
1
0
Out-of-gamut by dE=13 for sRGB
Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc
16 C 14 12 10 8 6 4 2
2 4 6 8 10 12 14 C 16

CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview



342° 10RP — 10G 162°

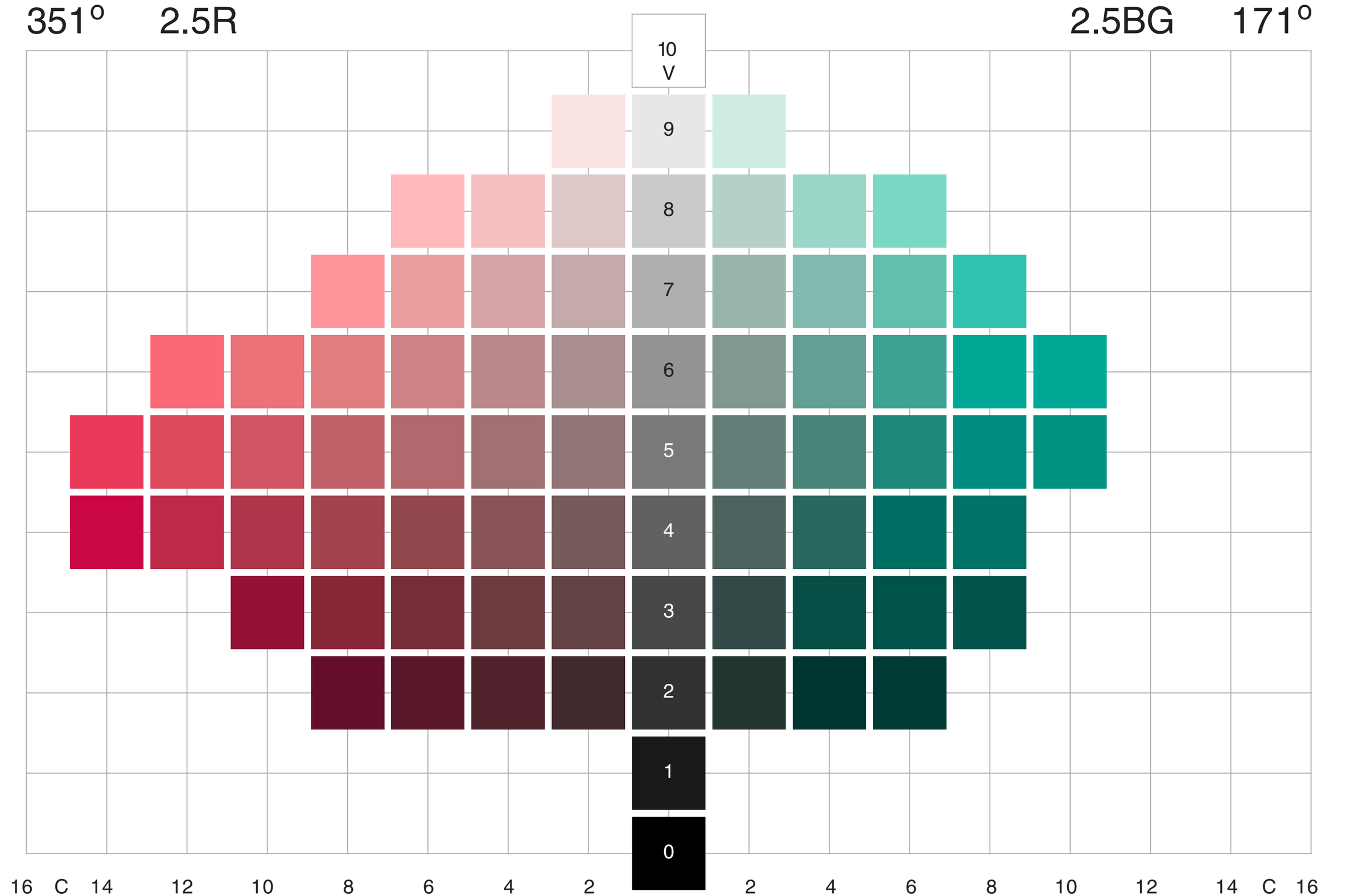
V	Hue	C	Lab			RGB			dE ISOcoated	dE sRGB
10		0	100	0	0	255	255	255	0	0
9	10RP	2	91.3	7.3	2.0	245	225	226	0	0
9		0	91.3	-0.3	0.2	229	230	230	0	0
9	10G	2	91.3	-13.0	2.1	204	238	225	2	0
8	10RP	6	82.6	28.3	7.7	255	186	193	4	2
8	10RP	4	81.5	17.5	4.8	237	191	194	0	0
8	10RP	2	81.8	7.0	2.0	218	199	200	0	0
8		0	81.4	-0.5	-0.3	201	202	203	0	0
8	10G	2	81.4	-11.8	1.8	179	209	198	0	0
8	10G	4	81.4	-22.9	3.4	155	215	195	3	0
8	10G	6	81.1	-34.0	4.0	125	219	192	11	0
7	10RP	8	72.2	36.1	9.7	242	151	161	1	0
7	10RP	6	71.9	26.4	7.1	225	158	165	0	0
7	10RP	4	71.8	17.5	4.6	209	164	168	0	0
7	10RP	2	71.9	7.8	2.0	192	171	173	0	0
7		0	71.4	-0.6	-0.3	173	175	175	0	0
7	10G	2	71.4	-11.8	1.6	152	181	171	0	0
7	10G	4	72.2	-22.6	2.7	130	189	171	0	0
7	10G	6	71.4	-32.4	3.1	102	191	168	1	0
7	10G	8	71.9	-42.4	4.0	66	197	167	6	0
6	10RP	12	62.6	57.1	14.5	244	102	129	2	0
6	10RP	10	62.6	45.6	10.4	227	116	136	0	0
6	10RP	8	62.0	36.3	8.2	212	123	137	0	0
6	10RP	6	62.7	28.8	7.2	202	132	140	0	0
6	10RP	4	61.5	18.6	4.9	182	136	141	0	0
6	10RP	2	61.5	8.5	2.1	164	143	145	0	0
6		0	61.2	0.1	-0.1	148	148	148	0	0
6	10G	2	62.1	-11.0	1.6	130	156	147	0	0
6	10G	4	61.3	-24.2	2.5	98	160	143	0	0
6	10G	6	61.3	-34.3	3.2	67	164	141	0	0
6	10G	8	61.4	-42.9	3.1	4	168	141	0	0
6	10G	10	60.2	-53.7	3.8	0	168	136	4	13
5	10RP	14	52.4	65.4	13.1	223	59	107	0	0
5	10RP	12	53.2	57.2	13.2	215	76	108	0	0
5	10RP	10	51.8	46.9	9.7	197	86	110	0	0
5	10RP	8	51.5	39.0	8.7	185	94	110	0	0
5	10RP	6	52.2	29.1	7.3	173	104	114	0	0
5	10RP	4	51.9	18.7	4.5	156	112	117	0	0
5	10RP	2	51.3	8.7	2.3	138	117	119	0	0
5		0	51.2	-0.5	-0.2	121	122	122	0	0
5	10G	2	50.8	-10.6	1.6	102	126	118	0	0
5	10G	4	50.9	-22.0	1.7	76	132	117	0	0
5	10G	6	51.2	-31.5	2.1	46	136	117	0	0
5	10G	8	51.3	-44.3	2.5	0	141	116	0	7
5	10G	10	51.0	-53.2	2.5	0	143	115	0	17
4	10RP	14	42.2	64.6	12.0	191	21	84	0	0
4	10RP	12	42.1	58.0	10.8	182	41	85	0	0
4	10RP	10	41.9	48.8	9.6	170	57	86	0	0
4	10RP	8	41.8	40.7	9.2	160	67	86	0	0
4	10RP	6	41.8	31.7	7.2	148	76	89	0	0
4	10RP	4	41.0	20.7	4.9	130	84	90	0	0
4	10RP	2	41.2	11.6	3.0	117	90	93	0	0
4		0	40.9	0.2	0.1	97	96	96	0	0
4	10G	2	40.3	-10.9	1.5	76	100	92	0	0
4	10G	4	41.3	-22.4	1.6	50	108	94	0	0
4	10G	6	40.8	-33.2	1.5	0	110	93	0	3
4	10G	8	40.5	-44.5	1.6	0	113	91	0	13
4	10G	10	40.9	-56.8	2.1	0	117	91	4	24
3	10RP	10	30.2	52.6	8.8	141	6	61	2	0
3	10RP	8	31.4	42.5	7.3	132	37	65	0	0
3	10RP	6	30.7	32.3	5.6	118	49	65	0	0
3	10RP	4	30.7	22.4	3.9	105	58	67	0	0
3	10RP	2	30.8	12.9	2.8	93	65	69	0	0
3		0	30.2	-0.6	-0.3	70	71	72	0	0
3	10G	2	30.8	-10.5	1.0	54	77	70	0	0
3	10G	4	30.0	-21.3	0.9	23	80	69	0	0
3	10G	6	30.5	-31.2	0.7	0	84	70	0	5
3	10G	8	29.5	-43.0	0.6	0	85	67	5	16
2	10RP	8	19.2	42.1	1.3	97	0	47	2	1
2	10RP	6	20.9	30.2	0.8	89	28	50	0	0
2	10RP	4	20.6	21.0	0.5	77	36	50	0	0
2	10RP	2	20.6	11.0	0.7	65	43	49	0	0
2		0	20.3	-0.1	-0.2	49	49	49	0	0
2	10G	2	19.7	-9.5	0.9	32	52	46	0	0
2	10G	4	19.0	-18.1	-0.1	3	53	46	0	0
2	10G	6	19.8	-30.4	-0.1	0	58	47	2	10
1		0	9.5	-0.5	0.2	26	27	26	0	0
0		0	0	0	0	0	0	0	0	0

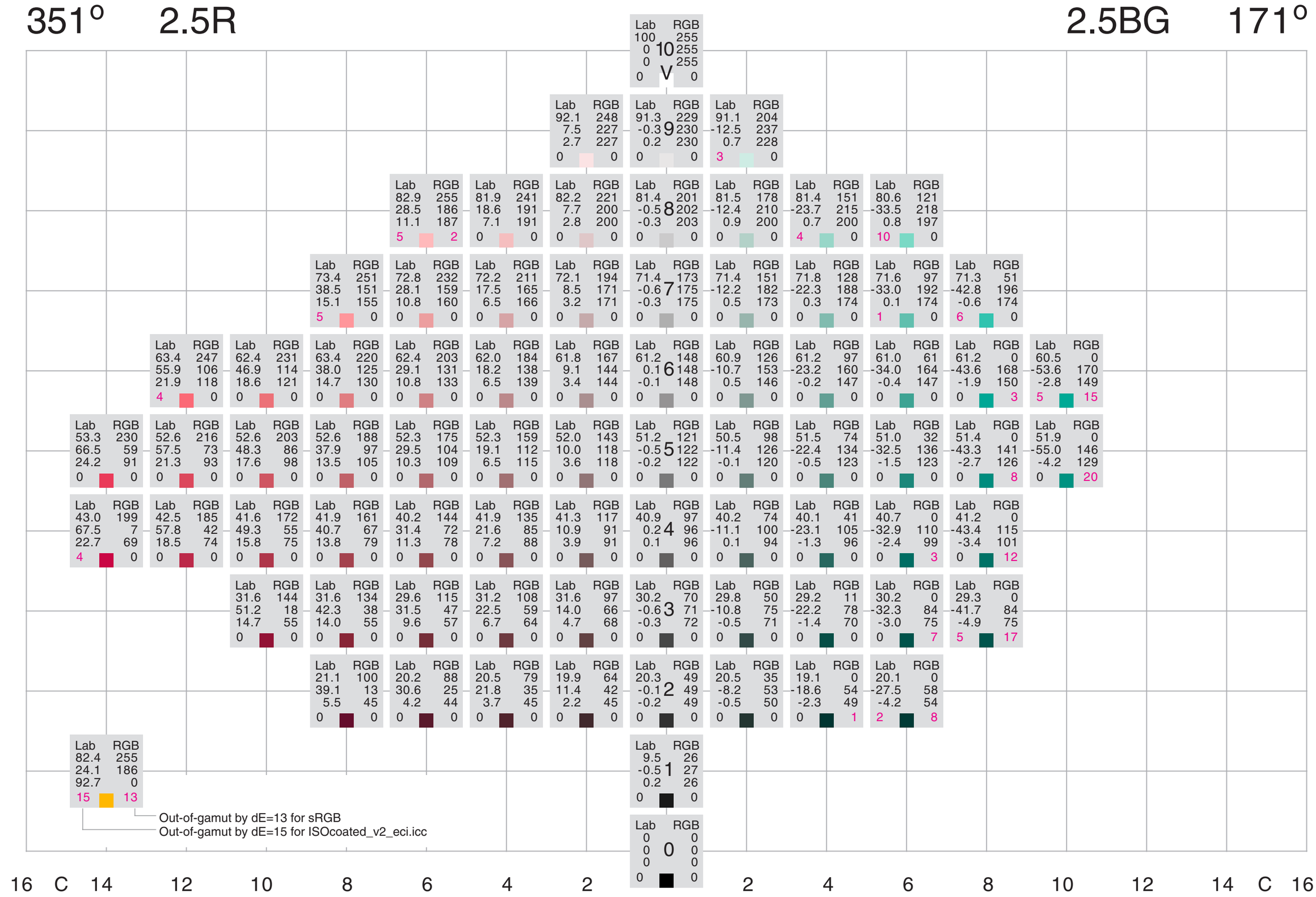
Legend sample: Lab 82.4 / 24.1 / 92.7 — RGB 255 / 186 / 0 — 15 — 13

Out-of-gamut by dE=13 for sRGB
Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc

16 C 14 12 10 8 6 4 2 | 2 4 6 8 10 12 14 C 16

CIELab Document / Rendering Intent Absolute Colorimetric / No Blackpoint Compensation / In Acrobat use Overprint Preview




351°
2.5R
2.5BG
171°
10 V
9
8
7
6
5
4
3
2
1
0
16 C 14 12 10 8 6 4 2 2 4 6 8 10 12 14 C 16
Out-of-gamut by dE=13 for sRGB
Out-of-gamut by dE=15 for ISOcoated_v2_eci.icc

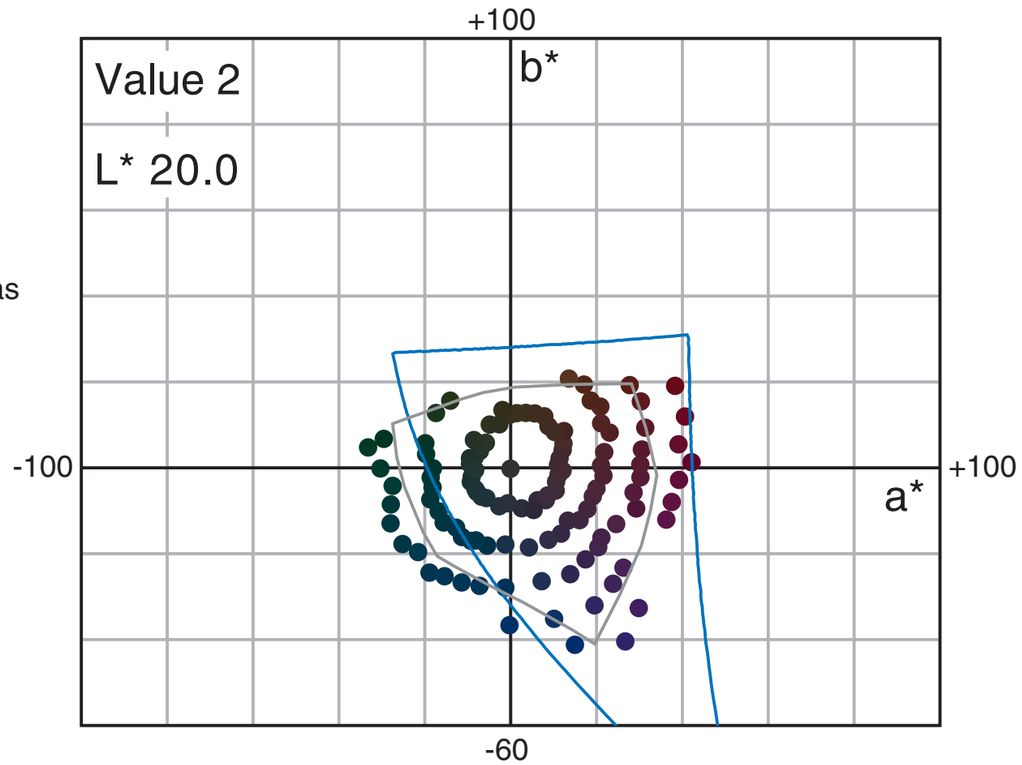
Planes of constant Value in CIELab

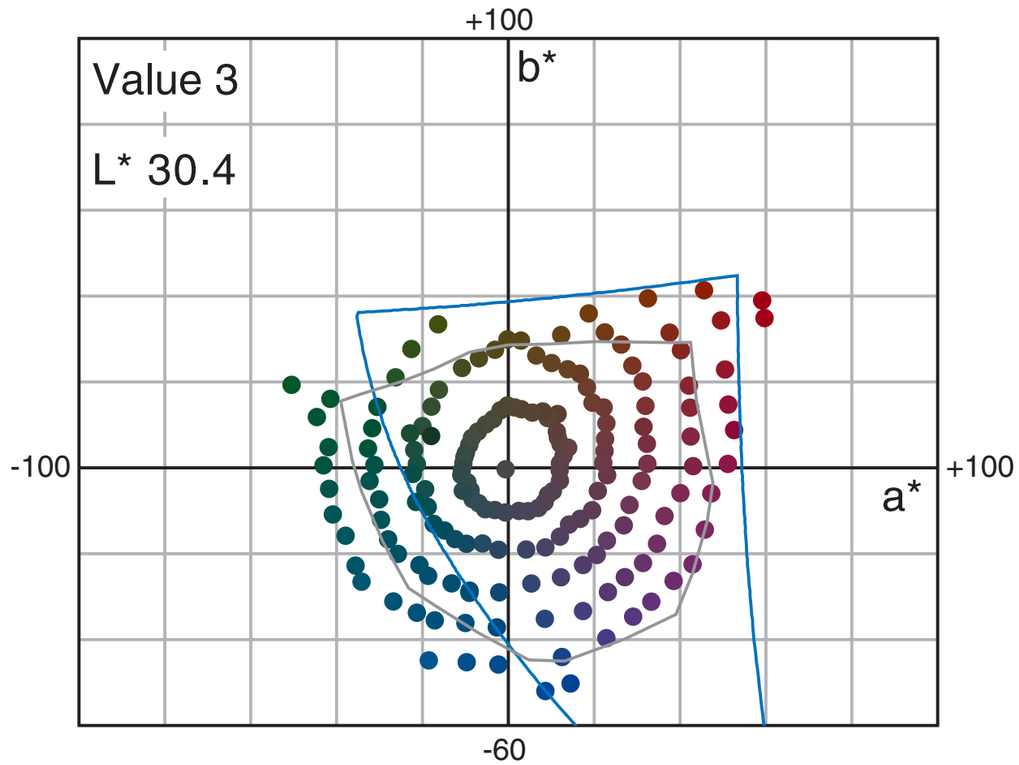
Gamut boundaries

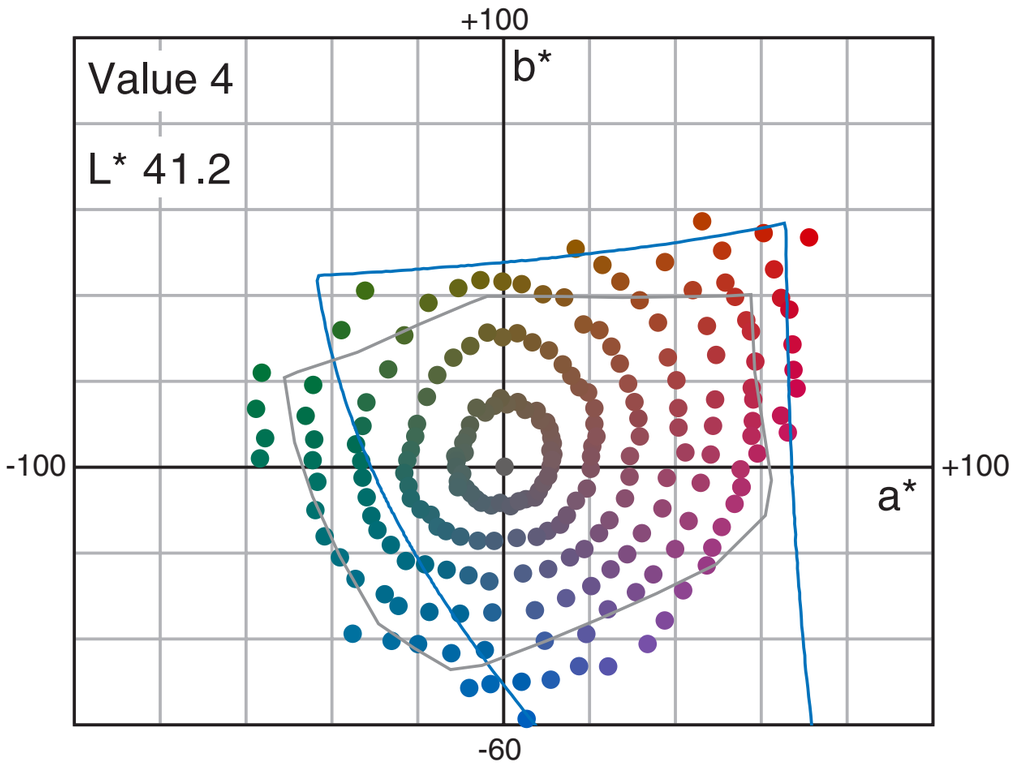
Blue
sRGB

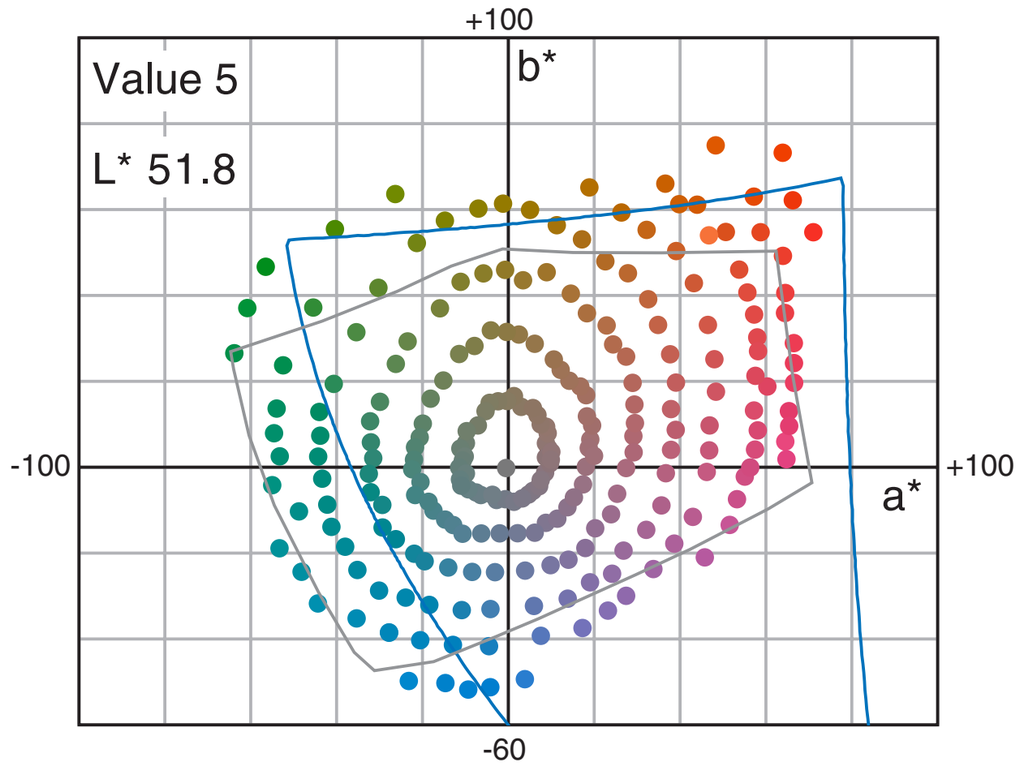
Gray
ISOCoated_v2_eci

L* was calculated as mean value









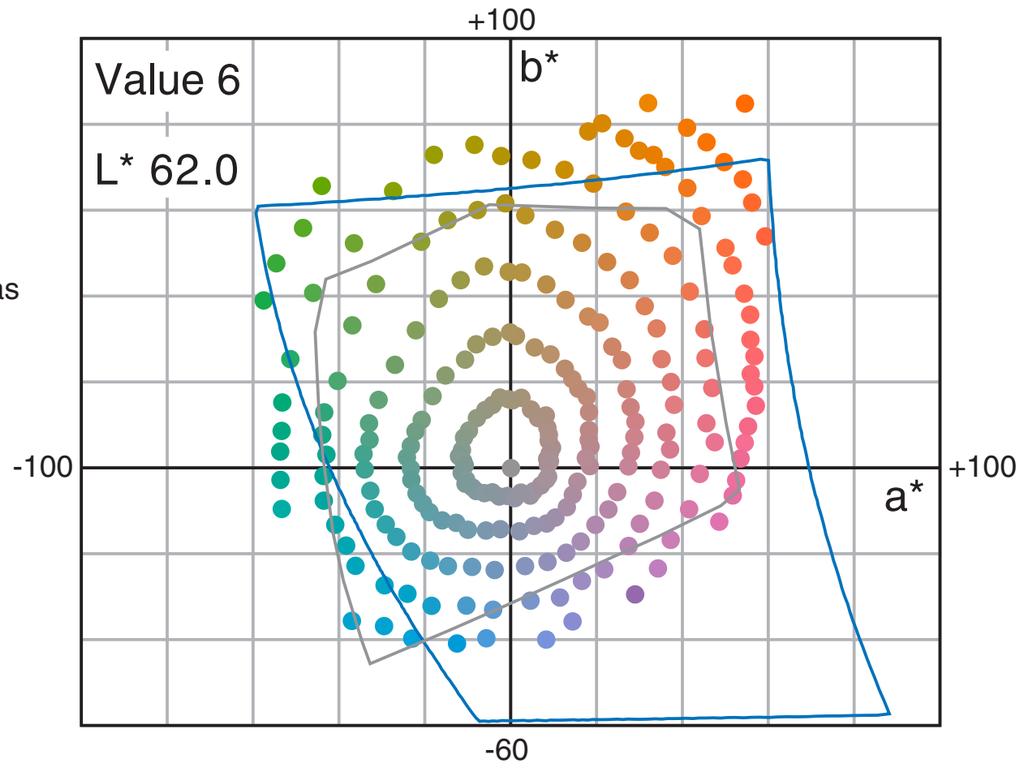
Planes of constant Value in CIELab

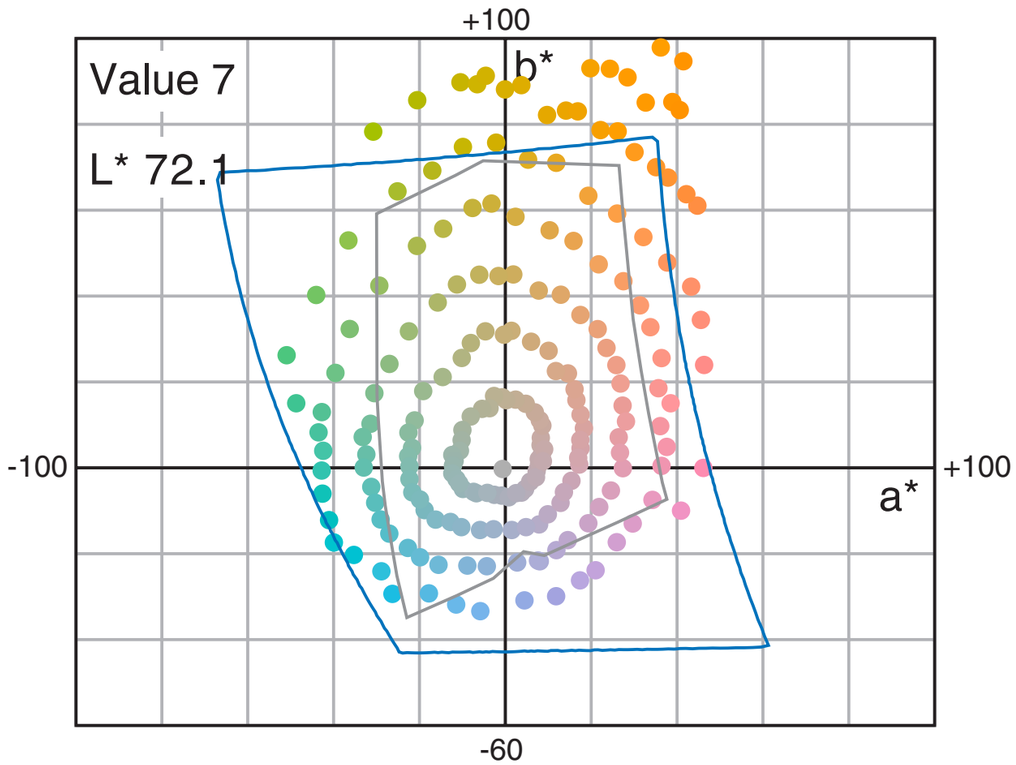
Gamut boundaries

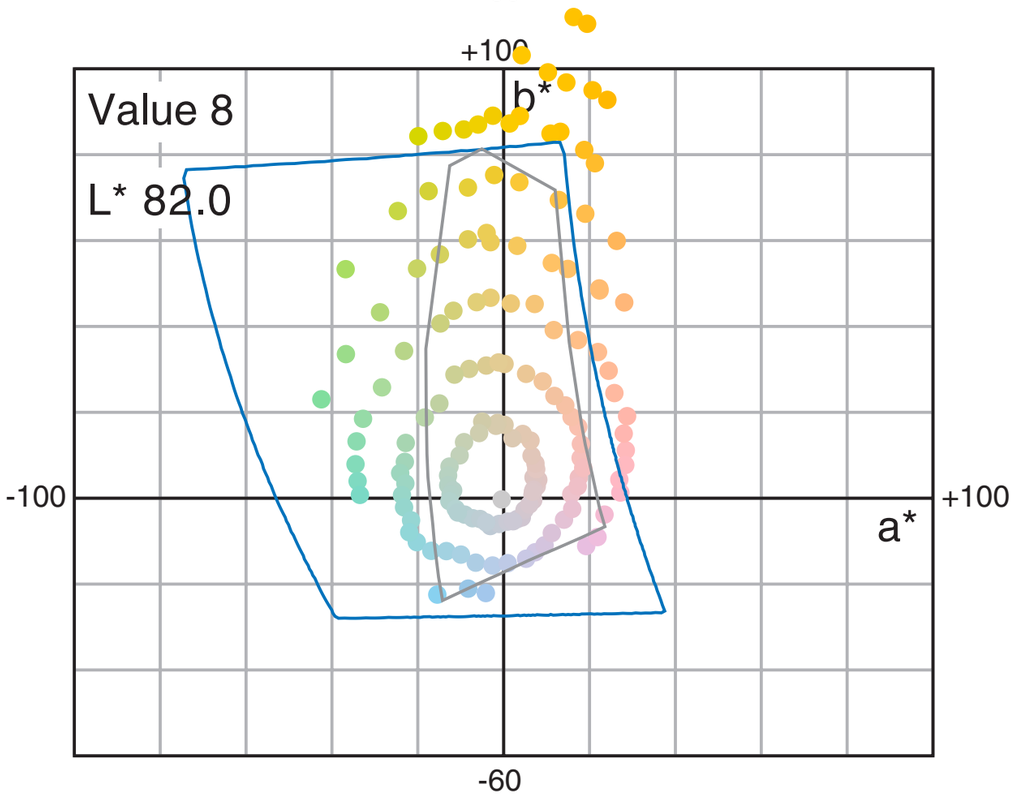
Blue
sRGB

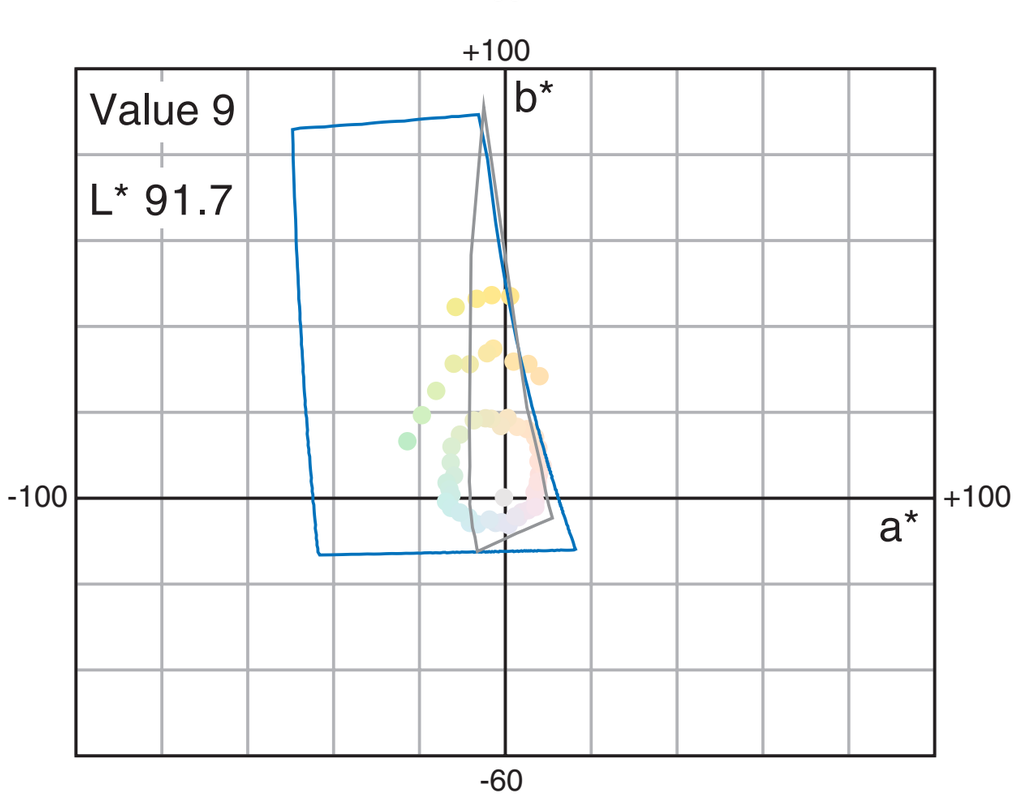
Gray
ISOCoated_v2_eci

L* was calculated as mean value









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Search by title or use this link
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This doc:
http://docs-hoffmann.de/munsell15052009-AbsCol-NoBPC.pdf
For Rendering Intent Relative Colorimetric / With Blackpoint Compensation use:
http://docs-hoffmann.de/munsell15052009