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TUB registration: 20130201-VE32/VE32L0NP.PDF /.PS
application for measurement of display output, no separation

TUB material: code=rha4ta

Ostwald optimal colours (o) of maximum (m) C _{AB} for D65, Y _w =100, Y _m =520_770, CIELAB data															%
i ₁ , λ ₁	i ₂ , λ ₂	L* ₁₀₀	a* ₁₀₀	b* ₁₀₀	C* _{ab}	a'	b'	h _{ab}	i _d , λ _d	i _c , λ _c	Code				%
0 405	32 561	80.85	-67.55	-32.54	74.98	0.1805	-0.1029	205.7	16 483	37 589	Cm	%			%
6 435	32 562	81.18	-81.89	-19.25	84.12	0.1732	-0.096	193.2	17 486	42 610		%			%
10 450	32 563	81.52	-109.06	11.43	109.66	0.1595	-0.0803	174.0	19 496	-1 496c		%			%
12 460	33 565	82.01	-120.74	33.26	125.23	0.1538	-0.0692	164.5	21 505	-1 505c		%			%
12 465	33 567	82.73	-118.76	34.5	123.67	0.1552	-0.0687	163.8	21 506	-1 506c		%			%
14 470	33 569	83.3	-123.47	57.53	136.22	0.1532	-0.0572	155.0	24 520	-1 520c		%			%
15 475	34 573	84.63	-118.73	70.39	138.03	0.1564	-0.0512	149.3	25 528	-1 528c	Gm	%			%
16 480	36 580	86.98	-107.21	84.2	136.33	0.1633	-0.0452	141.8	27 537	-1 537c		%			%
17 485	39 595	91.12	-80.53	100.07	128.45	0.1778	-0.0394	128.8	29 548	-1 548c		%			%
18 490	-1 490c	97.55	-23.15	119.05	121.28	0.2052	-0.0337	101.0	33 565	11 459	max	%			%
19 495	-1 495c	96.94	-20.63	125.42	127.1	0.2062	-0.0306	99.3	33 566	12 462		%			%
20 500	-1 500c	96.17	-17.33	131.15	132.29	0.2076	-0.0277	97.5	33 567	12 464		%			%
22 510	-1 510c	94.0	-8.24	140.17	140.41	0.2116	-0.0224	93.3	33 569	13 469		%			%
23 520	-1 519c	92.57	-2.53	142.99	143.01	0.2142	-0.0202	91.0	34 570	14 471	Ym	%			%
25 530	-1 529c	88.94	10.79	144.39	144.79	0.2205	-0.0165	85.7	34 573	15 475		%			%
27 540	-1 539c	84.43	25.54	141.4	143.69	0.2281	-0.0134	79.7	35 577	15 478		%			%
28 545	-1 544c	81.91	33.05	138.34	142.24	0.2322	-0.0121	76.5	35 579	15 479		%			%
29 550	-1 549c	79.2	40.58	134.51	140.5	0.2367	-0.0111	73.2	36 582	16 480		%			%
30 555	-1 554c	76.32	47.96	130.1	138.66	0.2413	-0.0103	69.7	36 584	16 481		%			%
32 560	-1 560c	70.18	61.63	120.13	135.02	0.2511	-0.0093	62.8	37 589	16 483		%			%
380	770	100.0	0.0	0.0	0.0	0.2154	-0.0861	0.0				%			%

Ostwald optimal colours (o) of maximum (m) C _{AB} for D65, Y _w =100, Y _m =770_520, CIELAB complementary															%
i ₁ , λ ₁	i ₂ , λ ₂	L* ₁₀₀	a* ₁₀₀	b* ₁₀₀	C* _{ab}	a'	b'	h _{ab}	i _d , λ _d	i _c , λ _c	Code				%
32 561	0 405	70.73	60.88	110.08	125.79	0.2505	-0.022	61.0	37 589	16 483	Rm	%			%
32 562	6 435	70.32	70.58	34.83	78.71	0.2562	-0.0659	26.2	42 610	17 486		%			%
32 563	10 450	69.88	85.85	-12.65	86.78	0.2653	-0.0935	351.6	-1 496c	19 496		%			%
33 565	12 460	69.24	92.89	-29.55	97.48	0.2698	-0.1035	342.3	-1 505c	21 505		%			%
33 567	12 465	68.27	94.84	-31.22	99.85	0.2716	-0.1046	341.7	-1 506c	21 506		%			%
33 569	14 470	67.49	99.24	-42.98	108.15	0.2748	-0.1119	336.5	-1 520c	24 520		%			%
34 573	15 475	65.52	102.87	-49.85	114.31	0.2784	-0.1167	334.1	-1 528c	25 528	Mm	%			%
36 580	16 480	61.69	107.96	-59.02	123.05	0.2848	-0.1241	331.3	-1 537c	27 537		%			%
39 595	17 485	53.22	112.99	-75.47	135.88	0.297	-0.1406	326.2	-1 548c	29 548		%			%
-1 490c	18 490	29.91	89.01	-117.0	147.01	0.3124	-0.2136	307.2	11 459	33 565	min	%			%
-1 495c	19 495	33.36	74.42	-112.09	134.55	0.2908	-0.1997	303.5	12 462	33 566		%			%
-1 500c	20 500	37.09	58.44	-106.44	121.43	0.2704	-0.1864	298.7	12 464	33 567		%			%
-1 510c	22 510	45.26	23.9	-93.37	96.38	0.2349	-0.1623	284.3	13 469	33 569		%			%
-1 519c	23 520	49.52	6.76	-86.32	86.58	0.2205	-0.152	274.4	14 471	34 570	Bm	%			%
-1 529c	25 530	58.0	-23.98	-72.06	75.95	0.1992	-0.1348	251.5	15 475	34 573		%			%
-1 539c	27 540	65.83	-46.7	-58.75	75.05	0.1868	-0.122	231.5	15 478	35 577		%			%
-1 544c	28 545	69.38	-54.68	-52.68	75.93	0.1833	-0.117	223.9	15 479	35 579		%			%
-1 549c	29 550	72.72	-60.59	-46.95	76.65	0.1812	-0.1126	217.7	16 480	36 582		%			%
-1 554c	30 555	75.82	-64.5	-41.62	76.77	0.1803	-0.1088	212.8	16 481	36 584		%			%
-1 560c	32 560	81.29	-66.96	-32.22	74.32	0.181	-0.1027	205.6	16 483	37 589		%			%
380	770	100.0	0.0	0.0	0.0	0.2154	-0.0861	0.0				%			%

Ostwald optimal colours (o) of maximum (m) C _{AB} for D65, Y _w ,10=100, Y _m =520_770, CIELAB data															%
i ₁ , λ ₁	i ₂ , λ ₂	L* ₁₀₀	a* ₁₀₀	b* ₁₀₀	C* _{ab}	a'	b'	h _{ab}	i _d , λ _d	i _c , λ _c	Code				%
0 405	31 556	79.94	-66.31	-34.08	74.56	0.1807	-0.1034	207.2	15 476	37 585	Cm	%			%
6 435	31 557	80.42	-82.6	-17.8	84.5	0.1724	-0.0949	192.1	16 480	44 621		%			%
10 450	31 559	80.48	-108.29	14.97	109.32	0.1591	-0.078	172.1	18 491	-1 491c		%			%
11 460	32 562	81.44	-111.37	27.39	114.69	0.1581	-0.0717	166.1	19 498	-1 498c		%			%
12 465	33 565	82.34	-112.77	40.26	119.75	0.1579	-0.0653	160.3	21 506	-1 506c		%			%
14 470	34 570	83.48	-109.79	65.41	127.8	0.1601	-0.053	149.2	24 522	-1 522c		%			%
15 475	35 579	86.33	-94.64	81.3	124.77	0.169	-0.0462	139.3	26 533	-1 533c	Gm	%			%
16 480	41 606	92.55	-53.33	102.14	115.22	0.1907	-0.0389	117.5	30 550	-1 550c		%			%
16 485	-1 484c	96.94	-20.21	109.71	111.55	0.2063	-0.0374	100.4	32 560	10 454		%			%
18 490	-1 490c	95.61	-14.83	124.45	125.34	0.2086	-0.0302	96.7	32 562	11 459	max	%			%
19 495	-1 495c	94.76	-11.22	130.34	130.82	0.2101	-0.0271	94.9	32 563	12 461		%			%
19 500	-1 499c	94.76	-11.22	130.34	130.82	0.2101	-0.0271	94.9	32 563	12 461		%			%
22 510	-1 510c	91.28	2.92	142.55	142.58	0.2166	-0.0195	88.8	33 567	13 466		%			%
23 520	-1 519c	89.77	8.54	144.07	144.32	0.2192	-0.0174	86.6	33 568	13 468	Ym	%			%
26 530	-1 530c	84.06	27.32	142.33	144.93	0.2288	-0.0115	79.1	34 573	14 472		%			%
27 540	-1 539c	81.79	33.86	139.63	143.68	0.2325	-0.0095	76.3	35 576	14 473		%			%
28 545	-1 544c	79.35	40.37	136.19	142.05	0.2363	-0.0075	73.4	35 578	14 474		%			%
29 550	-1 549c	76.75	46.79	132.12	140.16	0.2404	-0.0054	70.4	36 580	15 475		%			%
31 555	-1 555c	71.13	58.79	122.64	136.0	0.2489	0.0	64.3	37 586	15 476		%			%
32 560	10 451	69.5	84.42	-15.9	85.9	0.2645	-0.095	349.3	-1 492c	18 492		%			%
380	770	100.0	0.0	0.0	0.0	0.2152	-0.0857	0.0				%			%

Ostwald optimal colours (o) of maximum (m) C _{AB} for D65, Y _{w,10} =100, Y _m =770_520, CIELAB complementary															%
i ₁ , λ ₁	i ₂ , λ ₂	L* ₁₀₀	a* ₁₀₀	b* ₁₀₀	C* _{ab}	a'	b'	h _{ab}	i _d , λ _d	i _c , λ _c	Code				%
31 556	0 405	71.84	57.81	111.35	125.47	0.2481	-0.0221	62.5	37 585	15 476	Rm				%
31 557	6 435	71.27	68.77	29.56	74.85	0.2546	-0.0689	23.2	44 621	16 480					%
31 559	10 450	71.19	81.9	-15.15	83.29	0.2621	-0.0944	349.5	-1 491c	18 491					%
32 562	11 460	69.98	86.63	-25.22	90.23	0.2655	-0.1003	343.7	-1 498c	19 498					%
33 565	12 465	68.81	90.56	-33.85	96.68	0.2685	-0.1056	339.5	-1 506c	21 506					%
34 570	14 470	67.22	93.6	-46.01	104.3	0.2714	-0.1132	333.8	-1 522c	24 522					%
35 579	15 475	62.81	97.27	-56.68	112.58	0.2768	-0.1215	329.7	-1 533c	26 533	Mm				%
41 606	16 480	49.57	94.8	-81.7	125.15	0.2874	-0.1477	319.2	-1 550c	30 550					%
-1 484c	16 485	33.36	73.3	-109.63	131.88	0.2894	-0.1962	303.7	10 454	32 560					%
-1 490c	18 490	39.48	47.93	-101.69	112.42	0.2584	-0.1769	295.2	11 459	32 562	min				%
-1 495c	19 495	42.69	34.2	-96.93	102.79	0.2443	-0.1679	289.4	12 461	32 563					%
-1 499c	19 500	42.69	34.2	-96.93	102.79	0.2443	-0.1679	289.4	12 461	32 563					%
-1 510c	22 510	52.84	-7.33	-80.67	81.0	0.2099	-0.144	264.8	13 466	33 567					%
-1 519c	23 520	56.28	-19.89	-74.95	77.55	0.2014	-0.1373	255.1	13 468	33 568	Bm				%
-1 530c	26 530	66.39	-49.47	-57.84	76.11	0.1852	-0.1206	229.4	14 472	34 573					%
-1 539c	27 540	69.54	-55.96	-52.46	76.71	0.1825	-0.1162	223.1	14 473	35 576					%
-1 544c	28 545	72.53	-60.74	-47.32	77.0	0.1809	-0.1123	217.9	14 474	35 578					%
-1 549c	29 550	75.38	-63.87	-42.44	76.68	0.1803	-0.1088	213.6	15 475	36 580					%
-1 555c	31 555	80.53	-65.58	-33.56	73.67	0.1813	-0.103	207.1	15 476	37 586					%
10 451	32 560	81.82	-103.91	14.76	104.95	0.1621	-0.0782	171.9	18 492	-1 492c					%
380	770	100.0	0.0	0.0	0.0	0.2152	-0.0857	0.0							%

maximum (m) C_{AB} for D65, $Y_w=100$, $Y_m=520_770$, CIELAB data

i ₁	λ ₁	i ₂	λ ₂	L* ₁₀₀	a* ₁₀₀	b* ₁₀₀	C* _{ab}	a'	b'	h _{ab}	i _d	λ _d	i _c	λ _c	Code	%
0	405	32	561	80.85	-67.55	-32.54	74.98	0.1805	-0.1029	205.7	16	483	37	589	Cm	%
6	435	32	562	81.18	-81.89	-19.25	84.12	0.1732	-0.096	193.2	17	486	42	610		%
10	450	32	563	81.52	-109.06	11.43	109.66	0.1595	-0.0803	174.0	19	496	-1	496c		%
12	460	33	565	82.01	-120.74	33.26	125.23	0.1538	-0.0692	164.5	21	505	-1	505c		%
12	465	33	567	82.73	-118.76	34.5	123.67	0.1552	-0.0687	163.8	21	506	-1	506c		%
14	470	33	569	83.3	-123.47	57.53	136.22	0.1532	-0.0572	155.0	24	520	-1	520c		%
15	475	34	573	84.63	-118.73	70.39	138.03	0.1564	-0.0512	149.3	25	528	-1	528c	Gm	%
16	480	36	580	86.98	-107.21	84.2	136.33	0.1633	-0.0452	141.8	27	537	-1	537c		%
17	485	39	595	91.12	-80.53	100.07	128.45	0.1778	-0.0394	128.8	29	548	-1	548c		%
18	490	-1	490c	97.55	-23.15	119.05	121.28	0.2052	-0.0337	101.0	33	565	11	459	max	%
19	495	-1	495c	96.94	-20.63	125.42	127.1	0.2062	-0.0306	99.3	33	566	12	462		%
20	500	-1	500c	96.17	-17.33	131.15	132.29	0.2076	-0.0277	97.5	33	567	12	464		%
22	510	-1	510c	94.0	-8.24	140.17	140.41	0.2116	-0.0224	93.3	33	569	13	469		%
23	520	-1	519c	92.57	-2.53	142.99	143.01	0.2142	-0.0202	91.0	34	570	14	471	Ym	%
25	530	-1	529c	88.94	10.79	144.39	144.79	0.2205	-0.0165	85.7	34	573	15	475		%
27	540	-1	539c	84.43	25.54	141.4	143.69	0.2281	-0.0134	79.7	35	577	15	478		%
28	545	-1	544c	81.91	33.05	138.34	142.24	0.2322	-0.0121	76.5	35	579	15	479		%
29	550	-1	549c	79.2	40.58	134.51	140.5	0.2367	-0.0111	73.2	36	582	16	480		%
30	555	-1	554c	76.32	47.96	130.1	138.66	0.2413	-0.0103	69.7	36	584	16	481		%
32	560	-1	560c	70.18	61.63	120.13	135.02	0.2511	-0.0093	62.8	37	589	16	483		%
	380	770	100.0	0.0	0.0	0.0	0.0	0.2154	-0.0861	0.0						%

$rgb^*_{e,ab}$ and CIE data of a elementary hue circle according to CIE R1-47 for *Ostwald* colours for CIE illuminant D65
 $X_{Yz}, abc_{AB}, ABC_{AB}, LabC^*_{ab}, h_{ab}$ data for relative spacing of elementary hue h_{ab} of *CIELAB* for CIE 2 degree observer
 Elementary hue circle with 4 intended elementary hue angles: $h_{ab} = 25.6, 92.4, 162.1, 271.5$ of *CIELAB*, and 16 intended hue angles:
 25.6 42.3 59.0 75.7 92.4 109.8 127.2 144.7 162.1 189.4 216.8 244.1 271.5 300.0 328.5 357.1

CIELAB data of CIE test colours 9 (R): 40.0 58.9 28.3, 10 (Y): 81.3 -3.0 71.8, 11 (G): 52.2 -42.3 13.6, 12 (B): 30.5 1.2 -46.3

no_{ab}	Y	x	y	a	b	C_{AB}	A	B	C_{AB}	h_{AB}	L^*	a^*	b^*	C^*_{ab}	h_{ab}	$rgb^*_{e,ab}$	$Code_{ab}$
000	41.2	0.516	0.321	1.603	-0.201	0.693	26.9	9.6	28.5	19.7	70.3	70.8	33.7	78.4	25.4	1.00 0.00 0.00	% R00Y
001	41.5	0.571	0.371	1.539	-0.06	0.698	24.5	15.5	29.0	32.4	70.5	65.1	71.7	96.9	47.7	1.00 0.25 0.00	% R25Y
002	41.7	0.593	0.396	1.497	-0.01	0.693	22.8	17.7	28.9	37.8	70.7	61.2	106.6	122.9	60.1	1.00 0.50 0.00	% R50Y
003	58.9	0.546	0.452	1.208	-0.001	0.505	15.2	25.5	29.7	59.2	81.2	34.9	137.4	141.8	75.7	1.00 0.75 0.00	% R75Y
004	84.1	0.473	0.517	0.913	-0.006	0.43	-3.0	36.0	36.2	94.8	93.5	-6.1	141.7	141.9	92.4	1.00 1.00 0.00	% Y00G
005	89.6	0.406	0.552	0.735	-0.03	0.459	-19.2	36.3	41.1	117.9	95.8	-39.5	113.6	120.3	109.1	0.75 1.00 0.00	% Y25G
006	79.6	0.332	0.695	0.549	-0.04	0.562	-31.9	31.4	44.7	135.4	91.5	-77.3	101.1	127.3	127.3	0.50 1.00 0.00	% Y50G
007	67.8	0.247	0.635	0.589	-0.073	0.667	-38.0	24.5	45.2	147.1	85.9	-112.9	78.1	137.6	145.1	0.25 1.00 0.00	% Y75G
008	61.8	0.189	0.536	0.353	-0.203	0.64	-36.9	14.3	39.6	158.7	82.8	-119.6	38.1	125.5	162.3	0.00 1.00 0.00	% G00B
009	58.9	0.165	0.35	0.472	-0.552	0.491	-28.1	-6	28.9	193.7	81.2	-87.0	-13.8	88.1	199.0	0.00 1.00 0.50	% G25B
010	45.5	0.142	0.253	0.663	-0.955	0.647	-17.6	-23.6	29.5	233.3	73.2	-61.4	-64.6	76.8	216.8	0.00 1.00 1.00	% G50B
011	29.4	0.128	0.186	0.69	-1.474	0.171	-7.6	-30.5	31.5	259.9	61.1	-33.6	-66.7	74.7	243.2	0.00 0.50 1.00	% G75B
012	18.8	0.127	0.129	0.981	-2.291	1.856	0.5	-34.9	34.9	278.9	50.4	-3.1	-84.7	84.7	272.1	0.00 0.00 1.00	% B00R
013	8.9	0.136	0.067	2.02	-4.722	4.418	9.5	-38.2	39.9	324.0	35.8	63.8	-108.4	125.8	300.5	0.50 0.00 1.00	% B25R
014	26.3	0.329	0.14	2.344	-1.51	1.76	36.7	-28.3	46.3	282.3	58.3	112.5	-65.8	139.8	329.6	1.00 0.00 1.00	% B50R
015	40.6	0.437	0.249	1.75	-0.5	0.802	32.5	-2.6	32.6	355.3	69.9	83.6	-7.0	83.9	355.1	1.00 0.00 0.50	% B75R
016	41.2	0.516	0.321	1.603	-0.201	0.693	26.9	9.6	28.5	19.7	70.3	70.8	33.7	78.4	25.4	1.00 0.00 0.00	% R00Y

CIEXYZ data of CIE test colours 9 (R): 20.6 11.2 4.3, 10 (Y): 54.8 59.0 12.0, 11 (G): 12.1 20.3 15.3, 12 (B): 6.2 6.4 27.6

5 step equidistant grey scale with intended lightness: $L^* = 0.0, 25.0, 50.0, 75.0, 100.0$

000	0.0	0.0	0.0	0.0	0.0	1.045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	% N00W
001	4.4	0.312	0.329	0.95	-0.435	0.01	0.0	0.0	0.0	77.1	25.0	0.0	0.0	0.0	0.0	0.25	0.25	0.25	% N025W
002	18.4	0.312	0.329	0.95	-0.435	0.01	0.0	0.0	0.0	57.4	50.0	0.0	0.0	0.0	0.0	0.50	0.50	0.50	% N050W
003	48.2	0.312	0.329	0.95	-0.435	0.01	0.0	0.0	0.0	22.9	75.0	0.0	0.0	0.0	0.0	0.75	0.75	0.75	% N075W
004	100.0	0.312	0.329	0.95	-0.435	0.01	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	1.00	1.00	1.00	% N100W

1-000010-LO

VE320-7M

TUB-test chart VE32; CIE data for 16 Ostwald colours
CIELAB, *Yxy*, *YABCABh*, *LabCabh* data, D65, 2 and 10

input: w/rgb/cmyk ->
ree observer

~~1-000010-F0~~

1-001010-L

VE321-7N

urs input: *w/rgb/cmyk* ->
l 10 degree observer

V

TUB registration: 20130201-VE32/VE32L0NP.PDF /.PS
application for measurement of display output, no separation

TUB material: code=rha4ta