

Colour-difference data sets and performance (STRESS values)

Data set	Calculations with data for grey surrounds (D65, P40) and 0.1 < Y < 190				Colour difference formula				
	Difference ΔE^*	CIE LAB	CIE DE2000	CIE94	CMC	LABJND			
all ΔE^*	Pairs	Min	Mean	Max	CIE LAB	CIE DE2000	CIE94	CMC	LABJND
Witt	418	0.11	1.86	10.62	51.7	33.7	31.7	39.6	55.2
RIT-DuPont	312	0.77	1.43	4.4	33.4	20.5	20.3	31.8	38.3
Leeds	307	0.39	1.63	4.73	40.1	21.5	30.5	28.4	45.1
BFD.01	2776	0.03	3.0	18.18	42.4	31.1	33.8	32.8	53.0
Richter	330	0.05	0.9	4.85	61.0	52.6	47.8	50.1	30.2
Kittelmann	392	0.09	0.41	2.09	57.2	50.4	49.9	57.5	48.7
$\Delta E^*_{CIE LAB < 2}$	Pairs	Min	Mean	Max	CIE LAB	CIE DE2000	CIE94	CMC	LABJND
Witt	274	0.11	1.07	1.99	45.4	30.0	30.5	36.2	57.2
RIT-DuPont	280	0.61	0.99	1.96	21.7	19.1	19.1	32.8	37.0
Leeds	232	0.39	1.34	1.99	34.0	18.7	29.8	28.8	46.5
BFD.01	1152	0.03	1.06	1.99	38.0	30.2	33.9	35.9	56.8
Richter	305	0.05	0.74	1.89	49.2	54.3	49.0	51.4	30.2
Kittelmann	391	0.09	0.41	1.76	55.9	50.5	50.0	57.6	48.7
$\Delta E^*_{CIE DE2000 < 2}$	Pairs	Min	Mean	Max	CIE LAB	CIE DE2000	CIE94	CMC	LABJND
Witt	382	0.11	1.66	5.72	50.8	33.8	32.2	40.0	54.1
RIT-DuPont	312	0.77	1.43	4.4	33.4	20.5	20.3	31.8	38.3
Leeds	300	0.39	1.58	3.67	39.3	19.6	30.7	27.9	45.7
BFD.01	1823	0.03	1.81	7.84	43.1	28.1	31.5	32.3	52.1
Richter	330	0.05	0.9	4.85	61.0	52.6	47.8	50.1	30.2
Kittelmann	392	0.09	0.41	2.09	57.2	50.4	49.9	57.5	48.7

Colour-difference data sets and performance (STRESS values)

Data set	Calculations with data for grey surround near D65 and 1.2 < Y < 90				Colour difference formula				
	Difference ΔE^*_{DE2000}	CIE LAB	CIE DE2000	CIE94	CMC	LABJND			
all ΔE^*	Pairs	Min	Mean	Max	CIE LAB <td>CIE DE2000 <td>CIE94 <td>CMC <td>LABJND</td> </td></td></td>	CIE DE2000 <td>CIE94 <td>CMC <td>LABJND</td> </td></td>	CIE94 <td>CMC <td>LABJND</td> </td>	CMC <td>LABJND</td>	LABJND
Witt	418	0.08	1.09	3.75	51.7	33.7	31.7	39.6	55.2
RIT-DuPont	312	0.61	0.99	1.96	33.4	20.5	20.3	31.8	38.3
Leeds	307	0.3	1.12	2.73	40.1	21.5	30.5	28.4	45.1
BFD.01	2776	0.02	11.56	1.79	42.4	31.1	33.8	32.8	53.0
Richter	258	0.05	0.56	1.6	60.9	51.0	45.4	47.9	30.9
Kittelmann	392	0.1	0.31	1.55	57.2	50.4	49.9	57.5	48.7
$\Delta E^*_{CIE LAB < 2}$	Pairs	Min	Mean	Max	CIE LAB <td>CIE DE2000 <td>CIE94 <td>CMC <td>LABJND</td> </td></td></td>	CIE DE2000 <td>CIE94 <td>CMC <td>LABJND</td> </td></td>	CIE94 <td>CMC <td>LABJND</td> </td>	CMC <td>LABJND</td>	LABJND
Witt	274	0.08	0.8	2.82	45.4	30.0	30.5	36.2	57.2
RIT-DuPont	280	0.61	0.97	1.96	21.7	19.1	19.1	32.8	37.0
Leeds	232	0.3	1.04	1.8	34.0	18.7	29.8	28.8	46.5
BFD.01	1152	0.02	0.79	2.58	38.0	30.2	33.9	35.9	56.8
Richter	233	0.05	0.53	1.6	48.3	53.1	45.8	48.7	31.3
Kittelmann	391	0.1	0.31	1.55	55.9	50.5	50.0	57.6	48.7
$\Delta E^*_{CIE DE2000 < 2}$	Pairs	Min	Mean	Max	CIE LAB <td>CIE DE2000 <td>CIE94 <td>CMC <td>LABJND</td> </td></td></td>	CIE DE2000 <td>CIE94 <td>CMC <td>LABJND</td> </td></td>	CIE94 <td>CMC <td>LABJND</td> </td>	CMC <td>LABJND</td>	LABJND
Witt	382	0.08	0.96	1.99	50.8	33.8	32.2	40.0	54.1
RIT-DuPont	312	0.61	0.99	1.96	33.4	20.5	20.3	31.8	38.3
Leeds	300	0.3	1.09	1.99	39.3	19.6	30.7	27.9	45.7
BFD.01	1823	0.02	1.04	1.99	43.1	28.1	31.5	32.3	52.1
Richter	258	0.05	0.56	1.6	60.9	51.0	45.4	47.9	30.9
Kittelmann	392	0.1	0.31	1.55	57.2	50.4	49.9	57.5	48.7

TUB-test chart UE69; Colour difference formulae
 Colour difference data sets and formula performance

Colour differences: just noticeable colour thresholds, see Richter (1985/87)

Colour series number	Colour difference ISO 11644-4 (CIE LAB)				Colour difference LABJND 1985				Colour difference LABJND 1987			
	ΔL^*	Δa^*	Δb^*	ΔE^*_{ab}	ΔT^*_L	ΔT^*_a	ΔT^*_b	ΔE^*_{ab}	ΔT^*_L	ΔT^*_a	ΔT^*_b	ΔE^*_{ab}
WPN_01	0.28				1.0				0.92			
WPN_02	0.19				0.91				0.85			
WPN_03	0.14				0.83				0.79			
WPN_04	0.12				0.83				0.8			
WPN_05	0.15				1.14				1.12			
WPN_06	0.15				1.13				1.26			
WPN_07	0.19				1.41				1.11			
WPN_08	0.21				1.23				0.95			
WPN_09	0.18				0.97				0.94			
WPN_10	0.18				1.07				0.88			
WPN_11	0.18				1.11				0.98			
TDM_01	0.1				1.01				1.21			
TDM_02	0.09				0.97				1.13			
TDM_03	0.09				0.93				1.12			
TDM_04	0.1				1.04				1.15			
TDM_05	0.11				1.16				1.35			
BDY_01	0.09				0.89				1.21			
BDY_02	0.07				0.77				1.13			
BDY_03	0.08				0.8				1.12			
BDY_04	0.07				0.85				1.15			
BDY_05	0.07				0.72				1.35			

Colour differences: just noticeable colour thresholds, see Richter (1985/87)

Colour series number	Colour difference ISO 11644-4 (CIE LAB)				Colour difference LABJND 1985				Colour difference LABJND 1987			
	ΔL^*	Δa^*	Δb^*	ΔE^*_{ab}	ΔT^*_L	ΔT^*_a	ΔT^*_b	ΔE^*_{ab}	ΔT^*_L	ΔT^*_a	ΔT^*_b	ΔE^*_{ab}
WPN_01	0.28	1.12	1.74	0.28	0.9978	0.7992	0.1657		0.362	0.1141	0.0769	
WPN_02	0.19	0.89	1.15	0.19	0.9148	1.5233	1.7302		0.3348	0.1848	0.0717	
WPN_03	0.14	0.75	1.01	0.14	0.8313	1.3836	1.6628		0.3091	0.1936	0.0784	
WPN_04	0.12	0.71	0.94	0.12	0.834	0.8104	0.856		0.0	0.0003	0.0001	
WPN_05	0.15	0.62	1.07	0.15	1.1379	0.0281	0.3006		0.4276	0.2118	0.1011	
WPN_06	0.14	0.65	1.3	0.14	1.1326	0.5935	1.268		0.4169	0.2269	0.118	
WPN_07	0.19	0.67	0.96	0.19	1.4129	1.598	2.2164		0.5131	0.2251	0.1011	
WPN_08	0.21	0.83	1.12	0.21	1.2282	1.2935	1.9264		0.4327	0.2288	0.0988	
WPN_09	0.18	0.81	0.56	0.22	0.9683	0.9737	1.3324		0.3352	0.2162	0.0956	
WPN_10	0.18	0.7	0.41	0.36	1.0672	0.7837	0.8257		0.3654	0.0951	0.0357	
WPN_11	0.18	0.59	0.37	0.52	1.1119	0.5649	0.6309		0.3788	0.037	0.0147	
TDM_01	0.09	3.6	0.51	0.09	1.0096	44.9668	424.6188		0.2559	0.248	0.1042	
TDM_02	0.09	1.69	0.45	0.09	0.969	24.3977	111.5495		0.2458	0.2757	0.0869	
TDM_03	0.08	0.79	0.48	0.08	0.9288	1.2809	1.411		0.2358	0.0003	0.0001	
TDM_04	0.1	1.1	0.62	0.1	1.038	58.011	827.9982		0.2636	0.184	0.1253	
TDM_05	0.11	1.1	0.73	0.11	1.155	65.777	338.672		0.2935	0.1709	0.1514	
BDY_01	0.08	0.94	0.35	0.08	0.8935	5.7657	45.6462		0.227	0.2477	0.0759	
BDY_02	0.07	0.8	0.42	0.07	0.7673	2.7924	22.4532		0.195	0.2242	0.083	
BDY_03	0.07	0.7	0.45	0.07	0.7994	0.9407	0.173		0.203	0.1099	0.08	
BDY_04	0.07	0.86	1.22	0.07	0.7503	5.0373	41.7202		0.0634	0.2339	0.0767	
BDY_05	0.07	0.93	5.83	0.07	0.7244	6.6512	52.8395		0.1839	0.2465	0.0841	

input: w/r/g/b/cmyk -> w/r/g/b/cmyk
 output: no change

see similar files: http://130.149.60.45/~farbmetrik/UE69/UE69L0N1.TXT /PS; start output
 technical information: http://www.ps.bam.de or http://130.149.60.45/~farbmetrik

TUB registration: 20130201-UE69/UE69L0N1.TXT /PS
 application for measurement of display output

TUB material: code=thata