Accelerated Weathering Laboratory

AWL Ltd.
Berkeley House, Hunts Rise
South Marston Park, Swindon SN3 4TG, UK
T: 01793 834211 E: info@awlltd.co.uk
W: www.awlltd.co.uk

Certificate of Conformity for products tested in accordance with the requirements of:

BS AU 145e:2018

Certificate issued to:

Danz Benz Ltd, 11 Invicta Business Park, London Road, Wrotham, Kent, TN15 7RJ

danz benz
the benz or nothing

Commercial traceability : AWL 1871
Test report traceability : TUN-30303 / TR0812
Certificate No : COC-0075

This certificate confirms that full-construction number plate samples manufactured by the above-named company have been independently tested by UKAS accredited laboratory 7517 in accordance with the relevant clauses of BSI standard: ***BSAU145e:2018 – Specification for retroflecting number plates****. This certificate also confirms the sample construction codes shown below have met or exceeded the acceptance criteria within the standard.*

DB01 – Front White Reflective Pressed Metal Number Plate
DB02 – Rear Yellow Reflective Pressed Metal Number Plate

The number plate constructions shown above are representative only of the samples provided for testing and do not refer to quality of product produced by the above-named company during subsequent production runs. It is strongly advised that batch sample testing is carried out on at least an annual basis and always after any manufacturing, raw material supplier, material formulation, production process changes or any other change which may affect the quality and conformance of the product to this standard.

Date of Issue: 01.03.2022 **Authorised by: Paul Edwards** **Position: Technical Director**

LUX-TSI Ltd, Unit 1B, Pencoed Technology Park,
Pencoed, Bridgend, CF35 5AQ, UK
Website: www.lux-tsi.com
E-mail: info@lux-tsi.com

Test Report Number: TUN-30303

Report Number	TUN-30303
Customer	Danz Benz Ltd
Contact	Danny Lucas
Product Type	Numberplate
Test Purpose	Testing in accordance with BS AU145E:2018
Quote Reference	Q-301690
Works Order Number	WO-30303
Test Standards	BS AU145E:2018 Various Clauses
Lab Location Reference	LUX-TSI
Tested by	Ben Low
Date of Test	24/12/2021 – 21/02/2022
Analysed by	Dr Gareth Jones
Number of products tested	12

Address: LUX-TSI Ltd.,
Unit 1B Pencoed Technology Park,
Pencoed, Bridgend,
CF35 5AQ
Telephone: +44 (0) 1656 864618
Authorised by: Gareth Jones
E-mail: Gjones@lux-tsi.com
Signed:

Pictures held on file

Date: 22/02/2022

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LUX-TSI Ltd, Unit 1B, Pencoed Technology Park,
Pencoed, Bridgend, CF35 5AQ, UK
Website: www.lux-tsi.com
E-mail: info@lux-tsi.com

Test Method

Tests were carried out in accordance with BS AU145e:2018 Clauses 5.3, 11b, 11e, 13, 15.3, 15.4.1, 15.4.3, 15.5.2a, 15.5.2b. All environmental conditioning of the plates tested was subcontracted out to AWL Ltd and was assumed to have been carried out in compliance with the relevant clauses within BS AU 145E:2018.

Calibration

Konica Minolta T-10 illuminance meter calibrated to UKAS standard

Hunterlab Colourflex Ez calibrated traceable back to NPL reference standard

LMT L1000 photocurrent meter referenced to the above

Details of Product

Product name Number Plates

Manufacturer Danz Benz Ltd

Result

The following number plates failed to meet the requirements of the above-named testing.

Clause	Non-compliant plate references
5.3	None
11b	None
11e	None
13	None
15.3	None
15.4.1	None
15.4.3	None
15.5.2a	None
15.5.2b	None
15.5.2c	None

Clause 5 Performance of background and characters

Clause 5.3 Contrast in NIR between characters and background

WO	Manufacturer	Colour	Reference	Illumination (nm)	d	P1	P2	P2-P1	PASS/FAIL		
									P1<d	P2>d	P2-P1>200
30303	Danz Benz	WHITE	TP2W	850	114.5	15	255	240	PASS	PASS	PASS
30303	Danz Benz	WHITE	TP4W	850	98.05	46	255	209	PASS	PASS	PASS
30303	Danz Benz	WHITE	TP3W	850	112.02	20	255	235	PASS	PASS	PASS
30303	Danz Benz	WHITE	TP1AW	850	111.48	21	255	234	PASS	PASS	PASS
30303	Danz Benz	WHITE	TP1BW	850	111.47	21	255	234	PASS	PASS	PASS
30303	Danz Benz	WHITE	TP1CW	850	111.44	21	255	234	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP2Y	850	114.04	17	255	238	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP4Y	850	114.53	16	255	239	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP3Y	850	113.55	13	255	242	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP1AY	850	109.61	25	255	230	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP1BY	850	109.59	25	255	230	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP1CY	850	109.97	25	255	230	PASS	PASS	PASS
30303	Danz Benz	WHITE	TP2W	940*	110.89	24	255	231	PASS	PASS	PASS
30303	Danz Benz	WHITE	TP4W	940*	110.9	24	255	231	PASS	PASS	PASS
30303	Danz Benz	WHITE	TP3W	940*	109.48	18	255	237	PASS	PASS	PASS
30303	Danz Benz	WHITE	TP1AW	940*	113.18	16	255	239	PASS	PASS	PASS
30303	Danz Benz	WHITE	TP1BW	940*	113.21	16	255	239	PASS	PASS	PASS
30303	Danz Benz	WHITE	TP1CW	940*	113.28	16	255	239	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP2Y	940*	115.09	15	255	240	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP4Y	940*	115.37	15	255	240	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP3Y	940*	111.79	20	255	235	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP1AY	940*	113.6	11	255	244	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP1BY	940*	112.46	18	255	237	PASS	PASS	PASS
30303	Danz Benz	YELLOW	TP1CY	940*	112.73	18	255	237	PASS	PASS	PASS

***NOTE:** tested with a lamp with a peak wavelength centred around 950nm.

There is a point of contention with BSI as to the requirements for testing to this clause, specifically around Annex C, Clause 5.10 which details the limits as follows:

a) P1 > d
b) P2 > d
c) P2 – P1 > 200

For a valid number plate requirement a) can never be fulfilled as the overall deviation from the mean (d) will be around 100-130, and the black peak P1 must be below 25 for it to also be a pass. Therefore this requirement can never be satisfied. It is generally accepted that Clause 5.10 should instead read

a) P1 < d

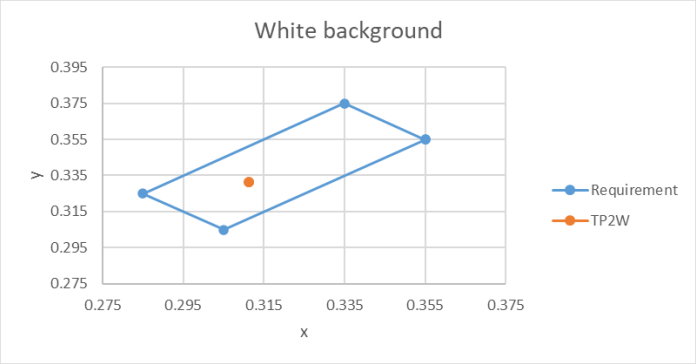
The results for clause 5.3 above were computed using this amendment.

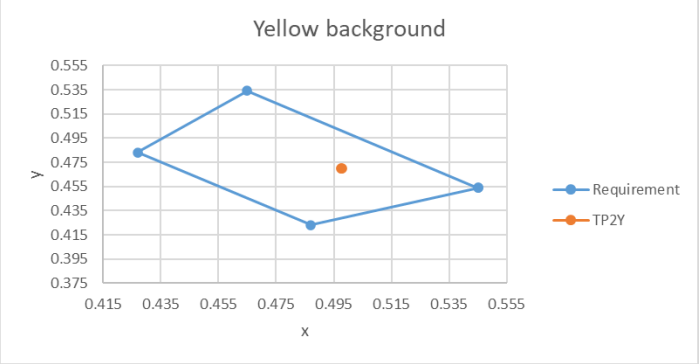
LUX-TSI Ltd, Unit 1B, Pencoed Technology Park,
Pencoed, Bridgend, CF35 5AQ, UK
Website: www.lux-tsi.com
E-mail: info@lux-tsi.com

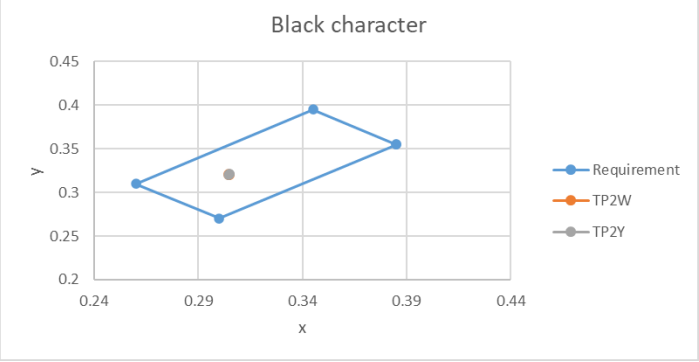
Clause 11 – Thermal Resistance

Clause 11b – Colourimetry

WO	Manufacturer	Colour	Reference	x	y	Luminance Factor β	β Requirement	Result
30304	DANZ BENZ	WHITE	TP2W	0.3112	0.3312	0.4264	>0.34	Pass
30304	DANZ BENZ	WHITE	TP2W	0.3113	0.3313	0.4242	>0.34	Pass
30304	DANZ BENZ	WHITE	TP2W	0.3112	0.3312	0.427	>0.34	Pass
30304	DANZ BENZ	YELLOW	TP2Y	0.4976	0.4702	0.2991	>0.27 <= 0.40	Pass
30304	DANZ BENZ	YELLOW	TP2Y	0.4977	0.4703	0.2997	>0.27 <= 0.40	Pass
30304	DANZ BENZ	YELLOW	TP2Y	0.4978	0.4703	0.2998	>0.27 <= 0.40	Pass
30304	DANZ BENZ	WHITE CHARACTER	TP2W	0.3047	0.3212	0.0106	<= 0.05	Pass
30304	DANZ BENZ	WHITE CHARACTER	TP2W	0.3051	0.3203	0.0107	<= 0.05	Pass
30304	DANZ BENZ	WHITE CHARACTER	TP2W	0.3047	0.3204	0.0106	<= 0.05	Pass
30304	DANZ BENZ	YELLOW CHARACTER	TP2Y	0.3048	0.321	0.0114	<= 0.05	Pass
30304	DANZ BENZ	YELLOW CHARACTER	TP2Y	0.3045	0.3205	0.0115	<= 0.05	Pass
30304	DANZ BENZ	YELLOW CHARACTER	TP2Y	0.3048	0.3211	0.0116	<= 0.05	Pass







LUX-TSI Ltd, Unit 1B, Pencoed Technology Park,
Pencoed, Bridgend, CF35 5AQ, UK
Website: www.lux-tsi.com
E-mail: info@lux-tsi.com

Clause 11e – Retroreflection

WO	Manufacturer	Colour	Reference	Observation Angle (°)	Entrance Angle (°)	Retroreflection (cd/lx/m2)	Requirement (cd/lx/m2)	Result
30305	DANZ BENZ	WHITE	TP2W	0.2	5	75.1	48	Pass
30305	DANZ BENZ	WHITE	TP2W	0.2	-5	74.6	48	Pass
30305	DANZ BENZ	YELLOW	TP2Y	0.2	5	58.6	32	Pass
30305	DANZ BENZ	YELLOW	TP2Y	0.2	-5	58.4	32	Pass

Repeatability

WO	Manufacturer	Colour	Reference	Observation Angle (°)	Entrance Angle (°)	Retroreflection (cd/lx/m2)	%Difference from measurement	Difference from measurement (cd/lx/m²)
30305	DANZ BENZ	WHITE	TP2W	0.2	5	75.1	0.01%	0.0
30305	DANZ BENZ	WHITE	TP2W	0.2	5	75.1	-0.03%	0.0
30305	DANZ BENZ	WHITE	TP2W	0.2	5	74.9	-0.27%	-0.2

Clause 13 – Resistance to Abrasion

13.1 – Retroreflection

WO	Manufacturer	Colour	Reference	Observation Angle (°)	Entrance Angle (°)	Retroreflection (cd/lx/m2)	Requirement (cd/lx/m2)	Result
30306	DANZ BENZ	WHITE	TP1AW	0.2	5	78.1	48	Pass
30306	DANZ BENZ	WHITE	TP1AW	0.2	-5	77.7	48	Pass
30306	DANZ BENZ	WHITE	TP1AW	0.2	45	12.2	4.8	Pass
30306	DANZ BENZ	WHITE	TP1AW	0.2	-45	15.0	4.8	Pass
30306	DANZ BENZ	YELLOW	TP1AY	0.2	5	57.6	32	Pass
30306	DANZ BENZ	YELLOW	TP1AY	0.2	-5	57.8	32	Pass
30306	DANZ BENZ	YELLOW	TP1AY	0.2	45	9.1	3.2	Pass
30306	DANZ BENZ	YELLOW	TP1AY	0.2	-45	10.3	3.2	Pass
30306	DANZ BENZ	WHITE	TP1BW	0.2	5	78.4	48	Pass
30306	DANZ BENZ	WHITE	TP1BW	0.2	-5	78.3	48	Pass
30306	DANZ BENZ	WHITE	TP1BW	0.2	45	12.4	4.8	Pass
30306	DANZ BENZ	WHITE	TP1BW	0.2	-45	16.0	4.8	Pass
30306	DANZ BENZ	YELLOW	TP1BY	0.2	5	57.0	32	Pass
30306	DANZ BENZ	YELLOW	TP1BY	0.2	-5	57.2	32	Pass
30306	DANZ BENZ	YELLOW	TP1BY	0.2	45	9.0	3.2	Pass
30306	DANZ BENZ	YELLOW	TP1BY	0.2	-45	11.1	3.2	Pass
30306	DANZ BENZ	WHITE	TP1CW	0.2	5	76.9	48	Pass
30306	DANZ BENZ	WHITE	TP1CW	0.2	-5	76.6	48	Pass
30306	DANZ BENZ	WHITE	TP1CW	0.2	45	12.5	4.8	Pass
30306	DANZ BENZ	WHITE	TP1CW	0.2	-45	14.8	4.8	Pass
30306	DANZ BENZ	YELLOW	TP1CY	0.2	5	57.4	32	Pass
30306	DANZ BENZ	YELLOW	TP1CY	0.2	-5	57.6	32	Pass
30306	DANZ BENZ	YELLOW	TP1CY	0.2	45	9.3	3.2	Pass
30306	DANZ BENZ	YELLOW	TP1CY	0.2	-45	9.9	3.2	Pass

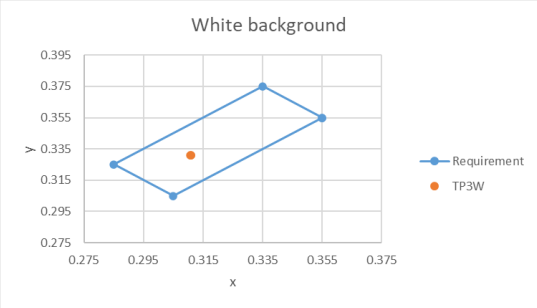
LUX-TSI Ltd, Unit 1B, Pencoed Technology Park,
Pencoed, Bridgend, CF35 5AQ, UK
Website: www.lux-tsi.com
E-mail: info@lux-tsi.com

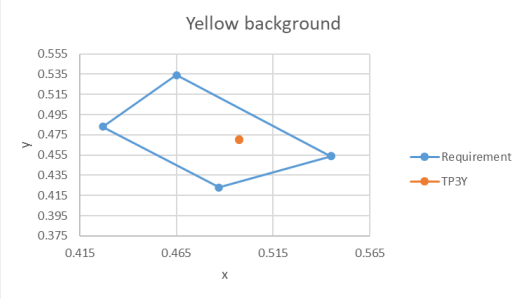
	Repeatability							
WO	Manufacturer	Colour	Reference	Observation Angle (°)	Entrance Angle (°)	Retroreflection (cd/lx/m2)	%Difference from measurement	Difference from measurement (cd/lx/m²)
30306	DANZ BENZ	WHITE	TP1AW	0.2	45	11.7	-3.71%	-0.4
30306	DANZ BENZ	WHITE	TP1AW	0.2	45	11.7	-4.05%	-0.5
30306	DANZ BENZ	WHITE	TP1AW	0.2	45	11.6	-4.78%	-0.6
30306	DANZ BENZ	YELLOW	TP1AY	0.2	45	9.1	-0.28%	0.0
30306	DANZ BENZ	YELLOW	TP1AY	0.2	45	9.0	-1.24%	-0.1
30306	DANZ BENZ	YELLOW	TP1AY	0.2	45	9.1	-0.05%	0.0
30306	DANZ BENZ	YELLOW	TP1BY	0.2	45	8.9	-0.91%	-0.1
30306	DANZ BENZ	YELLOW	TP1BY	0.2	45	8.9	-1.01%	-0.1
30306	DANZ BENZ	YELLOW	TP1BY	0.2	45	8.8	-1.98%	-0.2

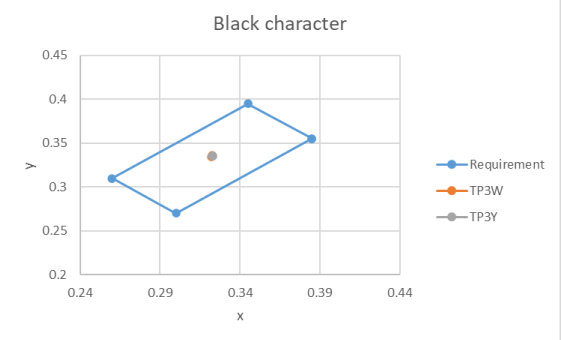
Clause 15 – Resistance to Weathering

Clause 15.3 – Colour Fastness

WO	Manufacturer	Colour	Reference	x	y	Luminance Factor β	β Requirement	Result
30307	DANZ BENZ	WHITE	TP3W	0.3109	0.3309	0.43	>0.34	Pass
30307	DANZ BENZ	WHITE	TP3W	0.3109	0.3309	0.4258	>0.34	Pass
30307	DANZ BENZ	WHITE	TP3W	0.3108	0.3309	0.425	>0.34	Pass
30307	DANZ BENZ	YELLOW	TP3Y	0.4975	0.4703	0.301	>0.27 <= 0.40	Pass
30307	DANZ BENZ	YELLOW	TP3Y	0.4976	0.4703	0.301	>0.27 <= 0.40	Pass
30307	DANZ BENZ	YELLOW	TP3Y	0.4976	0.4704	0.3008	>0.27 <= 0.40	Pass
30307	DANZ BENZ	WHITE CHARACTER	TP3W	0.3219	0.3348	0.0157	<= 0.05	Pass
30307	DANZ BENZ	WHITE CHARACTER	TP3W	0.3228	0.3361	0.02	<= 0.05	Pass
30307	DANZ BENZ	WHITE CHARACTER	TP3W	0.3227	0.3352	0.016	<= 0.05	Pass
30307	DANZ BENZ	YELLOW CHARACTER	TP3Y	0.3228	0.3356	0.0157	<= 0.05	Pass
30307	DANZ BENZ	YELLOW CHARACTER	TP3Y	0.3224	0.3356	0.0157	<= 0.05	Pass
30307	DANZ BENZ	YELLOW CHARACTER	TP3Y	0.323	0.3356	0.0156	<= 0.05	Pass







Clause 15.4.1 – Retroreflection Dry

WO	Manufacturer	Colour	Reference	Observation Angle (°)	Entrance Angle (°)	Retroreflection (cd/lx/m2)	Requirement (cd/lx/m2)	Result
30308	DANZ BENZ	WHITE	TP3W	0.2	5	77.4	48	PASS
30308	DANZ BENZ	WHITE	TP3W	0.2	-5	77.2	48	PASS
30308	DANZ BENZ	WHITE	TP3W	0.2	45	12.5	4.8	PASS
30308	DANZ BENZ	WHITE	TP3W	0.2	-45	13.5	4.8	PASS
30308	DANZ BENZ	YELLOW	TP3Y	0.2	5	59.3	32	PASS
30308	DANZ BENZ	YELLOW	TP3Y	0.2	-5	59.2	32	PASS
30308	DANZ BENZ	YELLOW	TP3Y	0.2	45	9.7	3.2	PASS
30308	DANZ BENZ	YELLOW	TP3Y	0.2	-45	9.9	3.2	PASS

Repeatability

WO	Manufacturer	Colour	Reference	Observation Angle (°)	Entrance Angle (°)	Retroreflection (cd/lx/m2)	%Difference from measurement	Difference from measurement (cd/lx/m²)
30308	DANZ BENZ	YELLOW	TP3Y	0.2	45	9.3	-3.91%	-0.4
30308	DANZ BENZ	YELLOW	TP3Y	0.2	45	9.6	-1.18%	-0.1
30308	DANZ BENZ	YELLOW	TP3Y	0.2	45	9.5	-1.72%	-0.2

Clause 15.4.3 – Retroreflection Wet

WO	Manufacturer	Colour	Reference	Observation Angle (°)	Entrance Angle (°)	Retroreflection (cd/lx/m2)	Requirement (cd/lx/m2)	Result
30309	DANZ BENZ	WHITE	TP3W	0.2	5	74.6	43.2	PASS
30309	DANZ BENZ	WHITE	TP3W	0.2	-5	74.4	43.2	PASS
30309	DANZ BENZ	YELLOW	TP3Y	0.2	5	57.1	28.8	PASS
30309	DANZ BENZ	YELLOW	TP3Y	0.2	-5	57.6	28.8	PASS

Repeatability

WO	Manufacturer	Colour	Reference	Observation Angle (°)	Entrance Angle (°)	Retroreflection (cd/lx/m2)	%Difference from measurement	Difference from measurement (cd/lx/m²)
30309	DANZ BENZ	YELLOW	TP3Y	0.2	5	57.5	0.61%	0.3
30309	DANZ BENZ	YELLOW	TP3Y	0.2	5	56.1	-1.74%	-1.0
30309	DANZ BENZ	YELLOW	TP3Y	0.2	5	57.6	0.81%	0.5

Clause 15.5 – Effect of Dirt

Clause 15.5.2a – Retroreflection

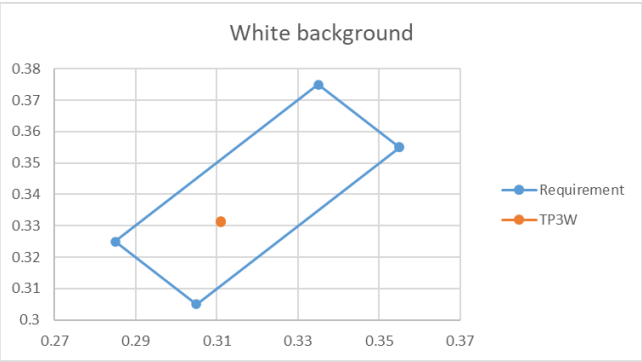
WO	Manufacturer	Colour	Reference	Observation Angle (°)	Entrance Angle (Bv°)	Retroreflection (cd/lx/m2)	Requirement (cd/lx/m2)	Result
30310	DANZ BENZ	WHITE	TP3W	0.2	5	76.1	48	Pass
30310	DANZ BENZ	WHITE	TP3W	0.2	-5	76.1	48	Pass
30310	DANZ BENZ	WHITE	TP3W	0.2	45	10.9	4.8	Pass
30310	DANZ BENZ	WHITE	TP3W	0.2	-45	15.4	4.8	Pass
30310	DANZ BENZ	YELLOW	TP3Y	0.2	5	57.5	32	Pass
30310	DANZ BENZ	YELLOW	TP3Y	0.2	-5	58.1	32	Pass
30310	DANZ BENZ	YELLOW	TP3Y	0.2	45	7.9	3.2	Pass
30310	DANZ BENZ	YELLOW	TP3Y	0.2	-45	9.7	3.2	Pass

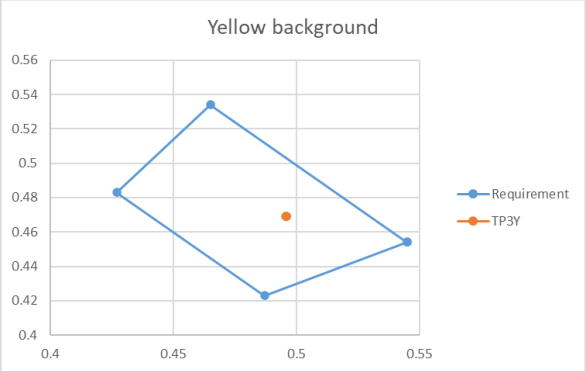
	Repeatability							
WO	**Manufacturer**	**Colour**	**Reference**	**Observation Angle (°)**	**Entrance Angle (°)**	**Retroreflection (cd/lx/m2)**	**%Difference from measurement**	**Difference from measurement (cd/lx/m²)**
30310	DANZ BENZ	YELLOW	TP3Y	0.2	45	7.9	0.57%	0.0
30310	DANZ BENZ	YELLOW	TP3Y	0.2	45	8.0	2.05%	0.2
30310	DANZ BENZ	YELLOW	TP3Y	0.2	45	8.2	3.63%	0.3

Clause 15.5.2b – Luminance Factor of white and yellow backgrounds

WO	Manufacturer	Colour	Reference	x	y	Luminance Factor β	β Requirement*	Result
30311	DANZ BENZ	WHITE	TP3W	0.3111	0.3313	0.4351	>0.272	Pass
30311	DANZ BENZ	WHITE	TP3W	0.3111	0.3312	0.4354	>0.272	Pass
30311	DANZ BENZ	WHITE	TP3W	0.3111	0.3313	0.4358	>0.272	Pass
30311	DANZ BENZ	YELLOW	TP3Y	0.4955	0.4692	0.3054	0.216 < β < 0.40	Pass
30311	DANZ BENZ	YELLOW	TP3Y	0.4958	0.4693	0.3053	0.216 < β < 0.41	Pass
30311	DANZ BENZ	YELLOW	TP3Y	0.4958	0.4693	0.3057	0.216 < β < 0.42	Pass

***NOTE:** the requirement here differs from that quoted in the standard. The standard states that "the luminance factor for white and yellow backgrounds shall be not less than 80% of the relevant minimum values for the retroreflecting backgrounds given in Table 3…", whereas the limit taken here is for 80% of the values in Table 2. Table 3 refers to the limits for the coefficient of retroreflection while the required limits for the Luminance factor are only found in table 2, hence this is assumed to be a typographical error in the standard.





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