
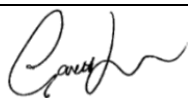


TEST REPORT

Client:	Capricorn Coating Services Ltd 1 Warstone Parade East Hokley Birmingham B18 6NR			
FAO:	Chris Bingley			
Sample Name:	CCSL 3D GEL AND MATT BLACK 4D CHARACTERS			
Testing performed at:	Unit 1B, Pencoed Technology Park, Pencoed, Bridgend, CF35 5AQ			
Laboratory No:	TUN-35384 to TUN-35386	Client Ref No:	WHITE 3MM or YELLOW 3MM	
Order No:	E-MAIL	Date received:	05/03/2025	
Condition of sample:	Post Thermal	Date tested:	06/03/2025 to 12/03/2025	
Sample Description:	Two sets of generic vehicle number plate with 3D Gel or 4D Characters applied, manufactured by Capricorn. Date of manufacture 2024. The generic plates have either a white or yellow background and the characters are all black lettering.			
Test conducted:	Test for compliance with: BS AU 145e:2018 Clause 11 Post thermal resistance testing (referring to clauses 7, 8 and 5.3)			
Disclaimers	<p>This report is for the exclusive use of LUX-TSI’s Customer and is provided pursuant to the agreement between LUX-TSI and its Customer. LUX-TSI’s responsibility and reliability are limited to the Terms and Conditions of the agreement. LUX-TSI assumes no liability to any other party, other than the Customer in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Customer is authorised to permit copying or distribution of this report and then only in its entirety. Any use of the LUX-TSI name or one of its marks for the sale or advertisement of the tested material, product or service must be approved in writing by LUX-TSI.</p> <p>The observations and test results in this report are relevant only to the sample tested. The sample was supplied by the client and not selected by LUX-TSI. Opinions and interpretations are outside the scope of this report. Data supplied in this report, is given in good faith, and based on the information provided by the Customer. This report does not remove the requirement for the Customer to obtain further independent advice and in particular to instruct a notified or competent body or person to carry out further evaluation work and/or testing. Accordingly, no warranty is given, nor is any term or condition to be implied, that the product, which is the subject of this report, complies with the requirements of any EU directives or UK statutory instruments.</p>			



Dr Gareth Jones
Lead Photometrist

Dated: 27/03/2025

All results relate only to the sample(s) received for testing.
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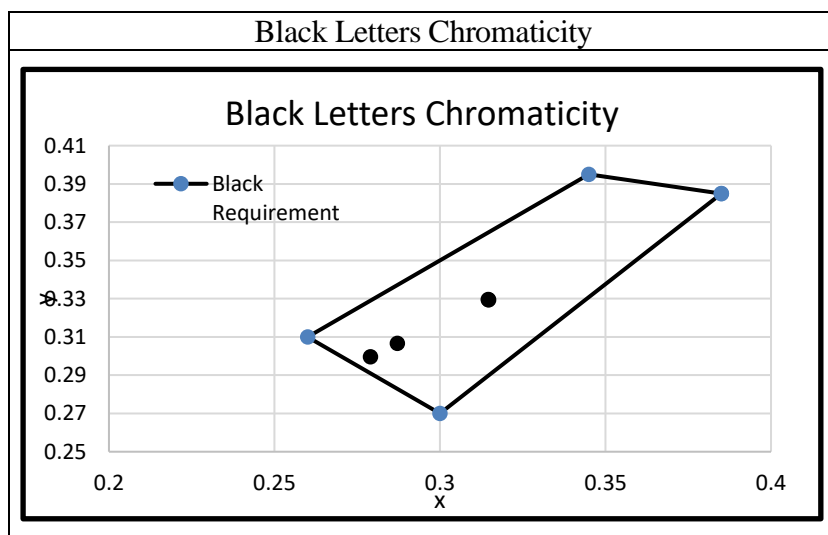
Test Conditions	<p>Measurements were made with an ambient temperature of 22°C +/- 2°C unless otherwise specified.</p> <p>Measurements were taken only after sufficient time for thermal stabilisation has been allowed.</p> <p>Illuminant Type A positioned at 17.3 meters from sample and coincident with photometric detector.</p>
Calibrations	<p>Photocurrent meter correlated to a UKAS accredited calibrated illuminance meter.</p> <p>Using luminous intensity standard we have also carried out measurements to confirm the photocurrent detector linearity.</p> <p>Distance meter UKAS calibrated.</p>
Test equipment	<p>KONICA MINOLTA CL 200 CHROMAMETER – LX1013TU</p> <p>TYPE A ILLUMINANT SYSTEM – LX1018TU and LX 1019TU</p> <p>HUNTERLAB COLOURFLEX EZ = ASSOCIATED STANDARDS – LX1020TU</p> <p>LMT II000 PHOTOCURRENT METER WITH P30SOT</p> <p>PHOTOMETER – LX1010TU and LX1011TU</p> <p>SELF-ALIGNING LASER LEVEL – LEICA – LX1017TU</p> <p>LASER DISTANCE GAUGE – TLM160I – LX1009TU</p> <p>INCLANOMETER – TADETO – LX1288TU</p>
Measurement of Uncertainty decision rule:	<p>Where a decision has been made with regards to a particular test the following methodology has been adopted in line with UKAS requirements for good practice. For each measurement taken LUX-TSI use what is called a Decision Rule.</p> <p>The decision rule chosen is called a ‘Non-binary statement with Guard Band’ which means for each measurement taken we calculate a band of Uncertainty based the Uncertainty of the particular measurement (UoM). In doing this we reduce the risk to the customer of falsely accepting a non-conforming item. We follow the ‘ILAC ‘Guidelines on decision Rules and Statements of Conformity’ document ‘ILAC-G8: 09/2019’.</p> <p>Based upon a standard Uncertainty multiplied by a coverage factor k=2, this provides a level of confidence of approximately 95% coverage probability of the expanded Uncertainty. Decisions are made on this basis as follows:</p> <ul style="list-style-type: none"> a) If any measured value plus and minus its guard band meets the requirements, then it is a PASS and coloured GREEN. b) If any measured value plus or minus its guard band fails to meet the requirements, then it is a FAIL and coloured RED. c) If any measured value meets the requirements but the measured value plus or minus its guard band does not meet the requirements, then it is classed as conditional pass "CPASS" and coloured AMBER. d) If any measured value does not meet the requirements but the measured value plus or minus its guard band does meet the requirements, then it is classed as conditional fail "CFAIL" and coloured AMBER.

Product Testing Stage	<p>The test results provided in this report are part of test schedule 2 of Table 1 following thermal resistance testing.</p> <p>Table 1 — <i>Test schedules</i></p> <table><tr><th rowspan="2">Number of samples and tests</th><th rowspan="2">Clause</th><th colspan="4">Test schedule</th><th rowspan="2">Total</th></tr><tr><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><td>No. of sample units required</td><td></td><td>1</td><td>1</td><td>3</td><td>1</td><td>6</td></tr><tr><td>1 Colorimetric test</td><td>7</td><td>T</td><td>—</td><td>—</td><td>—</td><td rowspan="10"></td></tr><tr><td>2 Retroreflection test</td><td>8</td><td>T</td><td>—</td><td>—</td><td>—</td></tr><tr><td>3 Resistance to bending</td><td>9</td><td>T</td><td>—</td><td>—</td><td>—</td></tr><tr><td>4 Resistance to solvents</td><td>10</td><td>T</td><td>—</td><td>—</td><td>—</td></tr><tr><td>5 Thermal resistance</td><td>11</td><td>—</td><td>T</td><td>—</td><td>—</td></tr><tr><td>6 Resistance to impact</td><td>12</td><td>—</td><td>—</td><td>T</td><td>—</td></tr><tr><td>7 Resistance to abrasion</td><td>13</td><td>—</td><td>—</td><td>T</td><td>—</td></tr><tr><td>8 Resistance to corrosion</td><td>14</td><td>—</td><td>—</td><td>T</td><td>—</td></tr><tr><td>9 Resistance to weathering</td><td>15</td><td>—</td><td>—</td><td>—</td><td>T</td></tr><tr><td>10 Opacity of characters in NIR</td><td>5.3</td><td>T</td><td>T</td><td>T</td><td>T</td></tr><tr><td colspan="7">"T" indicates that testing is necessary.</td></tr></table>	Number of samples and tests	Clause	Test schedule				Total	1	2	3	4	No. of sample units required		1	1	3	1	6	1 Colorimetric test	7	T	—	—	—		2 Retroreflection test	8	T	—	—	—	3 Resistance to bending	9	T	—	—	—	4 Resistance to solvents	10	T	—	—	—	5 Thermal resistance	11	—	T	—	—	6 Resistance to impact	12	—	—	T	—	7 Resistance to abrasion	13	—	—	T	—	8 Resistance to corrosion	14	—	—	T	—	9 Resistance to weathering	15	—	—	—	T	10 Opacity of characters in NIR	5.3	T	T	T	T	"T" indicates that testing is necessary.						
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Conclusion	The samples complied with the requirements of the above named testing.																																																																																						

Clause 11b luminance factor and chromaticity following thermal resistance testing (referencing Clause 7)

Sample Ref	Colour	Measured Values			Requirements		Results	
		x	y	Luminance factor β	Chromaticity (x/y)	Luminance factor β	Chromaticity (x/y)	Luminance factor β
CCSL WHITE 3MM BLACK 3D GEL	Black	0.2790	0.2996	0.00	See Table / Graph	$\beta \leq 0.05$	Pass	Pass
CCSL YELLOW 3MM BLACK 3D GEL	Black	0.2871	0.3066	0.00	See Table / Graph	$\beta \leq 0.05$	Pass	Pass
CCSL WHITE 3MM MATT BLACK 4D	Black	0.3146	0.3295	0.04	See Table / Graph	$\beta \leq 0.05$	Pass	Pass
CCSL YELLOW 3MM MATT BLACK 4D	Black	0.3147	0.3293	0.04	See Table / Graph	$\beta \leq 0.05$	Pass	Pass

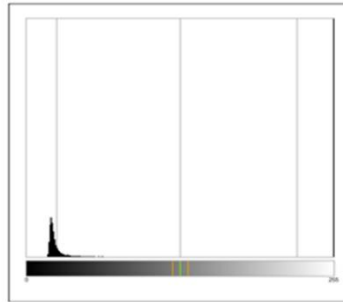
Chromaticity



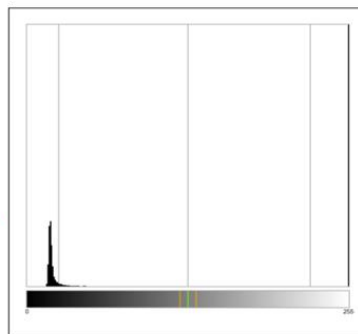
Clause 11e night time retroreflection testing following thermal resistance (referencing Clause 8 Visible Light Retroreflection)

Sample Ref	Colour	Angles		Requirements		Results	
		Observation Angle (°)	Vertical Entrance Angle (°) (H=0)	Minimum requirement (cd/lx/m ²) RA	Maximum requirement (cd/lx/m ²) RA	Coefficient of Retroreflection RA (cd/lx/m ²)	Result
CCSL WHITE 3MM BLACK 3D GEL	Black	0.2	5	---	0.5	0.3	Pass
	Black	0.2	-5	---	0.5	0.3	Pass
CCSL YELLOW 3MM BLACK 3D GEL	Black	0.2	5	---	0.5	0.2	Pass
	Black	0.2	-5	---	0.5	0.2	Pass
CCSL WHITE 3MM MATT BLACK 4D	Black	0.2	5	---	0.5	0.1	Pass
	Black	0.2	-5	---	0.5	0.0	Pass
CCSL YELLOW 3MM MATT BLACK 4D	Black	0.2	5	---	0.5	0.0	Pass
	Black	0.2	-5	---	0.5	0.0	Pass

Clause 5.3 Contrast in NR between characters and background
BS AU 145e Infrared Contrast Test Report



BS AU 145e Infrared Contrast Test Report



Clause 5.3 Contrast in NR between characters and background

Sample Ref	Colour	Measurements					Results		
		NIR I (nm)	d	Dark Peak (P1)	Light Peak (P2)	Peak Difference (P2-P1)	P1<d	P2>d	P2-P1>200
CCSL WHITE 3MM BLACK 3D GEL	White	850	112.74	20	255	235	Pass	Pass	Pass
		940*	113.95	18	255	237	Pass	Pass	Pass
CCSL YELLOW 3MM BLACK 3D GEL	Yellow	850	113.33	18	255	237	Pass	Pass	Pass
		940*	114.24	16	255	239	Pass	Pass	Pass
CCSL WHITE 3MM MATT BLACK 4D	White	850	115.75	18	255	237	Pass	Pass	Pass
		940*	115.17	16	255	239	Pass	Pass	Pass
CCSL YELLOW 3MM MATT BLACK 4D	Yellow	850	116.37	16	255	239	Pass	Pass	Pass
		940*	115.49	16	255	239	Pass	Pass	Pass

*tested with lamp with peak wavelength 950nm

Note

There is an error in the standard concerning the requirements for testing to this clause 5.3, 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 tabulated results for clause 5.3 above were computed using this amendment.

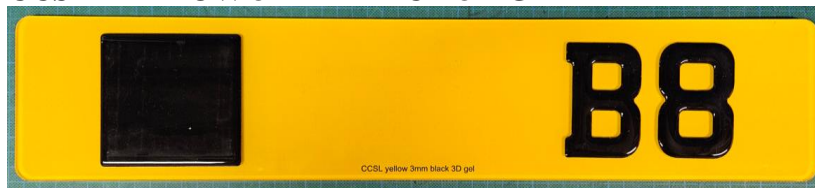
Captured images and histograms for these tests are stored at LUX-TSI and available upon request.

ILLUSTRATION

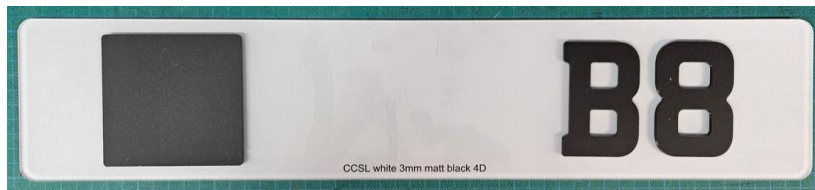
CCSL WHITE 3MM BLACK 3D GEL



CCSL YELLOW 3MM BLACK 3D GEL



CCSL WHITE 3MM MATT BLACK 4D



CCSL YELLOW 3MM MATT BLACK 4D



End of Report