

LCP TECHNOLOGY GMBH
1850 South Eight Mile Road
Kawkawlin, Mi. 48631

ATTN: Paul Nowak

41 Months Japan
41 Months Australia

Material: Customer Supplied and ACT Prepared Test Panels (See Attached Matrix)

ACT Quote Number: AQT 58109
ACT Project Number: AIN 173404

Prepared By: KBK
Date Prepared: 07/14/06
Logbook: RTC-17, pp. 67-86

APPROVED BY:



Kevin Wendt
Technical Manager

LABORATORY TEST REPORT

PROJECT AIN173404

Material I.D.: See Appendix I

Evaluation #1: 41 Months Japan and Australia

AQT 58109: Per Line Item #2 of Quotation
Material Received: 06/05/02
Test Start Date: 10/15/02 and 10/18/02
Test End Date: 03/21/06 and 03/17/06

Test Location: Atlas Material Testing Solutions, Australia and Florida

Test Numbers: WW19145 and WW19146

Exposure: 41 months

Examinations: Initial and Final Color Readings per Evaluation #2
Initial and Final 20° Gloss per Evaluation #3
Initial and Final DOI per Evaluation #4

Evaluation #2: Instrumented Color Change

AQT 58109: Per Line Item #8 of Quotation
Material Received: 06/05/02
Test Start Date: 07/01/02
Test End Date: 07/11/06

Test Method: SAE J1545 (JUN86)

Formula: CIELAB

Instrument: MacBeth Color-Eye 3000 Spectrophotometer (LCE #57)

Illuminant: Type D65

Instrument Geometry: Integrated Sphere

Degree Observer: 10 Degree

Specular Component: Included
UV Component: Included

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Viewing Port: Large Area View

Color Parameters: L*: Dark/Light Difference
a*: Red/Green Difference
b*: Yellow/Blue Difference

Delta E*: Total Difference Between Two Colors as Determined by the Square root of the Sum of the Squares of Deltas L*, a*, b*.

Evaluation #3: 20° Specular Gloss Test

AQT 58109: Per Line Item #6 of Quotation
Material Received: 06/05/02
Test Start Date: 07/01/02
Test End Date: 07/12/06

Test Method: ASTM D 523-99

Instruments: Gardco Novo-Gloss NG-60/20 (LCE #592)
ATI Systems Model 1864 SAC (LCE #202)

Examination: Initial and Final 20° Specular Gloss

Evaluation #4: Distinctness of Image (DOI)

AQT 58109: Per Line Item #4 of Quotation
Material Received: 06/05/02
Test Start Date: 07/01/02
Test End Date: 07/12/06

Test Method: LWI0028 (03/04)

Instrument: ATI Systems Model 1864 SAC (LCE #202)

Examination: Initial and Final Distinctness of Image

LABORATORY TEST REPORT

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Instrumented Color and 20° Specular Gloss Test Data: 41 Months Japan Exposure

ID	Parameter	Instrumented Color				20° Specular Gloss	
		Initial	Final	Change	Delta E*	Initial	Final
1-23	L*	31.78	30.59	-1.19	1.39	86.8	65.3
	a*	-1.34	-1.72	-0.38			
	b*	-28.16	-28.79	-0.63			
2-23	L*	27.76	26.64	-1.12	1.20	86.9	71.7
	a*	-4.44	-4.74	-0.30			
	b*	-5.79	-6.14	-0.35			
3-23	L*	26.13	24.88	-1.25	1.34	86.0	71.7
	a*	1.21	1.25	0.04			
	b*	-6.58	-7.09	-0.51			
4-23	L*	26.93	25.84	-1.09	1.35	86.3	72.3
	a*	5.47	5.50	0.03			
	b*	-20.35	-21.14	-0.79			
5-23	L*	30.38	28.91	-1.47	1.86	86.9	67.3
	a*	-13.51	-14.61	-1.10			
	b*	-6.00	-6.28	-0.28			
6-23	L*	27.36	26.25	-1.11	1.27	85.9	68.7
	a*	-1.98	-2.13	-0.15			
	b*	-5.09	-5.69	-0.60			
7-23	L*	26.07	24.62	-1.45	1.55	86.1	69.0
	a*	1.21	1.34	0.13			
	b*	-6.48	-7.03	-0.55			
8-23	L*	26.92	25.51	-1.41	1.75	87.2	70.0
	a*	6.16	6.52	0.36			
	b*	-21.09	-22.09	-1.00			

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Inst. Color and 20° Specular Gloss Test Data (cont.): 41 Months Japan Exposure

ID	Parameter	Instrumented Color				20° Specular Gloss	
		Initial	Final	Change	Delta E*	Initial	Final
9-23	L*	30.37	28.86	-1.51	1.91	87.1	66.3
	a*	-13.31	-14.45	-1.14			
	b*	-5.65	-5.97	-0.32			
10-23	L*	29.68	28.27	-1.41	1.63	86.3	50.0
	a*	-9.60	-10.38	-0.78			
	b*	-11.33	-11.59	-0.26			

DOI Test Data: 41 Months Japan Exposure

ID	Average DOI	
	Initial	Final
1-23	92	87
2-23	93	89
3-23	93	90
4-23	93	89
5-23	94	91
6-23	94	91
7-23	94	89
8-23	95	91
9-23	94	93
10-23	93	93

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Inst. Color and 20° Specular Gloss Test Data (cont.): **41 Months Australia Exposure**

ID	Parameter	Instrumented Color				20° Specular Gloss	
		Initial	Final	Change	Delta E*	Initial	Final
1-29	L*	31.69	31.23	-0.46	0.88	87.2	73.7
	a*	-1.33	-2.00	-0.67			
	b*	-27.94	-28.29	-0.35			
2-29	L*	28.14	26.38	-1.76	1.88	85.5	64.7
	a*	-5.03	-5.20	-0.17			
	b*	-5.32	-5.99	-0.67			
3-29	L*	26.16	24.94	-1.22	1.39	86.4	69.3
	a*	1.02	0.93	-0.09			
	b*	-6.59	-7.24	-0.65			
4-29	L*	26.79	25.20	-1.59	1.69	86.1	67.7
	a*	5.36	5.46	0.10			
	b*	-19.70	-20.28	-0.58			
5-29	L*	30.42	29.10	-1.32	1.47	86.4	65.7
	a*	-13.74	-14.17	-0.43			
	b*	-5.72	-6.21	-0.49			
6-29	L*	27.40	26.20	-1.20	1.42	86.5	70.3
	a*	-2.03	-2.07	-0.04			
	b*	-5.11	-5.86	-0.75			
7-29	L*	26.02	24.68	-1.34	1.47	86.3	68.0
	a*	1.27	1.19	-0.08			
	b*	-6.58	-7.21	-0.63			
8-29	L*	26.90	25.57	-1.33	1.50	87.0	68.3
	a*	6.19	6.34	0.15			
	b*	-21.10	-21.79	-0.69			

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Inst. Color and 20° Specular Gloss Test Data (cont.): 41 Months Australia Exposure

ID	Parameter	Instrumented Color				20° Specular Gloss	
		Initial	Final	Change	Delta E*	Initial	Final
9-29	L*	30.35	29.10	-1.25	1.43	86.5	68.3
	a*	-13.26	-13.94	-0.68			
	b*	-5.80	-6.01	-0.21			
10-29	L*	29.65	29.03	-0.62	0.78	86.8	68.3
	a*	-9.55	-10.01	-0.46			
	b*	-11.14	-11.29	-0.15			

DOI Test Data: 41 Months Australia Exposure

ID	Average DOI	
	Initial	Final
1-29	93	86
2-29	93	88
3-29	92	88
4-29	92	87
5-29	94	88
6-29	94	88
7-29	94	87
8-29	94	89
9-29	94	89
10-29	93	88

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Appendix I

Substrate: ACT Cold Roll Steel 4" x 12" x 0.032"

Phosphate: B3080 No Parcolene Imm DIW; Unpolish

ID	Ecoat	Primer	Basecoat	Clearcoat	Description
1	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Control-blue metallic &/or Mica w/color (pdtm formula)
2	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Jade HC-S Masstone
3	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Maple HC-S Masstone
4	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Sapphire HC-S Masstone
5	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Scarabeus HC-S Masstone
6	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Jade HC-XS Masstone
7	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Maple HC-XS Masstone
8	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Sapphire HC-XS Masstone
9	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Scarabeus HC-XS Masstone
10	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Aquarius Masstone
11	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Sapphire HC-S & UV fortification in b/c (1.0%/0.5%)*
12	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Maple HC-S & UV fortification in b/c (1.0%/0.5%)*
13	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Sapphire HC-XS & UV fortification in b/c (1.0%/0.5%)*
14	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Maple HC-XS & UV fortification in b/c (1.0%/0.5%)*
15	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Aquarius & UV fortification in b/c (1.0%/0.5%)*
16	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Scarabeus HC-S+14 micron mirrors CB4000 untreated
17	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Scarabeus HC-S+14 micron mirrors CB4000 treated
18	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Scarabeus HC-S+ amber glass chip untreated
19	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Control + 2% Vitrocoat 800 milled untreated in base only
20	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Control + 1% Vitroclear 1200 milled untreated in clear only
21	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Scarabeus HC-S + 2% Vitrocoat 800 milled untreated
22	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Scarabeus HC-S + 2% Vitrocoat 800 milled untreated + 14 micron mirrors CB4000 treated
23	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Scarabeus HC-S + 2% Vitrocoat 800 milled untreated + amber glass chip
24	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Maple HC-S + 2% Vitrocoat 800 milled untreated + mini beads untreated
25	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Maple HC-S + 2% Vitrocoat 800 milled untreated + mini beads treated
26	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Control high bake repair
27	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Control low bake repair
28	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Maple HC-XS high bake repair
29	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Maple HC-XS low bake repair
30	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Helicone Maple HC-XS + 2% Vitrocoat 800 milled untreated + 14 micron mirrors CB4000 treated (high bake repair)
31	ED5650	B89 OP-5	NWB270 W02-0301	Macflow 0-1300	Same as #30, except Low Bake Repair

- Additional UV fortification above normal based on Ciba recommendations