INISMa
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Avenue Gouverneur Cornez, 4
B-7000 MONS (Belgium)
Tel. (065)40.34.34
Fax (065)34.80.05

V.A.T. : BE 0413.106.271
RC MONS : 130.828 - Registration : 08/02/01

www.bcrc.be

Interuniversity Institute for Silicates, soils and Materials
Test and Research laboratory
Non-profit-making association

BELAC
Accreditation N° : 32-Test
according to ISO 17025

Including 5 pages

TEST REPORT : N° 2011A DIV 12556

Mons, November 3rd, 2011

REQUESTED BY : AVI Vinçotte Certification - Automotive Glazing
Business Class Kantoren Park
Jan Olieslagerslaan, 35
B-1800 VILVOORDE

REQUEST REFERENCE : IGPG Taber Round Robin test

NUMBER OF SAMPLES AND IDENTIFICATION :

4 SAMPLES 100 X 100 MM WITH CENTRAL HOLE (BAYER)
4 SAMPLES 100 X 100 MM WITHOUT CENTRAL HOLE (BAYER)

Type of samples : polycarbonate

REQUESTED TEST : Taber round robin test
Resistance to temperature changes and abrasion resistance* according to the UNECE regulation 43

SAMPLES RECEIVED ON : April 7th, 2011

TESTS START ON : April 15th, 2011

REMARK : * Test under BELAC accreditation

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DESCRIPTION OF THE EQUIPMENTS

TABER	5130	Specification
Serial number	771189	
Nominal vacuum nozzle opening	11 mm	11 mm (ISO/WD 3537-N528:2010(E))
Nozzle distance to specimen surface	0.8 to 6.4 mm	0.8 - 1.6 mm (ISO/WD 3537-528:2010(E))
Vacuum setting	100	
Type of aspirator	Taber	
Mass (left / right)	500 g/500g	500 g/500g (R43)
Rotation / min	60	65 to 75 rpm (R43)
Refacing medium	ST-11 refacing stone	Taber

WHEELS		5130	R43 reference
Type		CS-10F	
Lot number		DW22D2	
Expiration date		July 2012	
Initial Weight	Left	52.05 g	
	Right	51.72 g	
Initial thickness	Left	12.54 mm	12.5 mm (R43) 12.7+/-0.3 mm (ISO/WD 3537-N528:2010(E))
	Right	12.42 mm	
Initial hardness	Left	92	72 ± 5 (R43)
(shore A)	Right	90	
Initial Diameter	Left	51.82 mm	45 - 50 mm (R43) initial 51.9+/-0.5 mm used > 44.4 (ISO/WD 3537-N528:2010(E))
	Right	51.86 mm	

Climatic chamber	HC4015
Type	Weiss Technik
Serial number	41230

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TEST METHOD

Before testing, remove any protective masking material from the specimen.
Clean both size of the samples with demineralized water.
Handle test pieces by their edges to prevent contamination of their surfaces.

Condition the abrasive wheels and the samples, prior to testing, for a minimum of 48 hours (R43) at 23 ± - 2°C (R43) and 50 ± 5 % relative humidity.

Ageing test

Place the samples referenced #56, #57, #60 and #61 in a climatic chamber during 10 cycles of 15 hours.
Observe the samples after one cycle.

Description of a cycle :

- from room temperature to -40 ± 5°C in 2 hours
- -40 ± 5° C during 6 hours
- from -40 ±5 °C to +23 ± 2°C in 1 hour
- +23 ± 2°C during 1 hour
- from +23 ± 2°C to +72 ± 2°C in 1 hour
- +72 ± 2°C during 3 hours
- from +72 ± 2°C to +23 ± 2°C in 1 hour

Abrasion test

Testing conditions: temperature 20 ± 5°C (R43) and 60 ± 20 RH (R43).

Before testing each sample, perform 25 rotations on the fine side of the refacing stone "ST-11".

Attach the sample on the turntable of the "taber" using double-sided paper.
Place the 2 abrasive wheels on the sample and the vacuum pick-up nozzle of 11 mm above the sample at a distance of 0.8 mm to 6.4 mm (see table hereafter for details).
Perform 1000 rotations on each sample.

Measure of light scattered

Instruments Description	**For optical properties**
Spectrophotometer	Pacific Scientific Gardner
Type	XL-211 Hazegard System
Serial number	HG-8013 S Special
Illuminant	A

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Initial haze measurement

Place the unabraded specimen in the hazemeter sample holder with the side to be abraded facing the entrance port of the integrating sphere. Measure the light scattered (initial haze) at a minimum of four equally spaced points along the track. Average the results for each test piece.

Haze measurement after abrasion

The abraded track of the sample is placed against the entrance port of the integrating sphere and four readings are taken at four equally-spaced points.

The percentage of light scattered included in the table below is the average value of the four measurements before and after abrasion.

RESULTS

Percentage of light scattered before and after ageing test

Sample reference	Thickness (mm)	Percentage of light scattered (%)	
		Before ageing	After ageing
BMS-CAP3214-A #56	3.31	0.1	0.1
BMS-CAP3214-A #57	3.31	0.1	0.1
BMS-CAP3214-A #60	3.31	0.1	0.1
BMS-CAP3214-A #61	3.31	0.1	0.1

Percentage of light scattered before and after abrasion test

Sample reference	Central hole (yes/no)	Thickness (mm)	Nozzle distance	Percentage of light scattered (%)		
				Before abrasion	After abrasion	Difference
BMS-CAP3214-A #56	no	3.31	0.8 mm	0.1	1.3	1.2
BMS-CAP3214-A #57	no	3.31	0.8 mm	0.1	3.3	3.2
BMS-CAP3214-A #60	yes	3.31	0.8 mm	0.1	3.7	3.6
BMS-CAP3214-A #61	yes	3.31	0.8 mm	0.1	1.5	1.4
BMS-CAP3214-A #58	no	3.26	0.8 mm	0.1	1.3	1.2
BMS-CAP3214-A #59	no	3.27	1.6 mm	0.1	8.3	8.2
BMS-CAP3214-A #62	yes	3.27	3.2 mm	0.1	32.2	32.1
BMS-CAP3214-A #63	yes	3.26	6.4 mm	0.1	43.7	43.6

Patricia DUMONT
Head of Laboratory

Glazing and Components - INISMa

Avenue Gouverneur Cornez, 4 – B-7000 Mons
☎ : 32/(0)65/40.34.49
Fax : 32/(0)65/40.34.60
e-mail : vitrages@bcrc.be
url : www.bcrc.be