SGS

TEST REPORT

No. : SC110120032
Date : Jan. 25, 2011

The following sample(s) was/ were submitted and identified on behalf of the client as:

Sample Name	:	Tempered Glass
Sample No.	:	SC110120032
Test Required	:	Please see next page(s)
Test Method	:	Please see next page(s)
Product Specification	:	thickness: 4mm, 5mm, 6mm, 8mm
Date of Receipt	:	Jan. 14, 2011
Test Period	:	Jan. 14, 2011 to Jan. 25, 2011
Test result(s)	:	Please see next page(s)

******** To be continued********

Signed for SGS-CSTC Standards

SHML 235904

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TEST REPORT

Test Reference

1. EN 12150-1:2000 Glass in building – Thermally toughened soda lime silicate safety glass – Part 1: Definition and description
2. EN 12150-2:2004 Glass in building – Thermally toughened soda lime silicate safety glass – Part 2: Evaluation of conformity/Product standard
3. EN 1288-3:2000 Glass in building – Determination of the bending strength of glass – Part 3: Test with specimen supported at two points (four point bending)
4. EN 12600:2002 Glass in building – Pendulum test – Impact test method and classification for flat glass

Test Result:

1. Nominal Thickness 4mm

No.	Test Item	Test Method	Requirement	Test Result	Verdict
1	Nominal thickness and thickness tolerances	EN 12150-1:2000	±0.2mm	-0.20mm	Pass
2	Flatness	EN 12150-1:2000	Overall bow: ≤0.003mm/mm	0.002mm/mm	Pass
			Local bow: ≤0.5mm/300mm	0.0mm/300mm	
3	Fragmentation test	EN 12150-1:2000	5 specimens must be tested and meet the requirements: ①In any area of 50mm×50mm, the minimum particle count is 40 pieces; ②A few long fragment will be allowed, but no longer than 100mm	Particle count of 5 specimens were 188, 176, 178, 189 and 194, particle with longest length were 21, 19, 11, 27 and 18mm	Pass
4	Resistance against sudden temperature changes and temperature differentials	EN 12150-1:2000	Specimen must resist against sudden temperature changes and temperature differentials up to 200K	Specimen remain unbroken when sudden temperature changes and temperature differential is 250K	Pass

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No.	Test Item	Test Method	Requirement	Test Result	Verdict
5	Mechanical strength	EN 1288-3:2000	≥120N/mm^2	234 N/mm^2	Pass
				210 N/mm^2	
				143 N/mm^2	
6	Classification of performance under accidental human impact	EN 12600:2002	—— (See Note 1)	Performance Classification: 1(C)1(See note 1)	—— (See Note 1)

Note 1: As per EN 12150-1:2000 Clause 9.5 Classification of performance under accidental human impact. The safety glass should be classified by testing in accordance with EN 12600. The performance classification should be given as:

α(β)Φ

where,

α is the highest drop height class at which the product either did not break or broke in accordance with a) or b) of clause 4 of EN 12600;

Classification	Drop height(mm)
3	190
2	450
1	1200

β is the mode of breakage;

Type A – mode of breakage typical of annealed glass;

Type B – mode of breakage typical of laminated glass;

Type C – mode of breakage typical of toughened glass;

Φ is the highest drop height class at which the product either did not break or when broke, broke in accordance with a) of clause 4 of EN 12600.

******** To be continued********

The test specimens did not break at the drop height of 190mm, 450mm and 1200mm, the highest drop height class is class 1. So the performance classification is given as 1(C)1.

2. Nominal Thickness 5mm

No.	Test Item	Test Method	Requirement	Test Result	Verdict
1	Nominal thickness and thickness tolerances	EN 12150-1:2000	±0.2mm	-0.17mm	Pass
2	Flatness	EN 12150-1:2000	Overall bow: ⩽0.003mm/mm	0.002mm/mm	Pass
			Local bow: ⩽0.5mm/300mm	0.0mm/300mm	
3	Fragmentation test	EN 12150-1:2000	5 specimens must be tested and meet the requirements: ①In any area of 50mm×50mm, the minimum particle count is 40 pieces; ②A few long fragment will be allowed, but no longer than 100mm	Particle count of 5 specimens were 156, 208, 178, 164 and 211, particle with longest length were 18, 24, 17, 22 and 19mm	Pass
4	Mechanical strength	EN 1288-3:2000	≥120N/mm^2	161 N/mm^2	Pass
				170 N/mm^2	
				163 N/mm^2	

3. Nominal Thickness 6mm

No.	Test Item	Test Method	Requirement	Test Result	Verdict
1	Nominal thickness and thickness tolerances	EN 12150-1:2000	±0.2mm	-0.14mm	Pass
2	Flatness	EN 12150-1:2000	Overall bow: ⩽0.003mm/mm	0.001mm/mm	Pass
			Local bow: ⩽0.5mm/300mm	0.0mm/300mm	

******** To be continued********

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No.	Test Item	Test Method	Requirement	Test Result	Verdict
3	Fragmentation test	EN 12150-1:2000	5 specimens must be tested and meet the requirements: ①In any area of 50mm×50mm, the minimum particle count is 40 pieces; ②A few long fragment will be allowed, but no longer than 100mm	Particle count of 5 specimens were 214, 213, 209, 217 and 198, particle with longest length were 16, 19, 15, 17 and 15mm	Pass
4	Mechanical strength	EN 1288-3:2000	≥120N/mm^2	160 N/mm^2	Pass
				175N/mm^2	
				195N/mm^2	

4. Nominal Thickness 8mm

No.	Test Item	Test Method	Requirement	Test Result	Verdict
1	Nominal thickness and thickness tolerances	EN 12150-1:2000	±0.3mm	-0.15mm	Pass
2	Flatness	EN 12150-1:2000	Overall bow: ⩽0.003mm/mm	0.001mm/mm	Pass
			Local bow: ⩽0.5mm/300mm	0.0mm/300mm	
3	Fragmentation test	EN 12150-1:2000	5 specimens must be tested and meet the requirements: ①In any area of 50mm×50mm, the minimum particle count is 40 pieces; ②A few long fragment will be allowed, but no longer than 100mm	Particle count of 5 specimens were 164, 153, 167, 150 and 149, particle with longest length were 23, 22, 27, 22 and 14mm	Pass
4	Mechanical strength	EN 1288-3:2000	≥120N/mm^2	216 N/mm^2	Pass
				177 N/mm^2	
				170 N/mm^2	

******** To be continued********

5. SVHC

Test Requested: As requested by client, SVHC screening is performed according to: (i) Thirty eight (38) substances in the Candidate List of Substances of Very High Concern (SVHC) for authorization published by European Chemicals Agency (ECHA) by June 18, 2010 regarding Regulation (EC) No 1907/2006 concerning the REACH.

Summary	According to the specified scope and analytical techniques, concentrations of tested SVHC are ≤0.1% (w/w) in the submitted sample.	PASS

Sample Description: transparent glass

Test Method: SGS In-House method-SHTC-CHEM-SOP-97-T, SHTC-CHEM-SOP-302-T. Analyzed by ICP-OES, GC-MS, and UV-VIS.

Test Result: (Substances in the Candidate List of SVHC)

Substance Name	CAS No.	EC No.	Concentration(%)	RL (%)
2,4-Dinitrotoluene	121-14-2	204-450-0	ND	0.050
4,4-Diaminodiphenylmethane(MDA)	101-77-9	202-974-4	ND	0.050
5-tert-butyl-2,4,6-trinitro-m-xylene (musk xylene)	81-15-2	201-329-4	ND	0.050
Acrylamide	79-06-01	201-173-7	ND	0.050
Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins)	85535-84-8	287-476-5	ND	0.050
Aluminosilicate Refractory Ceramic Fibres*	650-017-00-8 (Index no.)	-	ND	0.005
Ammonium dichromate*	7789-09-5	232-143-1	ND	0.005
Anthracene	120-12-7	204-371-1	ND	0.050
Anthracene oil*	90640-80-5	292-602-7	ND	0.050
Anthracene oil, anthracene paste*	90640-81-6	292-603-2	ND	0.050

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Substance Name	CAS No.	EC No.	Concentration(%)	RL (%)
Anthracene oil, anthracene paste, anthracene fraction*	91995-15-2	295-275-9	ND	0.050
Anthracene oil, anthracene paste, distn. lights*	91995-17-4	295-278-5	ND	0.050
Anthracene oil, anthracene-low*	90640-82-7	292-604-8	ND	0.050
Benzyl butyl phthalate (BBP)	85-68-7	201-622-7	ND	0.050
Bis (2-ethylhexyl)phthalate (DEHP)	117-81-7	204-211-0	ND	0.050
Bis(tributyltin)oxide (TBTO)	56-35-9	200-268-0	ND	0.050
Boric acid*	10043-35-3 11113-50-1	233-139-2 234-343-4	ND	0.005
Cobalt dichloride*	7646-79-9	231-589-4	ND	0.005
Diarsenic pentaoxide*	1303-28-2	215-116-9	ND	0.005
Diarsenic trioxide*	1327-53-3	215-481-4	ND	0.005
Dibutyl phthalate (DBP)	84-74-2	201-557-4	ND	0.050
Diisobutyl phthalate	84-69-5	201-553-2	ND	0.050
Disodium tetraborate, anhydrous*	1303-96-4 1330-43-4 12179-04-3	215-540-4	ND	0.005
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α-HBCDD, β-HBCDD, γ-HBCDD)△	25637-99-4 and 3194- 55-6	247-148-4 and 221-695-9	ND	0.050
Lead chromate*	7758-97-6	231-846-0	ND	0.005
Lead chromate molybdate sulphate red (C.I. Pigment Red 104)*	12656-85-8	235-759-9	ND	0.005
Lead hydrogen arsenate*	7784-40-9	232-064-2	ND	0.005
Lead sulfochromate yellow (C.I. Pigment Yellow 34)*	1344-37-2	215-693-7	ND	0.005

******** To be continued********

Substance Name	CAS No.	EC No.	Concentration(%)	RL (%)
Pitch, coal tar, high temp.*	65996-93-2	266-028-2	ND	0.050
Potassium chromate*	7789-00-6	232-140-5	ND	0.005
Potassium dichromate*	7778-50-9	231-906-6	ND	0.005
Sodium chromate*	7775-11-3	231-889-5	ND	0.005
Sodium dichromate*	7789-12-0 and 10588-01-9	234-190-3	ND	0.005
Tetraboron disodium heptaoxide, hydrate*	12267-73-1	235-541-3	ND	0.005
Trichloroethylene	79-01-6	201-167-4	ND	0.050
Triethyl arsenate*	15606-95-8	427-700-2	ND	0.005
Tris(2-chloroethyl)phosphate	115-96-8	204-118-5	ND	0.050
Zirconia Aluminosilicate Refractory Ceremic Fibres*	650-017-00-8 (Index no.)	-	ND	0.005

Notes 2:

(1) RL = Reporting Limit. All RL are based on homogenous material

ND = Not detected (lower than RL), ND is denoted on the SVHC substance.

(2) △CAS No. of diastereoisomers identified (α-HBCDD, β-HBCDD, γ-HBCDD): 134237-50-6, 134237-51-7, 134237-52-8

(3) * The test result is based on the calculation of selected element(s) / marker(s) and to the worst-case scenario. For detail information, please refer to the SGS REACH website: www.reach.sgs.com/substance-of-very-high-concern-analysis-information-page.htm

Calculated concentration of boric acid, disodium tetraborate, anhydrous and tetraboron disodium heptaoxide, hydrate are based on the water extractive boron and sodium by ICP-OES.

RL = 0.005% is evaluated for element (i.e. cobalt, arsenic, lead, sodium, chromium, chromium (VI), silicon, aluminum, zirconium, boron, and potassium respectively), except molybdenum RL=0.0005%.

******** To be continued********

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Remark :

(1)The chemical analysis of specified SVHC is performed by means of currently available analytical techniques against the following SVHC related documents published by ECHA:
http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp
These lists are under evaluation by ECHA and may subject to change in the future.

(2)In accordance with Regulation (EC) No 1907/2006, any EU producer or importer of articles shall notify ECHA, in accordance with paragraph 4 of Article 7, if a substance meets the criteria in Article 57 and is identified in accordance with Article 59(1) of the Regulation, if (a) the substance in the Candidate List is present in those articles in quantities totaling over one tonne per producer or importer per year; and (b) the substance in the Candidate List is present in those articles above a concentration of 0.1% weight by weight (w/w).

(3)Article 33 of Regulation (EC) No 1907/2006 requires supplier of an article containing a substance meeting the criteria in Article 57 and identified in accordance with Article 59(1) in a concentration above 0.1% weight by weight (w/w) shall provide the recipient of the article with sufficient information, available to the supplier, to allow safe use of the article including, as a minimum, the name of that substance in the Candidate List.

(4)If a SVHC is found over the reporting limit, client is suggested to identify the component which contains the SVHC and the exact concentration of the SVHC by requesting further quantitative analysis from the laboratory.

******** End of report ********

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