Test Report No. 7191031433-MEC12-JWG
dated 26 APR 2012

PSB Singapore

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SUBJECT:

Testing of "Cresto Quartz" Brand Solid Surfacing Material

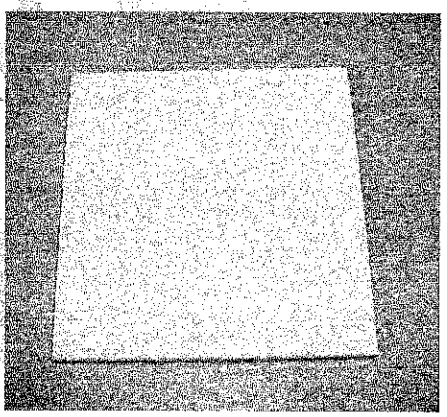
TESTED FOR:

Co-Top Design Services
No. 2 Kranji Link
Singapore 728648

Attn: Mr Rikki Chow

SAMPLE DESCRIPTION:

The following brand of solid surfacing material test specimen was submitted by Co-Top Design Services on 5th April 2012 and labelled as: "Cresto Quartz".

Nominal specimen dimensions	Quantity	Photo
300mm x 150mm x 20mm	7 pcs	
250mm x 250mm x 20mm	4 pcs	
200mm x 200mm x 20mm	4 pcs	
76mm x 25mm x 20mm	6 pcs	
64mm x 13mm x 20mm	12 pcs	
50mm x 50mm x 20mm	54 pcs	
50mm x 25mm x 20mm	4 pcs	
10mm x 10mm x 20mm	7 pcs	
ASTM D638, Type III	8 pcs	

TÜV SÜD PSB

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TEST METHODS:

PS 18 : 1966
International Association of Plumbing and Mechanical Officials – Material and Property Standard for Cultured Marble Lavatory

1) Density
ASTM D792-2008
Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

Norminal specimen dimensions	:	50mm x 25mm x 20mm
No. of determinations	:	2

2) Impact Resistance
PS18, Clause 4.1

Norminal specimen dimensions	:	250mm x 250mm x 20mm
Dropped height	:	6" of reverse side and 30" on the gel coat side
No. of determination	:	1

3) Barcol Hardness
PS18, Clause 5.4

Norminal specimen dimensions	:	250mm x 250mm x 20mm
No. of determinations	:	40

4) Oven Test for Cracking and Crazing
PS18, Clause 5.5

Norminal specimen dimensions	:	200mm x 200mm x 20mm
Test condition	:	74 ± 2°C for 10 days
No. of determinations	:	2

5) Water Absorption
PS18, Clause 4.4

Norminal specimen dimensions	:	76mm x 25mm x 20mm
Pre-conditioning	:	50 ± 3°C for 24hrs
Water immersion	:	23 ± 1°C for 24hrs
Reconditioning	:	50 ± 3°C for 24hrs
No. of determinations	:	3

6) Stain
PS18, Clause 5.8

Norminal specimen dimensions	:	250mm x 250mm x 20mm
Test condition	:	23 ± 2°C for 24hrs
No. of determination	:	1

7) Scrub Test (Washability)
PS18, Clause 5.9

Norminal specimen dimensions	:	300mm x 150mm x 20mm
No. of cycles	:	40,000
No. of determinations	:	2

TEST METHODS (CONTINUE):

8) Cigarette Test
PS18, Clause 5.8

Norminal specimen dimensions	:	150mm x 150mm x 20mm
Burning time	:	3 mins
No. of determination	:	1

9) Izod Impact Strength
ASTM D256:2010
Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

Norminal specimen dimensions	:	64mm x 13mm x 20mm
Capacity of pendulum	:	2J
No. of determinations	:	9

10) Tensile Properties
ASTM D638:2003
Standard Test Method for Tensile Properties of Plastics

Nominal specimen dimensions	:	ASTM D638, Type III
Initial gauge length	:	50mm
Length of grip separation	:	115mm
Crosshead speed	:	5mm/min
No. of determinations	:	5

11) Coefficient of Thermal Expansion by Thermomechanical Analysis
ASTM E831:2006
Standard Test Method for Linear Thermal Expansion of Solid Materials by Thermomechanical Analysis

Instrument used	:	TMA 2940 Thermomechanical Analyzer
Test condition	:	Ambient to 200°C
Nominal thickness	:	6 mm
Heating rate	:	5°C/min
Load	:	0.02N
Atmosphere	:	Air

12) Chemical Resistance

Norminal specimen dimensions	:	50mm x 50mm x 20mm
Test condition	:	23 ± 2°C for 24hrs
No. of determination	:	1

TEST RESULTS:

S/N	Test Characteristics	Test Results / Obervations	PS 18-66 Test Requirements
1	Density (g/cm^3), average	2.38	NA
2	Impact Resistance	No visible cracks was observed	Shall not show cracks
3	Barcol Hardness, average	77	40 minimum
4	Oven test for Cracking or Crazing	No visible cracks or crazing was observed	Shall not show evidence of cracking or crazing
5	Water absorption (%), average	0.012	Shall not absorb water in excess of 0.58% in 24hrs
6	Stain (a) Coffee (b) Tea (c) Washing Detergent (d) Acetone (e) Olive Oil (f) Lipstick (g) Fly Spray (h) Ink Washable (i) 6% Urea (j) Alcohol (k) 1% Iodine (l) Shoe Polish (paste form) (m) Vinegar (n) 10% Household Ammonia Solution (o) 10% Citric Acid solution (p) Amy Acetate (q) Carbon Tetrachloride (r) Trisodium Phosphate	 No effect No effect No effect No effect No effect No effect No effect No effect No effect No effect No effect No effect No effect No effect No effect No effect No effect No effect	Shall be such that it will withstand all reagents
7	Scrub Test	No brush marks were observed on the two tested solid surface panels	Shall withstand 40,000 cycles. Only slight brush marks are allowed
8	Cigarette Test (mm)	0.01	Shall not be more than 0.38mm
9	Izod Impact Strength (J/m), average	76.7	NA
10	(a) Maximum Tensile Strength (MPa), average (b) Elongation at Break (%), average	11.1 0.04	NA NA
11	Coefficient of Thermal Expansion (µm/m·°C) Alpha 1 (70°C to 180°C)	60 **(Figure 1)**	NA

TEST RESULTS: (CONTINUE)

Chemical Resistance	Test Results / Observations*	
	Results	Test Requirements
1) Hydrofluoric Acid (40%)	1.0	0
2) Hydrofluoric Acid (20%)	1.0	0
3) Nitric Acid (Conc)	0	1.0
4) Nitric Acid (20%)	0	0
5) Sulphuric Acid (98%)	0.5	3.0
6) Sulphuric Acid (20%)	0	0
7) Perchloric Acid (80%)	0	0
8) Perchloric Acid (12%)	0	0
9) Phosphoric Acid (85%)	0	0
10) Phosphoric Acid (17%)	0	0.5
11) Sodium Hydroxide (sat. aq)	0	0.5
12) Sodium Hydroxide (20%)	0	2.0
13) Potassium Hydroxide (30%)	0	0.5
14) Potassium Hydroxide (10%)	0	0
15) Alcoholic Potassium Hydroxide (30%)	0	0
16) Ammonia (0.89%)	0	0
17) Acetone	0	0.5
18) Chloroform	0	0
19) Carbon Tetrachloride	0	0
20) Toluene	0	0
21) Iso-propyl-alcohol (IPA)	0	0
22) Tetra hydro furan	0	0
23) Ethyl acetate	0	0
24) Di-ethyl-ether	0	0
25) Bleach (Household)	0	0
26) Hydrogen peroxide (3%)	0	0
27) Iodine (3.5%) aq	0	0
28) Bromine (sat. aq)	0	0
29) Potassium permanganate (sat.)	2.0	0
30) Ferric chloride (25%)	0	0
31) Silver Nitrate (5%)	2.0	1.0
32) Lead acetate (sat. aq)	0	0
33) Writing ink (Common)	1.0	0
34) Gentian violet (1% aq)	2.0	0
35) Motor Oil	0	0
36) Methyl alcohol	0	0
37) Acetic Acid	0	0

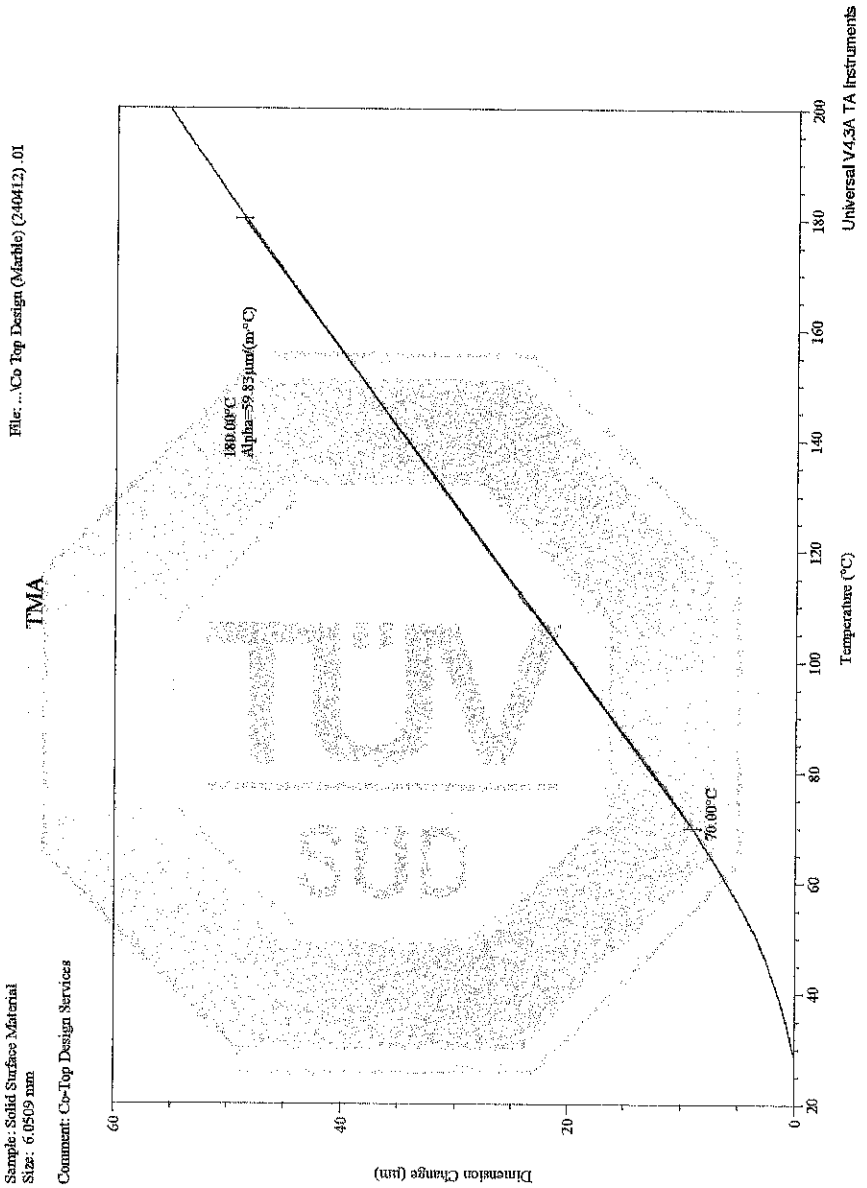
REMARKS:

0 denotes "No effect"
0.5 denotes "Faint Mark"
1.0 denotes "Noticeable Mark"
2.0 denotes "Obvious Mark"
3.0 denotes "Severe Mark"

June Wong
Associate Engineer

Li Xiang
Engineer
Polymer Products
Mechanical Centre

Figure 1: TMA thermogram of "Cresto Quartz" brand solid surfacing material test specimen



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July 2011