Test Report No. 7191084518-MEC14/02-ED
dated 11 Jun 2014

PSB Singapore

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SUBJECT:

Testing of sealant

TESTED FOR:

PFE Technologies Pte Ltd
No. 9 Gul Street 4
Singapore 629238

Attn: Mr Paul John Francia

SAMPLE DESCRIPTION:

The following items were received on 28 Mar 2014 as shown:

Sample	Size	Quantity
'Pereseal Neutral Seal & Weatherproof'	300 ml/cartridge	10 cartridges

TEST METHODS:

Adopted ASTM C920 : 2008 Standard Specification For Elastomeric Joint Sealants

Staining And Colour Change

1. ASTM C510 : 2005 Standard Test Method For Staining And Colour Change Of Single Or Multi-Component Joint Sealants

Test cycle	:	8 hours UV exposure at 55°C and 4 hours condensation at 45°C
Exposure duration	:	100 hours
No. of determination	:	1 for staining test, 1 for colour change test, 1 as control

Extrudability

2. ASTM C1183 : 2008 Standard Test Method For Extrusion Rate Of Elastomeric Sealants
(Cross Reference: ASTM D1475 : 2008 Standard Test Method For Density Of Liquid Coatings, Inks And Related Products)

Apparatus	:	Pycnometer and caulking gun
Test pressure	:	40 psi
No. of determination	:	1

TÜV SÜD PSB

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Flow Properties

3. ASTM C639 : 2007 Standard Test Method For Rheological (Flow) Properties Of Elastomeric Sealants

Method	:	Test method for 'Type II' sealant
Test conditions	:	a) 4.4°C in environmental chamber for 4 hours b) 50°C in oven for 4 hours
No. of determinations	:	2 for vertical and horizontal displacements

Hardness

4. ASTM C661 : 2006 Standard Test Method For Indentation Hardness Of Elastomeric-Type Sealants By Means Of A Durometer

Test Conditions:
a) 23°C and 50% relative humidity for 7 days
b) 38°C and 95% relative humidity for 7 days
c) 23°C and 50% relative humidity for 7 days

No. of determinations : 2, 3 points per test piece

Tack-Free Time

5. ASTM C679 : 2003 Standard Test Method For Tack-Free Time Of Elastomeric Sealants

No. of determinations : 2

Cyclic Adhesion & Cohesion

6. ASTM C719 : 2005 Standard Test Method For Adhesion And Cohesion Of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)

Test Conditions:
a) 23°C and 50% relative humidity for 7 days
b) 38°C and 95% relative humidity for 7 days
c) 23°C and 50% relative humidity for 7 days
d) Immersion in distilled water at 23°C for 7 days
e) Drying in oven at 70°C for 7 days

Cyclic Test Conditions:
Stage A-10 cycles of joint movements:
a) The joint width was compressed from 12.7mm to 9.5mm at 3.2 mm/h
b) It was extended from 9.5mm to 15.9mm at 3.2 mm/h
c) It was compressed again from 15.9mm to 12.7mm at 3.2 mm/h

Stage B-10 cycles of joint movements:
a) The joint width was compressed to 9.5mm and conditioned at 70°C for 16 to 20 hours
b) After ageing, the test specimens were cooled to 23°C for 2 to 3 hours
c) The joint width was extended to 15.9mm at -26°C and 3.2 mm/h
d) The specimens were removed and allowed to condition to room temperature

No. of determinations : 3

Effects Of Heat Ageing

7. ASTM C1246 : 2006 Standard Test Method For Effects Of Heat Ageing On Weight Loss, Cracking, And Chalking Of Elastomeric Sealants After Cure

Test Conditions:
a) 23°C and 50% relative humidity for 28 days
b) 70°C for 21 days

No. of determinations	:	3, 1 as control

Effects Of Accelerated Weathering

8. Adopted ASTM C793 : 2005 Standard Test Method For Effects Of Accelerated Weathering On Elastomeric Joint Sealants

Test cycle	:	8 hours UV exposure at 55°C and 4 hours condensation at 45°C
Lamp designation	:	Fluorescent UVA 340 mm
Exposure duration	:	250 hours
No. of determinations	:	3 (1 as control)
Bend test		
Apparatus	:	Steel mandrel
Test condition	:	-26°C for 24 hours
No. of determinations	:	3

Adhesion-In-Peel

9. ASTM C794 : 2006 Standard Test Method For Adhesion-In-Peel Of Elastomeric Joint Sealants

Test Conditions:
a) 23°C and 50% relative humidity for 7 days
b) 38°C and 95% relative humidity for 7 days
c) 23°C and 50% relative humidity for 7 days
d) Immersion in water at 23°C for 7 days

Crosshead speed	:	50.8 mm/min
No. of determinations	:	4

Material Identification/Verification

10. Material Identification/Verification By Fourier Transform Infra-Red Spectrometric Analysis (FTIR)

CONDITIONING:

Unless otherwise specified, all test specimens were tested at 23 ± 2°C and 65 ± 5% relative humidity.

TEST RESULTS:

Test	'Pereseal Neutral Seal & Weatherproof'	ASTM C920 : 2008 Standard Specification For Elastomeric Joint Sealants
1. Staining And Colour Change	No staining and no colour change	The sealant shall not cause any visible staining on the top surface of a white cement mortar base
2. Extrudability	>10 ml/min	Type S (single component), grade NS (non-sag or gunnable sealant) shall have an extrusion rate time of not < 10 ml/min
3. Rheological (Flow) Properties	Vertical displacement: 0 mm sag Horizontal displacement: No deformation	Grade NS (non-sag) or gunnable sealant shall have flow characteristics such that it does not sag >4.8mm in vertical displacement and shall show no deformation in horizontal displacement (refers to Types II and IV sealants)
4. Indentation Hardness test piece 1, average test piece 2, average	 22 22	T (traffic) sealant shall have a hardness reading of not <25 or >50 after being properly cured NT (non-traffic) sealant shall have a hardness reading of not <15 or >50 after being properly cured
5. Tack-Free Time	No transfer of test specimens to the polyethylene film	There shall be no transfer of the sealant to the polyethylene film when tested at 72 hours
6. Adhesion & Cohesion Under Cyclic Movement	No bond failure	The total loss in bond and cohesion areas among the three specimens tested for each surface shall not be >9 cm^2 with mortar substrates
7. Effects Of Heat Ageing On Weight Loss, Cracking And Chalking, average	0.5% No cracking and chalking	The sealant shall not lose >7% of its original weight or show any cracking and chalking
8. Effects Of Accelerated Weathering	No cracks after UV exposure and bend test	The sealant shall show no cracks after the specified UV exposure and shall show no cracks after exposure at cold temperature and the bend test
9. Adhesion-In-Peel, average test sample 1 test sample 2 test sample 3 test sample 4	85.1 N (19.2 lbf) 84.3 N (19.0 lbf) 85.5 N (19.3 lbf) 89.2 N (20.1 lbf) 81.6 N (18.4 lbf) cohesive failure within the sealant and no adhesive bond loss between sealant and substrate for each test piece	The peel strength for each individual test shall not be <22.2 N (5 lbf) and the sealant shall show no >25% adhesive bond loss for each individual test
10. Material Identification/ Verification By FTIR	Silicone-based material (refer to Figure 1)	-

REMARKS:

The test conditions for staining and colour change tests and effects of accelerated weathering test were adopted from ASTM G154 : 2006 Standard Practice For Operating Fluorescent Light Apparatus For UV Exposure Of Non-Metallic Materials.

Eddie Suwand
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Product Manager
Building
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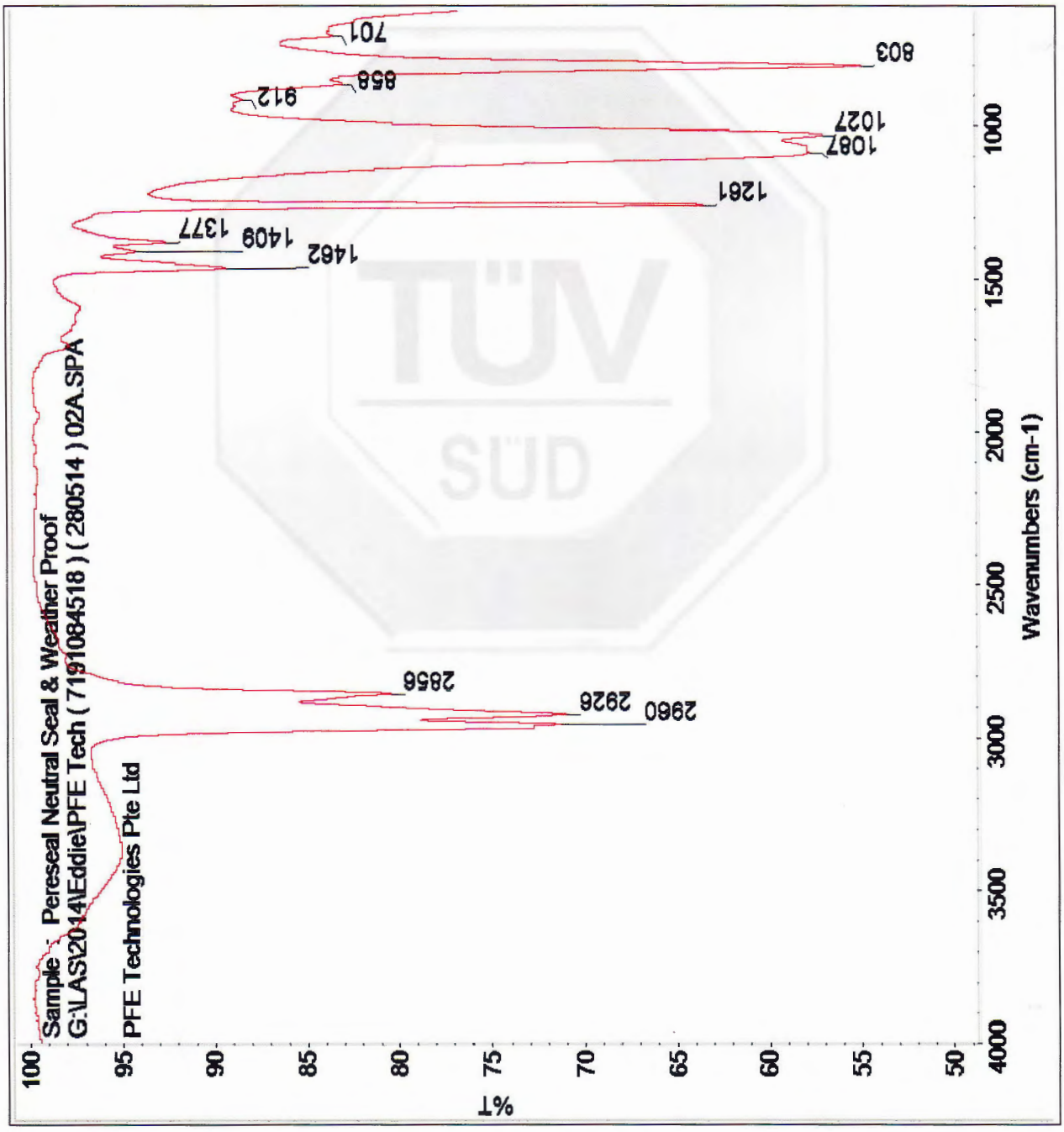
Figure 1 : IR spectrum of 'Pereseal Neutral Seal & Weatherproof'



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July 2011