

TEST REPORT



Your Ref: -

Date: 27 Mar 2006

Our Ref: 54S061301/ED

Page: 1 of 7

DID: 6885 1414

Fax: 6779 3903

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SUBJECT:

Testing of sealant

TESTED FOR:

PFE Technologies Pte Ltd
9 Gul Street 4
Singapore 629238

Attn: Mr Edward Woo

SAMPLE DESCRIPTION:

The following items were received as shown:

Sample/Substrate	Volume	Quantity	Date Received
'Pereseal Polyurethane Sealant'	600 ml	2 cartridges	6 Oct 2005
		5 cartridges	27 Oct 2005



TEST METHODS:

ASTM C920 : 2001 Standard Specification For Elastomeric Joint Sealants

Staining And Colour Change

1. ASTM C510 : 1997 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 : 1997 Standard Test Method For Extrusion Rate Of Elastomeric Sealants (Cross Reference: ASTM D1475 :1998 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 |

Flow Properties

3. ASTM C639 : 2001 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 displacement |

Hardness

4. ASTM C661 : 1998 Standard Test Method For Indentation Hardness Of Elastomeric-Type Sealants By Means Of A Durometer
- Test Conditions:
- | | |
|-----------------------|---|
| a) | 23°C and 70% relative humidity for 7 days |
| b) | 38°C and 95% relative humidity for 7 days |
| c) | 23°C and 70% relative humidity for 7 days |
| No. of determinations | : 2 (3 points per test piece) |

Tack-Free Time

5. ASTM C679 : 1997 Standard Test Method For Tack-Free Time Of Elastomeric Sealants
- | | | |
|-----------------------|---|---|
| No. of determinations | : | 2 |
|-----------------------|---|---|



Cyclic Adhesion & Cohesion

6. ASTM C719 : 1998 Standard Test Method For Adhesion And Cohesion Of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)

Test Conditions:

- a) 23°C and 65% relative humidity for 7 days
- b) 38°C and 90% relative humidity for 7 days
- c) 23°C and 65% 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 11.1mm at 3.2 mm/h
- b) It was extended from 11.1mm to 14.3mm at 3.2 mm/h
- c) It was compressed again from 14.3mm to 12.7mm at 3.2 mm/h

Stage B-10 cycles of joint movements:

- a) The joint width was compressed to 11.1mm 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 14.3mm 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 : 2000 Standard Test Method For Effects Of Heat Ageing On Weight Loss, Cracking, And Chalking Of Elastomeric Sealants After Cure

Test Conditions:

- a) 23°C for 28 days
- b) 70°C for 21 days

No. of determinations : 3 (1 as control)

Effects Of Accelerated Weathering

8. Adopted ASTM C793 : 1997 Standard Test Method For Effects Of Accelerated Weathering On Elastomeric Joint Sealants

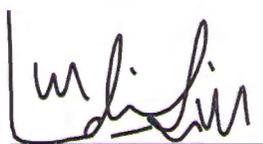
Test cycle : 8 hours UV exposure at 55°C and 4 hours condensation at 55°C
 Lamp designation : Fluorescent UVA 340 mm
 Exposure duration : 250 hours
 No. of determinations : 3 (1 as control)
 Bend test apparatus : Steel mandrel
 Test condition : -26°C for 24 hours
 No. of determinations : 3

TEST RESULTS:

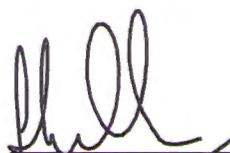
Test	'Pereseal Polyurethane Sealant'	ASTM C920 : 2001 Standard Specification For Elastomeric Joint Sealants
6. Adhesion & Cohesion Under Cyclic Movement	No bond failure	The total loss in bond and cohesion areas among the three specimens tested for each surface shall not be >9 cm ² with mortar substrates
7. Effects Of Heat Ageing On Weight Loss, Cracking And Chalking, average	2.3% 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 (a) Mortar (b) Glass (c) Aluminium	63.1 N (14.2 lbf) 191.7 N (43.2 lbf) 144.4 N (32.5 lbf)	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	Polyurethane-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 : 2000a Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Non-Metallic Materials.

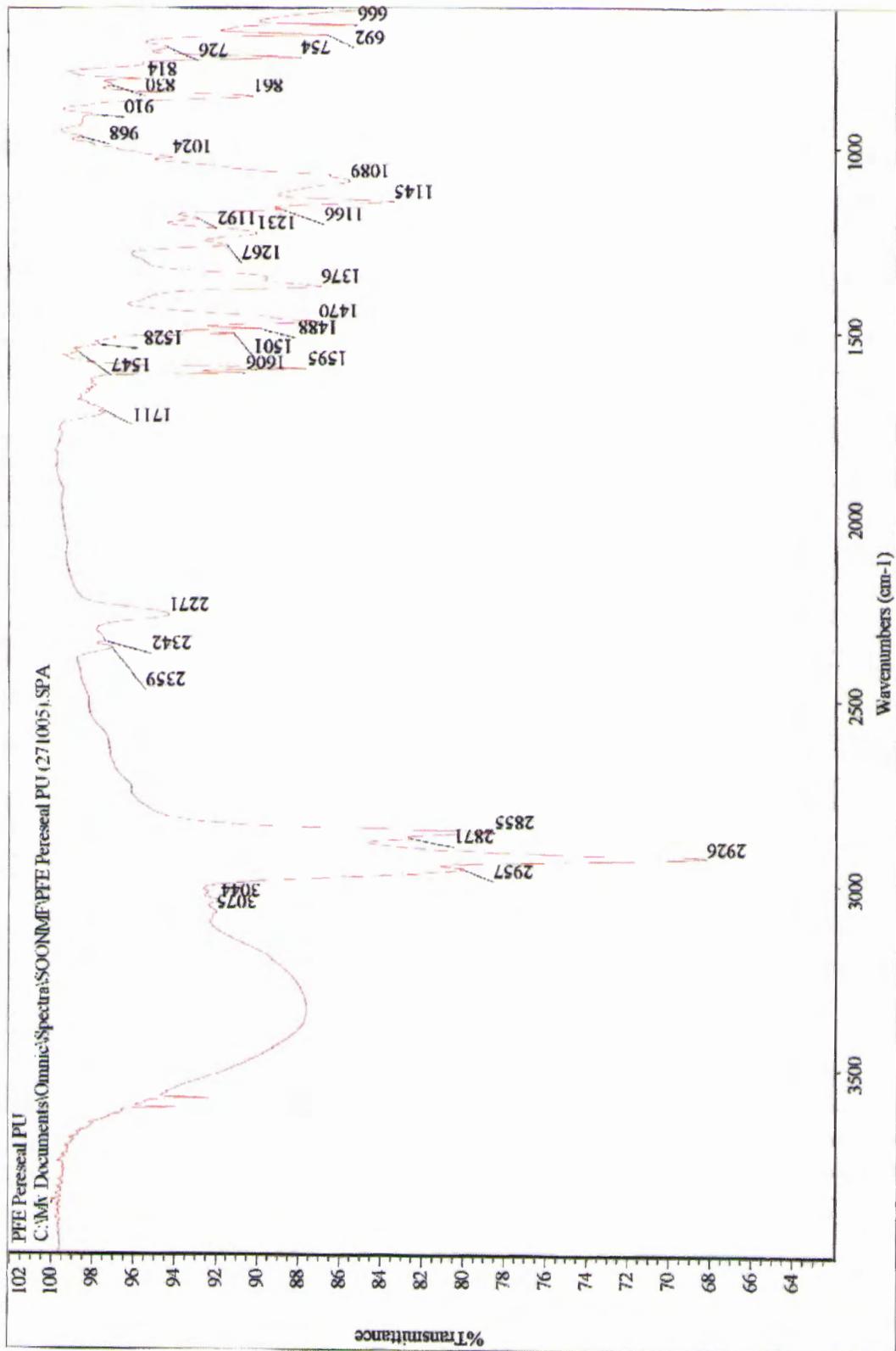


EDDIE SUWAND
ASSOCIATE ENGINEER



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Figure 1 : IR spectrum of 'Pereseal Polyurethane Sealant'



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May 2005