Test Report No. 7191168557-MEC17-ED
dated 1 Nov 2017

PSB Singapore

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SUBJECT:

Testing of sanitary sealant

TESTED FOR:

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

Attn: Mr Hans Goh

SAMPLE DESCRIPTION:

The following items were received on 28 Jul 017 as shown:

Sample	Size	Quantity
'Pereseal AF Bathroom And Kitchen Sealant' (Photo 1)	300 g/cartridge	10 cartridges

TEST METHODS:

HDB Specification : Sanitary Sealant

Chemical Resistance

1. Adopted ANSI Z124.3 : 1995 American National Standards For Plastic Lavatories
   Section 5.2 : Stain Resistance Test

Test condition	:	Close spot for 16 hours
Reagent	:	a. Household bleach (Concentrated Sodium Hypochlorite) b. Urine/Urea (6% Uric acid)
No. of determination	:	1 per reagent

Staining And Colour Change

2. Adopted ASTM C510 : 2016 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

TÜV SÜD PSB

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Extrudability

3. Adopted ASTM C1183/C1183M : 2013 Standard Test Method For Extrusion Rate Of Elastomeric Sealants

Test pressure	:	40 psi
No. of determination	:	1

Flow Properties

4. ASTM C639 : 2015 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

5. ASTM C661 : 2015 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

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

No. of determinations	:	2

Cyclic Adhesion & Cohesion

7. Adopted ASTM C719 : 2014 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

Test temperature	:	Room temperature
No. of determinations	:	3 for class 25

Effects Of Heat Ageing

8. ASTM C1246 : 2017 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

9. Adopted ASTM C793 : 2005 (2017) 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

10. ASTM C794 : 2015a 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

Fungal Resistance

11. Adopted ISO 846 : 1997 Plastics - Evaluation Of The Action Of Micro-Organisms
Section 8.2.2 : Determination Of Fungistatic Effect

Method	:	B
Test fungi	:	Aspergillus Niger (ATCC 6275) Penicillium Pinophilum (ATCC 36839) Chaetomium Globosum (ATCC 6205) Gliocladium Virens (ATCC 9645) Paecilomyces Variotti (ATCC 18502)
Incubation condition	:	29°C and above 95% relative humidity for 28 days

Intensity of growth	Evaluation
0	No growth apparent under the microscope
1	No growth visible to the naked eye, but clearly visible under the microscope
2	Growth visible to the naked eye, covering up to 25% of the test surface
3	Growth visible to the naked eye, covering up to 50% of the test surface
4	Considerable growth, covering more than 50% of the test surface
5	Heavy growth, covering the entire test surface

CONDITIONING:

Unless otherwise specified, all test specimens were conditioned at 23 ± 2°C, 70 ± 15% relative humidity and tested at 23 ± 2°C, 65 ± 5% relative humidity.

TEST RESULTS:

Test	'Pereseal AF Bathroom And Kitchen Sealant'	Sanitary Sealant, Acceptance Criteria
1. Chemical Resistance a. Household bleach b. Urine/urea (6% Uric Acid)	 No effect No effect	 Surface shall be unaffected after 16 hours of spot covered test
2. Staining And Colour Change	No colour change and no stain	No colour change, no stains
3. Extrudability	32.8 ml/min	≥ 10 ml/min
4. Rheological (Flow) Properties	Vertical displacement : 0 mm sag Horizontal displacement : No deformation	≤ 4.8 mm in vertical displacement Nil in horizontal displacement
5. Indentation Hardness, average	test piece 1, average : 30.5 test piece 2, average : 29.5 average of 2 test pieces : 30.0	≥ 15 and ≤ 50
6. Tack-Free Time	No transfer of test specimens to the polyethylene film	≤ 4 hours
7. Effects Of Heat Ageing On Weight Loss, Cracking And Chalking, average	 No cracking and chalking 1.2%	 No cracking/chalking ≤ 7% loss of weight
8. Adhesion & Cohesion Under Cyclic Movement	 No loss in bond	 < 90 mm^2 break
9. Effects Of Accelerated Weathering	No cracks after UV exposure and after bend test	No cracks after ultraviolet test and bend test
10. Adhesion-In-Peel, average	41.7 N cohesive failure within the sealant and no adhesive bond loss between sealant and substrate for each test piece	≤ 25% adhesive bond loss

TEST RESULTS:

Test	'Pereseal AF Bathroom And Kitchen Sealant'	Sanitary Sealant, Acceptance Criteria
11. Fungal Resistance, Rating Of Fungal Growth On Test Specimens At The End Of Incubation period	Batch 0 #1 : 0 (None) #2 : 0 (None) #3 : 0 (None) #4 : 0 (None) #5 : 0 (None)	-
	Batch I #1 : 0 (None) #2 : 0 (None) #3 : 0 (None) #4 : 0 (None) #5 : 0 (None)	No growth (Intensity of growth = 0)
	Batch S #1 : 0 (None) #2 : 0 (None) #3 : 0 (None) #4 : 0 (None) #5 : 0 (None)	-
Spore Viability Check #1 #2		- Growth Growth

Note :

Batch 0 : Control samples, stored under standard temperature and moisture conditions without inoculation.
Batch I : Test samples inoculated with micro-organisms and incubated.
Batch S : Sterile samples, stored under the same conditions a Batch I without inoculation.

REMARKS:

1. The test conditions for staining and colour change tests and effects of accelerated weathering test were adopted from ASTM G154 : 2016 Standard Practice For Operating Fluorescent Light Apparatus For UV Exposure Of Non-Metallic Materials.
2. Fungal Resistance ISO 846
   a. The test results showed that the sample exhibits strong fungistatic effect.
   b. The test results related to the samples as received.

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Senior Associate Engineer

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Engineer
Real Estate & Infrastructure
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Photo 1 : 'Pereseal AF Bathroom And Kitchen Sealant'

PSB Singapore

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