FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

REPORT ON PERFORMANCE TEST OF SILICONE SEALANT

Client	:	Wacker Chemicals Korea Inc.
Project	:	Testing of Silicone Sealant
Client Ref.	:	--
Report No.	:	250750PC250235
Date	:	11 June 2025

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Client Ref. : --
Report No. : 250750PC250235

1.0 Introduction

Fugro Technical Services Limited was commissioned by the client, Wacker Chemicals Korea Inc. to conduct a series of tests on sealant to BS 5889 : 1989 and BS 3712 : 1985.

The test sample was given the laboratory I.D.: PC250235 was received by Fugro Technical Services Limited on 21 March 2025.

Description of Sample : TOPP Weatherproofing Silicone Sealant

2.0 Summary of Test Results

Test Item		Test Method	Type Test	Test Surface	Lab Sample I.D.	Test Results
Slump properties		BS 3712 : Part 1 : 1985, clause 8	--	--	PC250235/1-4	Pass
Skin forming test		BS 5889 : 1989, Appendix A	--	--	PC250235/5-6	Pass
Extrusion rate		BS 3712 : Part 1 : 1985, clause 6	--	--	PC250235/7-8	Pass
Staining (for sealants used on cementitious surfaces)		BS 3712 : Part 2 : 1973, clause 2.2.2	--	--	PC250235/9	Pass
Tensile Extension Properties	(B) Force on Extension at 23 ± 2°C	BS 3712 : Part 4 : 1985, 4.4.1	B	Clear Flat Glass	PC250235/10-12	Pass
	(B) Elastic recovery	BS 3712 : Part 4 : 1985, 4.4.3	B	Clear Flat Glass	PC250235/13-15	Pass
Initial Adhesion Test		BS 5889 : 1989, B5	B	Clear Flat Glass	PC250235/16-18	Pass
			B	Aluminium	PC250235/19-21	Pass
			B	Cement Mortar	PC250235/22-24	Pass
Adhesion and Cohesion After Exposure to Ultraviolet Radiation Through Glass		BS 5889 : 1989, B7	B	Clear Flat Glass with Aluminium	PC250235/25-27	Pass

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2.0 Summary of Test Results

Test Item	Test Method	Type Test	Test Surface	Lab Sample I.D.	Test Results
Adhesion in Peel	BS 3712 : Part 4 : 1985, Clause 3	--	Clear Flat Glass	PC250235/28-31	Pass
		--	Aluminium	PC250235/32-35	Pass
		--	Cement Mortar	PC250235/36-39	Pass
Loss of Mass After Heat Ageing	BS 3712 : Part 4 : 1985, clause 5	--	--	PC250235/40-42	Pass
Cyclic Adhesion Test	BS 5889 : 1989, B6	B	Clear Flat Glass	PC250235/43-45	Pass
		B	Aluminium	PC250235/46-48	Pass
		B	Cement Mortar	PC250235/49-51	Pass

Remark : The test results relate only to the samples tested.

Checked by : _____ Certified by : _____

Ng Shu Shing Chris
Assistant Manager (Product Testing Laboratory)

Date : 12 JUN 2025 Date : 12 JUN 2025

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3.0 Individual Results

3.1 Slump Properties

(BS 3712 : Part 1 : 1985, Clause 8)

Lab. Sample I.D. : PC250235/1-4
Date Received : 21 March 2025
Date Test Started : 23 April 2025
Date Test Completed : 24 April 2025

Lab. Sample I.D.	Condition	Observation	Specification for	
			Vertical Displacement	Horizontal Displacement
PC250235/1	Vertically 5 ± 2°C	No sealant slumped was oberved.	Sealant shall not slump by more than 2.0 mm	Sealant shall not protrude in front of the original profile
PC250235/2	Horizontally 5 ± 2°C	No sealant protrusion in front of the original profile was observed.		
PC250235/3	Vertically 50 ± 2°C	No sealant slumped was oberved.		
PC250235/4	Horizontally 50 ± 2°C	No sealant protrusion in front of the original profile was observed.		

Note : The test results **comply** with the requirement of BS 5889 : 1989, Clause 6.

3.12 Skin Forming Test

(BS 5889 : 1989, Appendix A)

Lab. Sample I.D. : PC250235/5-6
Date Received : 21 March 2025
Date Tested : 22 April 2025

Lab. Sample I.D.	Time Elapsed (min)	Observation at Surface Skin
PC250235/5	5	A skin was not formed
PC250235/6	360	A skin was formed

Specification : A skin shall not form on the sealant within 5 mins but shall form within 360 mins.
Note : The test results **comply** with the requirement of BS 5889 : 1989, Clause 5.

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3.13 Extrusion Rate

(BS 3712 : Part 1 : 1985, Clause 6)

Lab. Sample I.D. : PC250235/7-8
Date Received : 17 March 2025
Date Test Started : 21 May 2025
Date Test Completed : 22 May 2025

Lab. Sample I.D.	Air Pressure (kPa)	Test Temperature (°C)	Time for Displacement of 200 ml Water (seconds)	Extrusion Rate (mL/min)	Specification for Extrusion Rate (mL/min)
PC250235/7	250	25	33	364	≥75 mL/min
PC250235/8	250	5	52	231	

Note : The test results **comply** with the requirement of BS 5889 : 1989, Clause 7.

3.14 Staining (for sealant used on cementitious surfaces)

(BS 3712 : Part 2 : 1973, 2.2.2)

Lab. Sample I.D. : PC250235/9
Date Received : 21 March 2025
Date Test Started : 06 May 2025
Date Test Completed : 20 May 2025

Lab Sample I.D.	Observation at Surface Skin	Specification
PC250235/9	No staining on the unprimed surface of the test stone	No staining on the primed or unprimed surface of the test stone

Note : The test results **comply** with the requirement of BS 5889 : 1989, Clause 11.

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3.15 Tensile Extension Properties (Type B)

(BS 3712 : Part 4 : 1985, 4.4.1)

Lab. Sample I.D. : PC250235/10-12
Date Received : 21 March 2025
Date Tested : 08 May 2025

Lab. Sample I.D.	Test Surface	Maximum Tensile Force (N)	Maximum Extension (%)	Tensile Force at 60% Extension (N)	Specification for Tensile Force at 60% Extension (N)
PC250235/10	Clear flat glass	328	164	234	150 to 450 (Type B)
PC250235/11	Clear flat glass	338	170	224	
PC250235/12	Clear flat glass	352	195	223	

Note : The test results **comply** with the requirement of BS 5889 : 1989 Table 2.

3.16 Elastic Recovery(Type B)

(BS 3712 : Part 4 : 1985, 4.4.3)

Lab. Sample I.D. : PC250235/13-15
Date Received : 21 March 2025
Date Test Started : 08 May 2025
Date Test Completed : 09 May 2025

Lab. Sample I.D.	Test Surface	Mean Width (mm)			Elastic Recovery (%)	Specification for Elastic Recovery (%)
		Initial	Under Extension	After Elastic Recovery		
PC250235/13	Clear flat glass	11.87	18.99	12.83	91.91	> 90 (Type B)
PC250235/14	Clear flat glass	11.91	19.06	12.83	92.28	
PC250235/15	Clear flat glass	11.25	18.00	12.24	91.20	

Note : The test results **comply** with the requirement of BS 5889 : 1989 Table 3.

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3.17 Initial Adhesion Test (Type B)

(BS 5889 : 1989, B5)

Lab. Sample I.D. : PC250235/16-24
Date Received : 21 March 2025
Date Test Started : 08 May 2025
Date Test Completed : 15 May 2025

Lab. Sample I.D.	Test Surface	Extension (%)	Failure Area (mm^2)	Observation after 7-day extension	Specification for failure area (mm^2)
PC250235/16	Clear flat glass	25	0	No adhesive and cohesive failure	<100
PC250235/17	Clear flat glass	25	0	No adhesive and cohesive failure	
PC250235/18	Clear flat glass	25	0	No adhesive and cohesive failure	
PC250235/19	Aluminium	25	0	No adhesive and cohesive failure	
PC250235/20	Aluminium	25	0	No adhesive and cohesive failure	
PC250235/21	Aluminium	25	0	No adhesive and cohesive failure	
PC250235/22	Cement Mortar	25	0	No adhesive and cohesive failure	
PC250235/23	Cement Mortar	25	0	No adhesive and cohesive failure	
PC250235/24	Cement Mortar	25	0	No adhesive and cohesive failure	

Note : The test results **comply** with the requirement of BS 5889 : 1989, Clause 10.1 and 10.2

3.18 Adhesion and Cohesion After Exposure to Ultraviolet Radiation Through Glass (Type B)

(BS 5889 : 1989, B7)

Lab. Sample I.D. : PC250235/25-27
Date Received : 21 March 2025
Date Test Started : 08 May 2025
Date Test Completed : 17 May 2025

Lab. Sample I.D.	Test Surface	Extension (mm)	Failure Area (mm^2)	Observation after test	Specification for failure area (mm^2)
PC250235/25	Clear flat glass with Aluminium	12 to 19	0	No adhesive and cohesive failure	<100
PC250235/26	Clear flat glass with Aluminium	12 to 19	0	No adhesive and cohesive failure	
PC250235/27	Clear flat glass with Aluminium	12 to 19	0	No adhesive and cohesive failure	

Note : The test results **comply** with the requirement of BS 5889 : 1989, Clause 10.1 and 10.4

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3.19 Adhesion in Peel

(BS 3712 : Part 4 : 1985, Clause 3)

Lab. Sample I.D. : PC250235/28-39
Date Received : 21 March 2025
Date Test Started : 09 May 2025
Date Test Completed : 23 May 2025

Lab. Sample I.D.	Test Surface	Average Peel Strength (N)	Adhesive failure area (%)	Specification for	
				Applied load (N)	Failure area (%)
PC250235/28	Clear flat glass	64	0	≥25	≤25
PC250235/29	Clear flat glass	77	0		
PC250235/30	Clear flat glass	63	0		
PC250235/31	Clear flat glass	65	0		
PC250235/32	Aluminium	64	0		
PC250235/33	Aluminium	61	0		
PC250235/34	Aluminium	61	0		
PC250235/35	Aluminium	61	0		
PC250235/36	Cement Mortar	47	0		
PC250235/37	Cement Mortar	60	0		
PC250235/38	Cement Mortar	54	0		
PC250235/39	Cement Mortar	54	0		

Note : The test results **comply** with the requirement of BS 5889 : 1989, Clause 12.

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3.20 Loss of Mass After Heat Ageing

(BS 3712 : Part 4 : 1985, Clause 5)

Lab. Sample I.D. : PC250235/40-42
Date Received : 21 March 2025
Date Test Started : 06 May 2025
Date Test Completed : 20 May 2025

Lab. Sample I.D.	Mass of Sealant (g)		Loss of Mass (%)	Observation	Specification for Loss of Mass (%)
	Original	After Heating			
PC250235/40	12.10	11.81	2.40	No crack, bubble or chalking was observed after test	≤ 10
PC250235/41	11.72	11.45	2.30	No crack, bubble or chalking was observed after test	
PC250235/42	11.85	11.56	2.45	No crack, bubble or chalking was observed after test	

Note : The test results **comply** with the requirement of BS 5889 : 1989, Clause 9

3.21 Cyclic Adhesion Test (Type B)

(BS 5889 : 1989, B6)

Lab. Sample I.D. : PC250235/43-51
Date Received : 21 March 2025
Date Test Started : 09 May 2025
Date Test Completed : 23 May 2025

Lab. Sample I.D.	Test Surface	Failure Area (mm^2)	Observation	Specification for failure area (mm^2)
PC250235/43	Clear flat glass	0	No adhesive and cohesive failure	<100
PC250235/44	Clear flat glass	0	No adhesive and cohesive failure	
PC250235/45	Clear flat glass	0	No adhesive and cohesive failure	
PC250235/46	Aluminium	0	No adhesive and cohesive failure	
PC250235/47	Aluminium	0	No adhesive and cohesive failure	
PC250235/48	Aluminium	0	No adhesive and cohesive failure	
PC250235/49	Cement Mortar	0	No adhesive and cohesive failure	
PC250235/50	Cement Mortar	0	No adhesive and cohesive failure	
PC250235/51	Cement Mortar	0	No adhesive and cohesive failure	

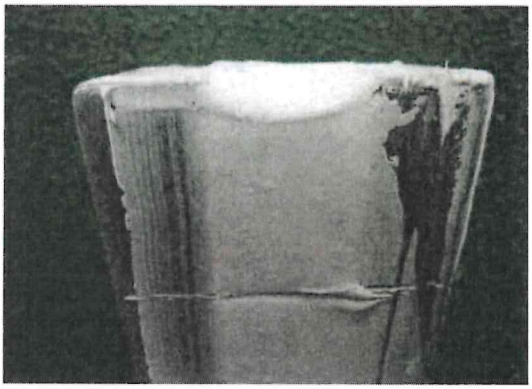
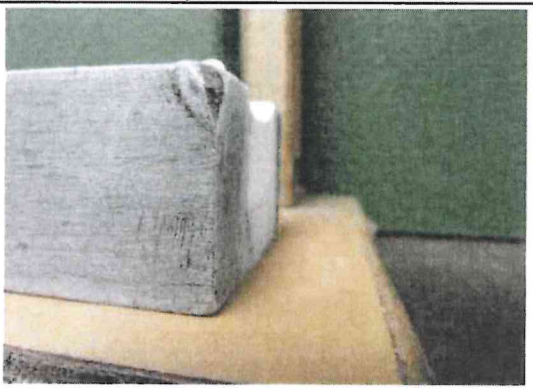
Note : The test results **comply** with the requirement of BS 5889 : 1989, Clause 10.1 and 10.3

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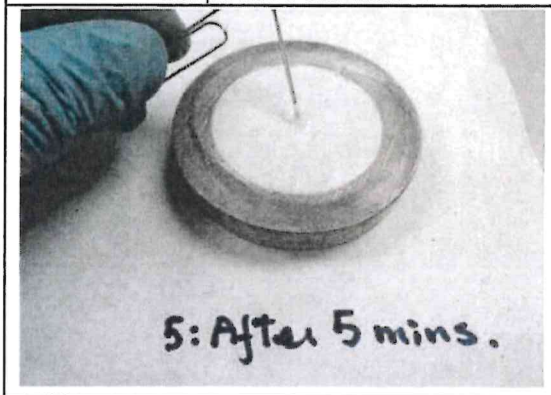
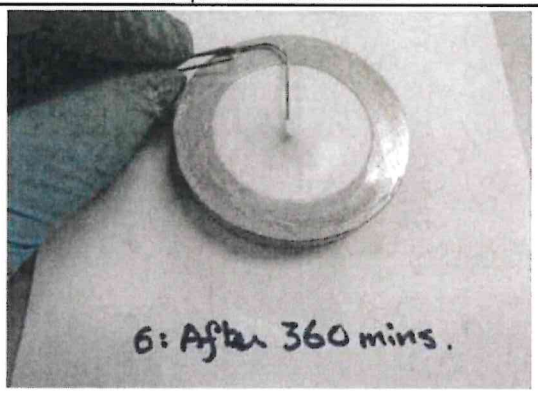
4.0 Record Photographs

	
Sample After Test (Slump Properties) Sample I.D.: PC250235/1-2	Sample After Test (Slump Properties) Sample I.D.: PC250235/1-2
	
Sample After Test (Slump Properties) Sample I.D.: PC250235/1-2	Sample After Test (Slump Properties) Sample I.D.: PC250235/1-2
	
Sample After Test (Slump Properties) Sample I.D.: PC250235/1-2	Sample After Test (Slump Properties) Sample I.D.: PC250235/3-4

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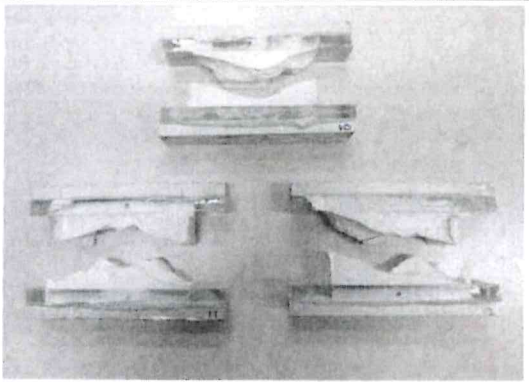
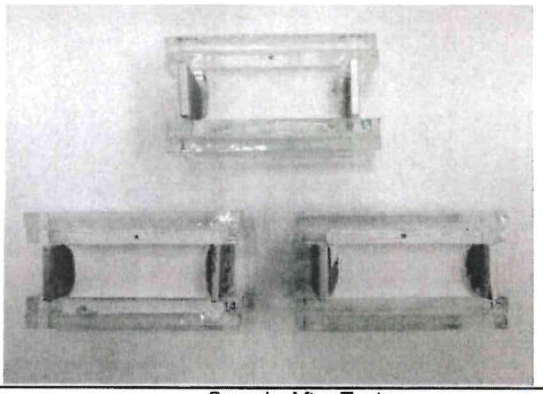
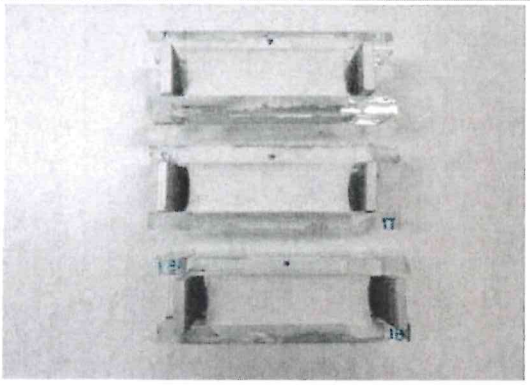
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Sample After Test (Slump Properties) Sample I.D.: PC250235/3-4	Sample After Test (Slump Properties) Sample I.D.: PC250235/3-4
	
Sample After Test (Slump Properties) Sample I.D.: PC250235/3-4	Sample After Test (Slump Properties) Sample I.D.: PC250235/3-4
	
Sample After Test (Skin Forming Test) Sample I.D.: PC250235/5	Sample After Test (Skin Forming Test) Sample I.D.: PC250235/6

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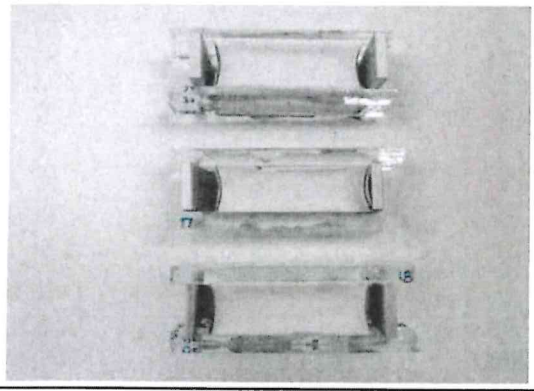
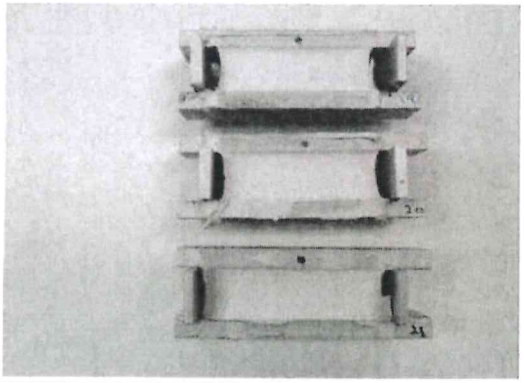
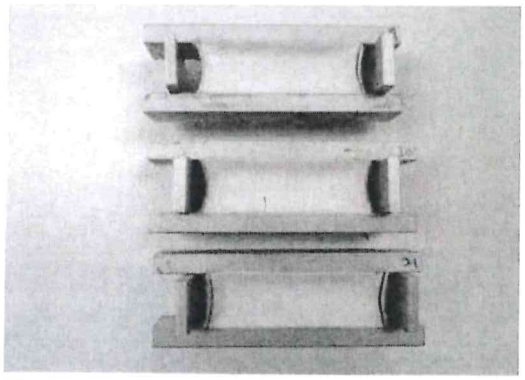
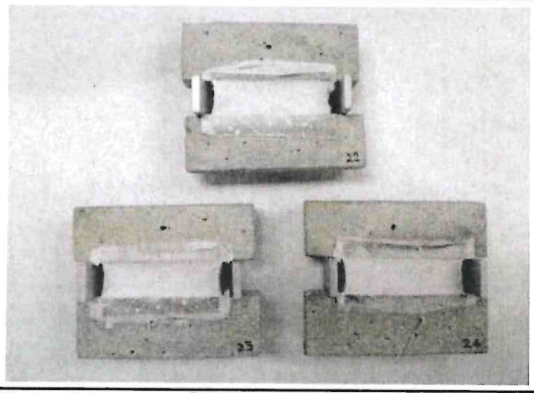
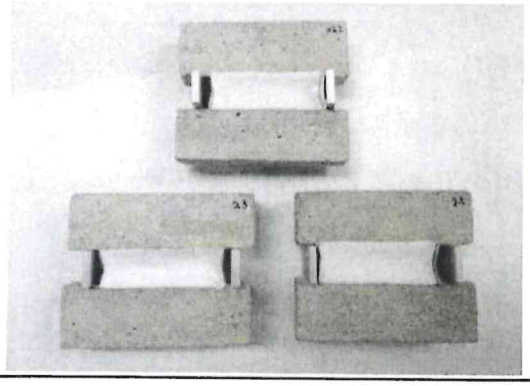
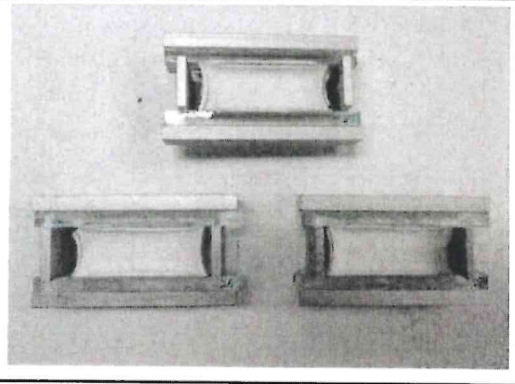
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Test Configuration (Extrusion Rate) Sample I.D.: PC250235/7-8	Sample After Test (Staining (for sealant used on stone surfaces)) Sample I.D.: PC250235/9
	
Sample After Test (Tensile Extension Properties (Type B)) Sample I.D.: PC250235/10-12	Sample After Test (Elastic Recovery (Type B)) Sample I.D.: PC250235/13-15
	
Sample After Test (Initial Adhesion(Type B)) Sample I.D.: PC250235/16-18	NA

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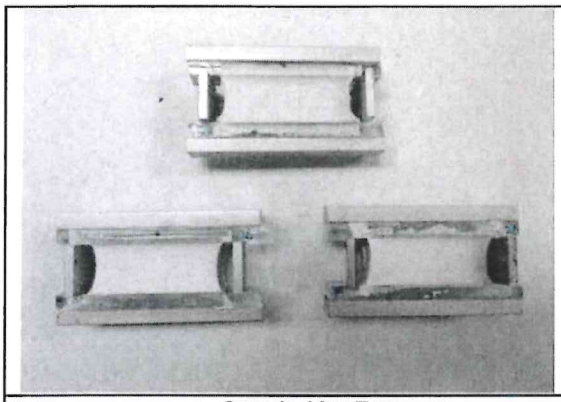
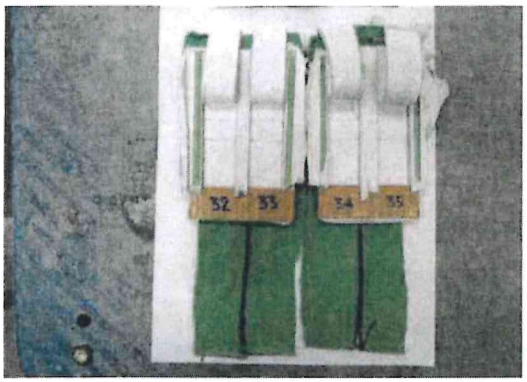
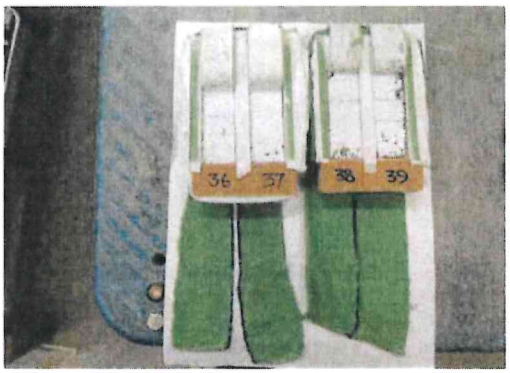
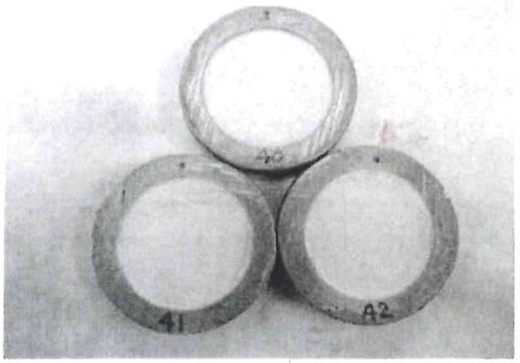
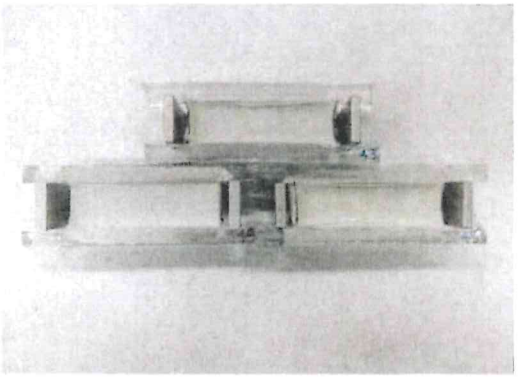
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Sample After Test (Initial Adhesion(Type B)) Sample I.D.: PC250235/16-18	Sample After Test (Initial Adhesion(Type B)) Sample I.D.: PC250235/19-21
	
Sample After Test (Initial Adhesion(Type B)) Sample I.D.: PC250235/19-21	Sample After Test (Initial Adhesion(Type B)) Sample I.D.: PC250235/22-24
	
Sample After Test (Initial Adhesion(Type B)) Sample I.D.: PC250235/22-24	Sample After Test (Adhesion and Cohesion After Exposure to Ultraviolet Radiation Through Glass(Type B)) Sample I.D.: PC250235/25-27

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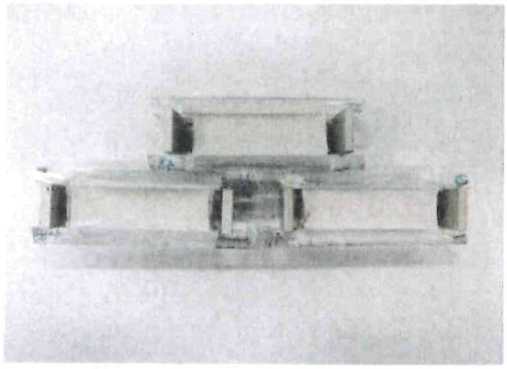
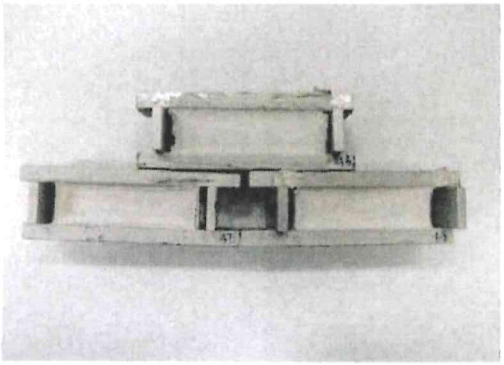
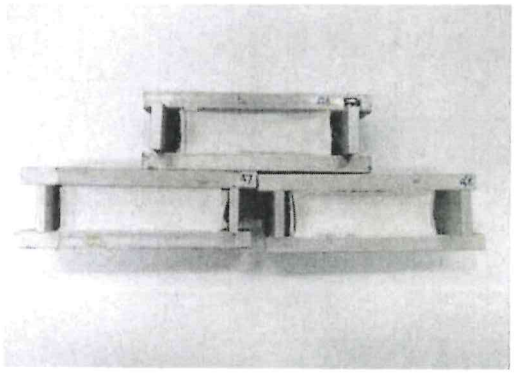
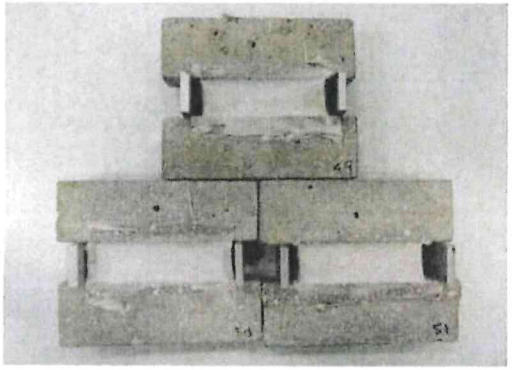
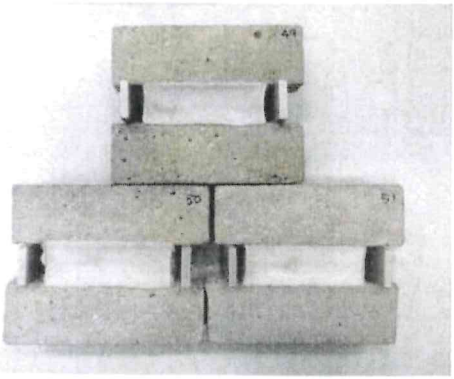
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Sample After Test (Adhesion and Cohesion After Exposure to Ultraviolet Radiation Through Glass(Type B)) Sample I.D.: PC250235/25-27	Sample After Test (Adhesion in Peel) Sample I.D.: PC250235/28-31
	
Sample After Test (Adhesion in Peel) Sample I.D.: PC250235/32-35	Sample After Test (Adhesion in Peel) Sample I.D.: PC250235/36-39
	
Sample After Test (Loss of Mass After Heat Ageing) Sample I.D.: PC250235/40-42	Sample After Test (Cyclic Adhesion Test(Type B)) Sample I.D.: PC250235/43-45

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Client Ref. : --
Report No. : 250750PC250235

	
Sample After Test (Cyclic Adhesion Test(Type B)) Sample I.D.: PC250235/43-45	Sample After Test (Cyclic Adhesion Test(Type B)) Sample I.D.: PC250235/46-48
	
Sample After Test (Cyclic Adhesion Test(Type B)) Sample I.D.: PC250235/46-48	Sample After Test (Cyclic Adhesion Test(Type B)) Sample I.D.: PC250235/49-51
	
Sample After Test (Cyclic Adhesion Test(Type B)) Sample I.D.: PC250235/49-51	TOPP Weathering Silicone Sealant

End of Report

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