



CONSTRUCTION MATERIALS

TECHNOLOGIES

LABORATORY TEST REPORT

Report for: Curacreto, SA de CV
Av. 1 de Mayo #8A
Mexico City, Mexico 11870

Attention: Jorge A. Robles Ramos

Product Name:	Technoply SBS SP 400 Aluminum Flake	Manufacturer:	Curacreto, SA de CV
Date Received:	Jan. 3, 2018	Sampling:	Curacreto, SA de CV, Mexico City, Mexico
PRI-CMT Project No.:	CURA-006-02-01	Test Dates:	Jan. 3, 2017 – Apr. 25, 2018

Purpose: Evaluate the named products for compliance with **ASTM D 6164: Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Material Using Polyester Reinforcements** and **ASTM D 5147 Section 13: Accelerated Weathering** as required by the **Florida Building Code Test Protocols for High-Velocity Hurricane Zones, Test Application Standard (TAS) No. 110-2000 Testing Requirements for Physical Properties of Roof Membranes, Insulation, Coatings, and Other Roofing Components.**

Test Methods: Testing was completed in compliance with ASTM D 6164-05^{e1} and ASTM D 6164/D 6164M-11: *Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Material Using Polyester Reinforcements.* Test methods assigned or referenced include ASTM D 146: *Standard test Methods for Sampling and testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing;* ASTM D 1204: *Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature;* ASTM D 4073: *Standard Test Method for Tensile-Tear Strength of Bituminous Roofing Membranes;* ASTM D 4977: *Standard Test Method for Granule Adhesion to Mineral Surfaced Roofing by Abrasion;* ASTM D 5147: *Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Materials;* ASTM D 5636: *Standard Test Method for Low Temperature Unrolling of Felt or Sheet Roofing and Waterproofing Materials;* and ASTM D 5869: *Standard Practice for Dark Oven Heat Exposure of Roofing and Waterproofing Materials.*

Sampling: Product samples were provided by Curacreto, SA de CV from Mexico City, Mexico.

CURA-006-02-01

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Results:

Property	Test Method	Results							Requirement	
									Type I, Grade G	
Physical Properties – Before Heat Conditioning										
Peak Load, (lbf/in-width) 1" x 6" specimens; Cond. 2h @ -0.4±3.6°F; Test @ -0.4±3.6°F; Rate = 0.08in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	111	120	109	114	110	113	4	≥ 70	
	CMD	79	83	86	94	98	88	8	≥ 70	
Elongation, (%) 1" x 6" specimens; Cond. 2h @ -0.4±3.6°F; Test @ -0.4±3.6°F; Rate = 0.08in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	44	41	38	40	37	40	3	≥ 20	
	CMD	24	34	43	44	55	40	12	≥ 20	
Peak Load, (lbf/in-width) 1" x 6" specimens; Cond. 2h @ 73.4±3.6°F; Test @ 73.4±3.6°F; Rate = 2.0in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	70	81	77	91	78	80	8	≥ 50	
	CMD	54	61	54	63	66	60	5	≥ 50	
Elongation, (%) 1" x 6" specimens; Cond. 2h @ 73.4±3.6°F; Test @ 73.4±3.6°F; Rate = 2.0in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	48	68	63	70	59	62	9	≥ 35	
	CMD	48	60	49	70	76	61	13	≥ 35	
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CURA-006-02-01

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Property	Test Method	Results							Requirement	
		1	2	3	4	5	Avg.	St. Dev.	Type I, Grade G	
Ultimate Elongation, (%) 1" x 6" specimens; Cond. 2h @ 73.4±3.6°F; Test @ 73.4±3.6°F; Rate = 2.0in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	152	378	181	107	441	252	148	≥ 38	
	CMD	182	132	152	155	172	159	20	≥ 38	
Tear Strength, (lbf) 3" x 8" specimens with assigned notch; Cond. 4h @ 73.4±3.6°F & 50±5%RH; Test @ 73.4±3.6°F; Rate = 2.0in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	106	101	104	93	103	101	5	≥ 55	
	CMD	126	135	128	127	130	129	4	≥ 55	
Low Temperature Flexibility, (Pass/Fail) 1" x 6" specimens; Cond. 2h @ 0°F; Test weathering side away from mandrel; Test 180±5° over 1" ø in 2±1s @ 0°F; Visual Inspection in "flexed" position	ASTM D 5147	1	2	3	4	5			Pass = "none of the specimens show cracking"	
	MD	Pass	Pass	Pass	Pass	Pass			Pass @ 0°F	
	CMD	Pass	Pass	Pass	Pass	Pass			Pass @ 0°F	
Dimensional Stability, (%) 10" x 10" specimens; Cond. 40h @ 73.4±3.6°F & 50±5%RH; Test 24h±15min @ 176±3.6°F	ASTM D 1204/ ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	0.0	0.0	0.0	0.0	0.1	0.0	0.0	≤ 1	
	CMD	0.0	0.0	0.1	0.1	0.1	0.1	0.0	≤ 1	
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CURA-006-02-01

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Property	Test Method	Results							Requirement	
									Type I, Grade G	
Compound Stability, [Pass/Fail] 2.0±0.05" x 3.0±0.05" specimens; Cond. 4h @ 73.4±3.6°F & 50±5%RH; Test 2h,15min±5min @ 215±5°F	ASTM D 5147	1	2	3	4	5				Pass = no failures showing signs of flowing, dripping, or drop formation
	MD	Pass	Pass	Pass	Pass	Pass				Pass
	CMD	Pass	Pass	Pass	Pass	Pass				Pass
Granule Embedment (g) Grade G products only; 2" x 9" specimens; Cond. 30min @ 73.4±3.6°F; Test 50 complete cycles	ASTM D 4977/ ASTM D 5147	1	2	AVG.						
		0.4	0.4	0.4						≤ 2
Physical Properties – After Heat Conditioning										
Heat Conditioning Exposure: 90±0.25d @ 158±5°F	ASTM D 5869/ ASTM D 5147									
Peak Load, (lbf/in-width) 1" x 6" specimens; Cond. 2h @ -0.4±3.6°F; Test @ -0.4±3.6°F; Rate = 0.08in/min ±3%	ASTM D 5147	1	2	3	4	5	AVG.	St. Dev.		
	MD	116	115	113	101	113	112	6		≥ 70
	CMD	79	74	76	74	78	76	3		≥ 70
Elongation, (%) 1" x 6" specimens; Cond. 2h @ -0.4±3.6°F; Test @ -0.4±3.6°F; Rate = 0.08in/min ±3%	ASTM D 5147	1	2	3	4	5	AVG.	St. Dev.		
	MD	35	34	36	24	35	33	5		≥ 20
	CMD	27	16	20	15	24	20	5		≥ 20
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CURA-006-02-01

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Property	Test Method	Results							Requirement	
									Type I, Grade G	
Peak Load, (lbf/in-width) 1" x 6" specimens; Cond. 2h @ 73.4±3.6°F; Test @ 73.4±3.6°F; Rate = 2.0in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	107	93	82	85	91	91	10	≥ 50	
	CMD	77	69	69	62	74	70	6	≥ 50	
Elongation, (%) 1" x 6" specimens; Cond. 2h @ 73.4±3.6°F; Test @ 73.4±3.6°F; Rate = 2.0in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	54	44	44	44	49	47	5	≥ 35	
	CMD	44	53	51	40	52	48	6	≥ 35	
Ultimate Elongation, (%) 1" x 6" specimens; Cond. 2h @ 73.4±3.6°F; Test @ 73.4±3.6°F; Rate = 2.0in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	56	52	48	46	51	51	4	≥ 38	
	CMD	48	57	54	43	55	51	6	≥ 38	
Low Temperature Flexibility, [Pass/Fail] 1" x 6" specimens; Cond. 2h @ 0°F; Test weathering side away from mandrel; Test 180±5° over 1" ø in 2±1s @ 0°F; Visual Inspection in "flexed" position	ASTM D 5147	1	2	3	4	5			Pass = "none of the specimens show cracking"	
	MD	Pass	Pass	Pass	Pass	Pass			Pass @ 0°F	
	CMD	Pass	Pass	Pass	Pass	Pass			Pass @ 0°F	
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CURA-006-02-01

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Property	Test Method	Results					Requirement			
							Type I, Grade G			
Physical Properties – Other										
Unrolling, [Pass/Fail] 10±1/8" x 18±1/8" specimens; Cond. 24h @ 73.4±3.6°F & 50±5%RH; Test Cond. 2h @ Temp±1°F; Test unroll in 4-6s; Visual Inspection in "unrolled" position	ASTM D 5636/ ASTM D 5147	1	2	3	4					Pass = "finished product shall not crack nor be so sticky as to cause tearing or other material damage upon being unrolled at any temperature between 40 and 140°F"
	Temp=40°F	Pass	Pass	Pass	Pass					Pass
	Temp=140°F	Pass	Pass	Pass	Pass					Pass
Dimensions and Masses										
Thickness, (mils) 27-1/2" x manufacture width; 5 measurement points	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
		147	147	144	146	145	146	1	≥ 130	
Net Mass, (lb/100ft ²) 1 specimen; manufacture roll	ASTM D 228									
		82								≥ 75
Bottom Coating Thickness, (mils) Heat Welding Application Products; 6" x manufacture width; 5 measurement points	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
		49	46	47	46	49	47	2	≥ 40	
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Property	Test Method	Results							Requirement	
									Type I, Grade G	
Physical Properties – After Accelerated Weathering										
Xenon Arc Weathering Exposure: 83±0.35d @ Cycle A	ASTM D 4798/ ASTM D 5147									
Peak Load, (lbf/in-width) 1" x 6" specimens; Cond. 2h @ -0.4±3.6°F; Test @ -0.4±3.6°F; Rate = 0.08in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	104	113	118	105	112	111	6	≥ 70	
	CMD	93	88	87	63	69	80	13	≥ 70	
Elongation, (%) 1" x 6" specimens; Cond. 2h @ -0.4±3.6°F; Test @ -0.4±3.6°F; Rate = 0.08in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	37	30	33	19	38	31	8	≥ 20	
	CMD	39	32	35	13	21	27	14	≥ 20	
Peak Load, (lbf/in-width) 1" x 6" specimens; Cond. 2h @ 73.4±3.6°F; Test @ 73.4±3.6°F; Rate = 2.0in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	90	112	88	88	81	92	12	≥ 50	
	CMD	66	71	76	78	66	72	5	≥ 50	
Elongation, (%) 1" x 6" specimens; Cond. 2h @ 73.4±3.6°F; Test @ 73.4±3.6°F; Rate = 2.0in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.		
	MD	59	66	52	56	57	58	5	≥ 35	
	CMD	64	62	64	67	56	63	4	≥ 35	
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Property	Test Method	Results							Requirement
		1	2	3	4	5	Avg.	St. Dev.	Type I, Grade G
Ultimate Elongation, (%) 1" x 6" specimens; Cond. 2h @ 73.4±3.6°F; Test @ 73.4±3.6°F; Rate = 2.0in/min ±3%	ASTM D 5147	1	2	3	4	5	Avg.	St. Dev.	
	MD	96	74	84	114	100	94	15	≥ 38
	CMD	71	73	72	76	66	72	4	≥ 38
Low Temperature Flexibility, [Pass/Fail] 1" x 6" specimens; Cond. 2h @ 0°F; Test weathering side away from mandrel; Test 180±5° over 1" ø in 2±1s @ 0°F; Visual Inspection in "flexed" position	ASTM D 5147	1	2	3	4	5			Pass = "none of the specimens show cracking"
	MD	Pass	Pass	Pass	Pass	Pass			Pass @ 0°F
	CMD	Pass	Pass	Pass	Pass	Pass			Pass @ 0°F

Notes: 1) N/A indicates Not Applicable; NT indicates Not Tested; As Agreed: as agreed by buyer and seller

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Statement of Compliance:

The products tested have demonstrated compliance with the physical property requirements of ASTM D 6164-05^{e1} and ASTM D 6164/D 6164M-11: *Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Material Using Polyester Reinforcements*, Type I and Florida Building Code Test Protocols for High-Velocity Hurricane Zones, Test Application Standard (TAS) No. 110-2000 *Testing Requirements for Physical Properties of Roof Membranes, Insulation, Coatings, and Other Roofing Components*. The laboratory test results presented in this report are representative of the material supplied.

Signed: _____
Date: _____



Zachary R. Priest, P.E.
Florida Registered Professional Engineer
PE No.: 74021

STATE OF FLORIDA
PROFESSIONAL ENGINEER

Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	04/27/2018	9	N/A

END OF REPORT

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