CONSTRUCTION MATERIALS

T E C H N O L O G I E S

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 BFG 300 S**	**Manufacturer:**	Curacreto, SA de CV
Date Received:	Aug. 23, 2017	**Sampling:**	Curacreto, SA de CV, Mexico City, Mexico
PRI-CMT Project No.:	CURA-001-02-03	**Test Dates:**	Aug. 25 – Dec. 13, 2017

Purpose: Evaluate the named product for compliance with **ASTM D 6163-00$^{\varepsilon 1}$: *Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Material Using Glass Fiber Reinforcements*** 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***.

Test Methods: Testing was completed in compliance with ASTM D 6163-00$^{\varepsilon 1}$: *Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Material Using Glass Fiber* 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.

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pricmt.com

Results:

Property	Test Method	Results							Requirement Type I, Grade S
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	134	157	169	191	180	**166**	22	≥ 70
	CMD	70	70	74	70	75	**72**	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	5	5	5	6	5	**5**	0	≥ 1
	CMD	5	4	5	4	5	**5**	0	≥ 1
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	76	107	84	85	**88**	11	≥ 30
	CMD	32	29	27	31	34	**31**	3	≥ 30
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	16	5	12	8	9	**10**	4	≥ 2
	CMD	4	4	4	4	5	**4**	0	≥ 2

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Property	Test Method	Results							Requirement Type I, Grade S
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	39	60	53	54	62	**54**	9	≥ 3
	CMD	103	77	133	107	108	**106**	20	≥ 3
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	148	218	184	145	185	**176**	30	≥ 35
	CMD	81	77	81	94	80	**82**	7	≥ 35
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	0.0	**0.0**	0.0	≤ 0.5
	CMD	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0	≤ 0.5

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Property	Test Method	Results							Requirement Type I, Grade S
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.**					
		NA	NA	NA					NA
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	206	187	208	200	202	**201**	8	≥ 70
	CMD	89	71	71	74	70	**75**	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	6	9	7	5	6	**6**	2	≥ 1
	CMD	5	4	4	5	4	**4**	0	≥ 1

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Property	Test Method	Results							Requirement
									Type I, Grade S
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	147	166	162	160	161	**159**	7	≥ 30
	CMD	50	48	46	57	56	**57**	11	≥ 30
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	7	8	8	7	8	**8**	1	≥ 2
	CMD	4	3	5	4	4	**4**	1	≥ 2
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	30	31	26	31	20	**28**	5	≥ 3
	CMD	41	32	31	29	40	**35**	5	≥ 3
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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Property	Test Method	Results							Requirement Type I, Grade S
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"
		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.	
		122	120	124	119	121	**121**	2	≥ 80
Net Mass, (lb/100ft^2) 1 specimen; manufacture roll	ASTM D 228								
		72							≥ 45
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.	
		N/A	N/A	N/A	N/A	N/A	**N/A**	N/A	Not Required

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 product tested has demonstrated compliance with the physical property requirements of ASTM D 6163-00$^{\varepsilon 1}$: *Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Material Using Glass Fiber* 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: _____
Zachary R. Priest, P.E.
Florida Registered Professional Engineer
PE No.: 74021

Date: 12/27/2017

ZACHARY R. PRIEST
LICENSE
No 74021
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	12/27/2017	7	NA

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END OF REPORT

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CONSTRUCTION MATERIALS

T E C H N O L O G I E S

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 BP 300 S**	**Manufacturer:**	Curacreto, SA de CV
Date Received:	Sep. 14, 2017	**Sampling:**	Curacreto, SA de CV, Mexico City, Mexico
PRI-CMT Project No.:	CURA-004-02-03	**Test Dates:**	Sep. 21, 2017 – Jan. 4, 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*** 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$^{\varepsilon 1}$ 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

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Results:

Property	Test Method	Results							Requirement Type I, Grade S
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	106	98	106	114	104	**106**	6	≥ 70
	CMD	104	86	94	106	101	**98**	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	48	36	42	47	42	**43**	5	≥ 20
	CMD	46	35	37	41	43	**41**	5	≥ 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	88	79	86	90	86	**86**	4	≥ 50
	CMD	65	69	63	65	73	**67**	4	≥ 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	51	54	55	47	**53**	5	≥ 35
	CMD	54	60	57	66	63	**60**	5	≥ 35

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Property	Test Method	Results							Requirement Type I, Grade S
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	98	76	71	77	73	**79**	11	≥ 38
	CMD	78	96	95	89	82	**88**	8	≥ 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	112	97	105	99	98	**102**	6	≥ 55
	CMD	139	141	134	136	131	**136**	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	0.2	0.0	0.1	0.1	0.1	**0.1**	0.1	≤ 1
	CMD	0.2	0.1	0.2	0.2	0.1	**0.1**	0.1	≤ 1

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Property	Test Method	Results							Requirement Type I, Grade S
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.**					
		N/A	N/A	**N/A**					≤ 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	107	96	100	100	101	**101**	4	≥ 70
	CMD	63	76	84	76	75	**75**	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	36	33	36	32	36	**35**	2	≥ 20
	CMD	24	33	35	27	37	**31**	6	≥ 20

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Property	Test Method	Results							Requirement Type I, Grade S
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	87	88	89	89	94	**89**	3	≥ 50
	CMD	61	62	60	59	66	**62**	3	≥ 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	49	48	48	50	58	**51**	4	≥ 35
	CMD	55	48	52	42	65	**52**	8	≥ 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	54	51	51	53	60	**54**	3	≥ 38
	CMD	59	51	56	48	74	**58**	10	≥ 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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Property	Test Method	Results							Requirement Type I, Grade S
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"
		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.	
		136	129	133	137	136	**134**	4	≥ 85
Net Mass, (lb/100ft^2) 1 specimen; manufacture roll	ASTM D 228								
		69							≥ 54
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.	
		69	63	60	69	65	**65**	4	≥ 40

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$^{\varepsilon 1}$ 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: _____
Zachary R. Priest, P.E.
Florida Registered Professional Engineer
PE No. 74021

ZACHARY R. PRIEST
LICENSE
No 74021
STATE OF FLORIDA
PROFESSIONAL ENGINEER

Date: 01/09/2018

Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	01/09/2018	7	N/A

END OF REPORT

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CONSTRUCTION MATERIALS

T E C H N O L O G I E S

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 FR SP 400 G**	**Manufacturer:**	Curacreto, SA de CV
Date Received:	Sep. 14, 2017	**Sampling:**	Curacreto, SA de CV, Mexico City, Mexico
PRI-CMT Project No.:	CURA-004-02-06	**Test Dates:**	Oct. 11, 2017 – Feb. 1, 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$^{\varepsilon 1}$ 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.

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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	114	102	101	113	113	**109**	7	≥ 70
	CMD	77	75	79	92	84	**81**	7	≥ 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	40	35	39	46	43	**41**	4	≥ 20
	CMD	21	26	26	38	32	**29**	7	≥ 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	85	92	92	79	81	**86**	6	≥ 50
	CMD	60	61	56	56	62	**59**	3	≥ 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	53	50	63	56	47	**54**	6	≥ 35
	CMD	54	58	51	58	57	**56**	3	≥ 35

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Property	Test Method	Results							Requirement 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	81	85	95	83	75	**84**	7	≥ 38
	CMD	78	82	71	77	83	**78**	5	≥ 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	111	118	108	98	95	**106**	10	≥ 55
	CMD	121	144	125	145	130	**133**	11	≥ 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	0.1	0.1	0.0	0.0	0.1	**0.1**	0.1	≤ 1
	CMD	0.1	0.1	0.0	0.0	0.0	**0.0**	0.0	≤ 1

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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.**					
		1	1	**1**					≤ 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	91	102	94	96	107	**98**	6	≥ 70
	CMD	67	69	67	73	74	**70**	4	≥ 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	29	31	31	21	34	**29**	5	≥ 20
	CMD	22	24	30	28	21	**25**	4	≥ 20

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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	90	92	96	90	97	**93**	3	≥ 50
	CMD	68	63	62	60	60	**63**	3	≥ 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	40	40	54	47	50	**46**	6	≥ 35
	CMD	53	42	51	49	33	**46**	8	≥ 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	48	46	59	55	53	**52**	5	≥ 38
	CMD	56	47	56	55	41	**51**	7	≥ 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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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.	
		179	181	180	172	170	**176**	5	≥ 130
Net Mass, (lb/100ft^2) 1 specimen; manufacture roll	ASTM D 228								
		90							≥ 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.	
		85	75	89	71	75	**79**	8	≥ 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	105	91	87	102	86	**94**	9	≥ 70
	CMD	81	71	61	73	91	**75**	11	≥ 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	29	24	33	22	**29**	6	≥ 20
	CMD	40	31	22	33	42	**34**	8	≥ 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	102	94	93	95	94	**96**	4	≥ 50
	CMD	66	72	67	55	65	**65**	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	57	51	51	67	**56**	7	≥ 35
	CMD	59	63	56	37	52	**53**	10	≥ 35

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Property	Test Method	Results							Requirement
									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	58	59	53	54	74	**60**	9	≥ 38
	CMD	63	66	61	46	57	**58**	8	≥ 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$^{\varepsilon 1}$ 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: _____
Zachary R. Priest, P.E.
Florida Registered Professional Engineer
PE No.: 74021

Date: 02/05/2018

ZACHARY R. PRIEST LICENSE No 74021 STATE OF FLORIDA PROFESSIONAL ENGINEER

Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	02/05/2018	9	N/A

END OF REPORT

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CONSTRUCTION MATERIALS

T E C H N O L O G I E S

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 G**	**Manufacturer:**	Curacreto, SA de CV
Date Received:	Nov. 8, 2017	**Sampling:**	Curacreto, SA de CV, Mexico City, Mexico
PRI-CMT Project No.:	CURA-004-02-08	**Test Dates:**	Dec. 21, 2017 – Apr. 20, 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$^{\varepsilon 1}$ 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.

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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	97	104	120	132	117	**114**	14	≥ 70
	CMD	79	73	77	85	69	**77**	6	≥ 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	41	46	52	42	**44**	6	≥ 20
	CMD	34	25	22	35	13	**26**	9	≥ 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	91	87	89	86	83	**89**	3	≥ 50
	CMD	66	64	75	63	62	**66**	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	54	58	51	58	**54**	4	≥ 35
	CMD	58	54	62	57	61	**58**	3	≥ 35

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Property	Test Method	Results							Requirement 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	141	89	311	339	90	**194**	122	≥ 38
	CMD	81	78	85	79	83	**81**	3	≥ 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	90	109	98	94	101	**98**	7	≥ 55
	CMD	120	128	133	115	122	**124**	7	≥ 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	0.1	0.0	0.0	0.1	0.0	**0.0**	0.0	≤ 1
	CMD	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0	≤ 1

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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.**					
		2.6	1.2	**1.9**					≤ 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	95	110	96	110	118	**106**	10	≥ 70
	CMD	75	79	74	86	75	**78**	5	≥ 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	23	36	15	26	35	**27**	9	≥ 20
	CMD	24	29	38	39	36	**33**	7	≥ 20

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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	102	85	95	92	97	**94**	7	≥ 50
	CMD	80	70	72	65	68	**71**	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	59	44	52	49	54	**51**	6	≥ 35
	CMD	60	45	56	51	50	**52**	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	62	49	53	51	56	**54**	5	≥ 38
	CMD	64	50	66	54	53	**57**	7	≥ 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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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.	
		174	172	171	171	171	**172**	2	≥ 130
Net Mass, (lb/100ft^2) 1 specimen; manufacture roll	ASTM D 228								
		89							≥ 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.	
		89	78	87	82	78	**83**	5	≥ 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	94	100	110	113	91	**102**	10	≥ 70
	CMD	78	70	72	73	86	**76**	6	≥ 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	35	43	43	27	**36**	7	≥ 20
	CMD	35	32	44	33	45	**38**	6	≥ 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	94	90	101	92	86	**93**	6	≥ 50
	CMD	72	70	65	68	63	**68**	4	≥ 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	55	56	62	52	53	**56**	4	≥ 35
	CMD	63	62	51	55	46	**55**	7	≥ 35

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Property	Test Method	Results							Requirement 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	58	61	81	58	55	**63**	11	≥ 38
	CMD	66	66	54	59	49	**59**	8	≥ 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$^{\varepsilon 1}$ 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: _____
Zachary R. Priest, P.E.
Florida Registered Professional Engineer
PE No.: 74021

Date: 04/27/2018

ZACHARY R. PRIEST LICENSE 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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CONSTRUCTION MATERIALS

T E C H N O L O G I E S

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$^{\varepsilon 1}$ 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.

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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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Property	Test Method	Results							Requirement 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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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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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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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
									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$^{\varepsilon 1}$ 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: _____
Zachary R. Priest, P.E.
Florida Registered Professional Engineer
PE No.: 74021

Date: 04/27/2018

ZACHARY R. PRIEST LICENSE 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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