

**DYNAMIC WIND UPLIFT RESISTANCE PROPERTIES OF SIPLAST INC.,
“PARADIENE 30 ADHERED GYPSUM COVER BOARD SYSTEM”
ADHESIVE APPLIED MEMBRANE ROOF ASSEMBLY**

IN ACCORDANCE WITH CSA A123.21-20 STANDARD

Report to: **Siplast Inc.**
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Report No.: 21-06-B0047-1 DRAFT 1
9 Pages, 3 Appendices

Proposal No.: 21-006-255072

Date: September 14, 2021

“PARADIENE 30 ADHERED GYPSUM COVER BOARD SYSTEM” Summary:

Roof Membrane (Cap): Paradiene 30 FR, 3.3 mm (130 mils thick) with 76.2 mm (3.0”) overlap,
PA-311 R Adhesive – full coverage

Roof Membrane (Base): Paradiene 20, 2.5 mm (0.10” thick) with 76.2 mm (3.0”) overlap,
PA-311 R Adhesive – full coverage

Support Panel: DensDeck® Prime, 6.4 mm (1/4” thick), 1219 mm x 2438 mm (4 x 8’),
Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)

Insulation (Top Layer): Paratherm, 38.1 mm (1.5” thick), 1219 x 1219 mm (4 x 4’), Staggered from bottom layer,
Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)

Insulation (Bottom Layer): Paratherm, 38.1 mm (1.5” thick), 1219 x 1219 mm (4 x 4’),
Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)

Vapour Barrier: Siplast SA Vapor Retarder, 0.81 mm (32 mils thick) with 76.2 mm (3”) overlap,
Self-adhered to substrate

Thermal Barrier: DensDeck® Prime, 12.7 mm (1/2” thick), 1219 mm x 2438 mm (4 x 8’),
Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)

Decking: Steel Deck, 22 ga, RD938, 230 MPa (33.4 ksi),
Mechanically attached at every flute

**Dynamic Uplift
Resistance:**

2.873 kPa (60.00 PSF) (Test Pressure of 4.309 kPa (90.00 PSF), reduced to 2.873 kPa (60.00 PSF) with Safety Factor of 1.5 as Published Dynamic Uplift Resistance “DUR”)

1.0 INTRODUCTION

At the request of Siplast Inc., Element Materials Technology Inc. was retained to evaluate the dynamic wind uplift resistance (*DUR*) properties of an adhesive applied membrane roof system identified as “PARADIENE 30 ADHERED GYPSUM COVER BOARD SYSTEM” in accordance with the requirements outlined in CSA A123.21-2020 Standard “*Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane Roofing Systems*” as outlined in Proposal Number 21-006-255072.

The roof system was installed by Semple Gooder personnel (*contracted by Siplast Inc.*) at Element’s Mississauga location from June 18, 2021. Upon construction of the roof system at Element by Siplast Inc., personnel, the assembly was assigned the following Element Specimen Number:

<u>Client Specimen Description</u>	<u>Element Specimen No.</u>
PARADIENE 30 ADHERED GYPSUM COVER BOARD SYSTEM	21-06-B0047-1

Overall Test Size: 1,880 x 5,791 mm (6.16 x 19 ft)

Roof Section Construction Details:

Roof Membrane (Cap):	Paradiene 30 FR, 3.3 mm (130 mils thick) with 76.2 mm (3.0”) overlap, PA-311 R Adhesive – full coverage
Roof Membrane (Base):	Paradiene 20, 2.5 mm (0.10” thick) with 76.2 mm (3.0”) overlap, PA-311 R Adhesive – full coverage
Support Panel:	DensDeck® Prime, 6.4 mm (1/4” thick), 1219 mm x 2438 mm (4 x 8’), Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)
Insulation (Top Layer):	Paratherm, 38.1 mm (1.5” Thick), 1219 x 1219 mm (4 x 4’), Staggered from bottom layer Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)
Insulation (Bottom Layer):	Paratherm, 38.1 mm (1.5” Thick), 1219 x 1219 mm (4 x 4’) Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)
Vapour Barrier:	Siplast SA Vapor Retarder, 0.81 mm (32 mils thick) with 76.2 mm (3”) overlap, Self-adhered to substrate
Thermal Barrier:	DensDeck® Prime, 12.7 mm (1/2” Thick), 1219 mm x 2438 mm (4 x 8 ft) Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)
Decking:	Steel Deck, 22 ga, RD938, 230 MPa (33.4 ksi), Mechanically attached at every flute
Requested Design Pressure:	2.873 kPa (60.00 PSF)
Test Pressure (1.5 x Design Pressure):	4.309 kPa (90.00 PSF)

2.0 PROCEDURE

Test Method	Test Description
CSA A123.21-2020	Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane Roofing Systems ⁽¹⁾

Note: SI units are the primary units of measure.

System Installed By:	Siplast Inc.
System Installation Date:	June 18, 2021
Curing Temperature:	50°C (122°F) for 28 days
Time Elapsed Between System Construction & Testing:	40 Days
System Test Date:	July 29, 2021
System Tested By:	Element Materials Technology

Safety Factor: As outlined in CSA A123.21-20 standard, Section 10.1 the dynamic uplift resistance is reduced by a safety factor of 1.5.

Admissible Wind Uplift Load Calculation:

As per CSA A123.21-2020 standard, Section 4.1: *“The wind-induced forces on a roof and the responses of the system are time-and space-dependent, and thus are dynamic in nature. Design wind pressure varies with building location, height, roof slope, and other parameters. Using the local building code or wind standard or internet-based tool, Wind-Rci (found at www.sigders.ca), the design pressure of a roof assembly can be calculated.”*

Testing Setup & Procedure:

The roof assembly was constructed within a “steel roof test frame” provided by Element that included a pre-installed steel roof deck (22 ga, RD938, 230 MPa). The steel roof deck was mechanically attached to structural supports

Details of the roof system tested are located in Appendix A, B & C of this report.

The roof deck was positioned within the test frame to a depth equal to the thickness of the roof assembly, allowing the cap sheet of the roof to be flush to the exposed upper face of the test frame (as shown below in Figure 1).



Figure 1 – Roof Test Frame Positioned Steel Deck

¹ The indicated test data is valid under the test conditions only. A successful application under other than the reported test conditions is not proven with this test report.

2.0 PROCEDURE (CONTINUED)

Upon construction and curing of the roof assembly, the test frame with the installed roof system was lifted and positioned on support base. Upon positioning the test frame onto the support base, Element's Dynamic Wind Uplift pressure chamber was lifted and positioned above the test specimen and clamped to the support base as shown below in Figure 2:



Figure 2 – Stock Photos of Dynamic Wind Uplift Pressure Chamber Connection

The uniform wind uplift pressures were applied to the assembly using a controllable blower system.

Based on the roof system configuration (*adhesive applied membrane roof system*), the Method 2 load cycle as outlined in CSA A123.21-2020 standard, Section 8.4 was employed to evaluate the roof assembly.

Level A:

Based on the Test Pressure, P, where P = the requested design pressure x 1.5.
 2.873 kPa (60.00 PSF) x 1.5 = 4.309 kPa (90.00 PSF), details of the Level A (P x 1.0) loading schedule are outlined below:

Level	Group	Sequence	Number of Cycles (Method 2)	Test Pressure (PSF)	Test Pressure (kPa)	Relief Pressure (PSF)	Relief Pressure (kPa)
A	1	1	25	22.50	1.077	0.00	0.000
		2	250	45.00	2.155	0.00	0.000
		3	450	67.50	3.232	0.00	0.000
		4	50	90.00	4.309	0.00	0.000
	2	5	0	45.00	2.155	22.50	1.077
		6	75	67.50	3.232	22.50	1.077
		7	20	90.00	4.309	22.50	1.077
		8	5	90.00	4.309	45.00	2.155

Level B:

Based on the Test Pressure, P, where P = the requested design pressure x 1.5.
 2.873 kPa (60.00 PSF) x 1.5 x 1.25 = 5.387 kPa (112.50 PSF), details of the Level A (P x 1.25) loading schedule are outlined below:

Level	Group	Sequence	Number of Cycles (Method 2)	Test Pressure (PSF)	Test Pressure (kPa)	Relief Pressure (PSF)	Relief Pressure (kPa)
B	1	1	0	0.00	0.000	0.00	0.000
		2	175	56.70	2.715	0.00	0.000
		3	350	84.60	4.051	0.00	0.000
		4	50	112.50	5.387	0.00	0.000
	2	5	0	0.00	0.000	0.00	0.000
		6	50	84.60	4.051	27.90	1.336
		7	20	112.50	5.387	27.90	1.336
		8	5	112.50	5.387	56.70	2.715

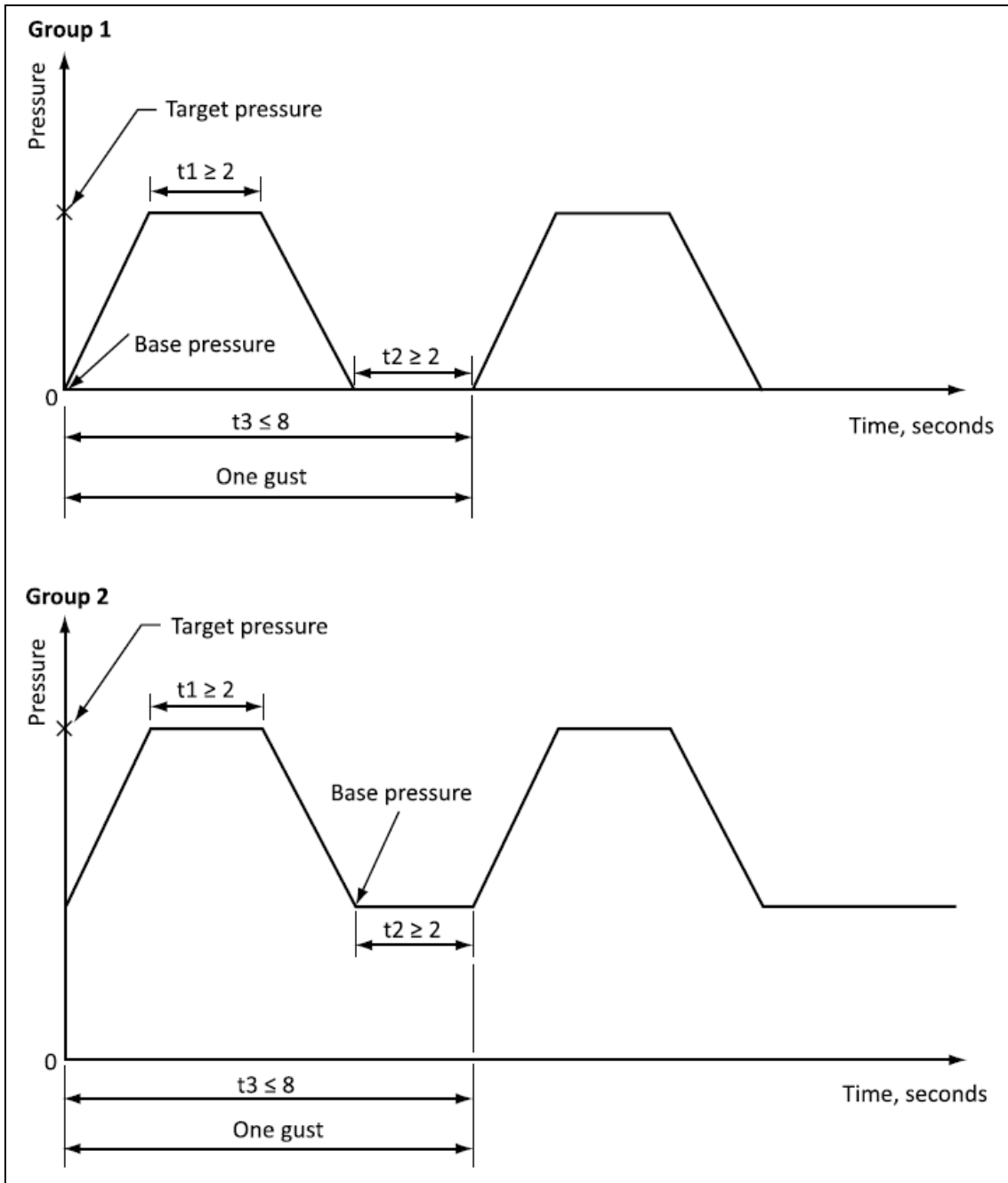


Figure 3 – Group 1 & 2 Gust Load Pressure Profiles (CSA A123.21-14 Figure 4)

3.0 TEST RESULTS

Table No. 1 – Summarized Dynamic Wind Uplift Resistance Results Element Specimen No.: 21-06-B0047-1 (Test Date: 2021-07-29), Method 2								
Level	Group	Sequence	Number of Cycles (Method 2)	Test Pressure (PSF)	Test Pressure (kPa)	Relief Pressure (PSF)	Relief Pressure (kPa)	Results
A	1	1	25	22.50	1.077	0.00	0.000	Pass
		2	250	45.00	2.155	0.00	0.000	Pass
		3	450	67.50	3.232	0.00	0.000	Pass
		4	50	90.00	4.309	0.00	0.000	Pass
	2	5	0	45.00	2.155	22.50	1.077	Pass
		6	75	67.50	3.232	22.50	1.077	Pass
		7	20	90.00	4.309	22.50	1.077	Pass
		8	5	90.00	4.309	45.00	2.155	Pass

Table No. 2 – Summarized Dynamic Wind Uplift Resistance Results Element Specimen No.: 21-06-B0047-1 (Test Date: 2021-07-29), Method 2									
Level	Group	Sequence	Number of Cycles (Method 2)	Test Pressure (PSF)	Test Pressure (kPa)	Relief Pressure (PSF)	Relief Pressure (kPa)	Results	
B	1	1	0	0.00	0.000	0.00	0.000	Pass	
		2	175	56.70	2.715	0.00	0.000	Pass	
		3	350	84.60	4.051	0.00	0.000	Pass	
		4	50	112.50	5.387	0.00	0.000	Pass	
	2	5	0	0.00	0.000	0.000	0.00	0.000	Pass
		6	50	84.60	4.051	27.90	1.336	Fail	
		7	20	112.50	5.387	27.90	1.336	-	
		8	5	112.50	5.387	56.70	2.715	-	

Total Testing Time: 3.5-hours
 Temperature at Start of Test: 24.4°C (75.9°F)
 Temperature at End of Test: 27.3°C (81.1°F)

Upon completion of testing (**Level A**), the test specimen was visually inspected and the following observations were made:

- No blistering observed on membranes at seams.
- No signs of support panel became detached from overall system.
- No seam/membrane rupture, tear, or delamination was observed.
- No seam/membrane developed holes.
- No deck failure.
- No seam exhibited failure, opening or rupture that caused pressure to no longer sustain loads during testing.

During **Level B**, testing was terminated due to failures and the test specimen was visually inspected and the following observations were made:

- Upon inspection for mode of failure, a blister was observed to propagate to exceed 10% of area.
- Upon inspection for mode of failure, the base sheet delaminated from the insulation board.
- No seam/membrane rupture, tear, or delamination was observed on other components.
- No seam/membrane developed holes.
- No deck failure.
- No seam exhibited failure, opening or rupture that caused pressure to no longer sustain loads during testing.



Figure 4 – Blister observed to propagate at different locations



Figure 5 – Adhesive failure between the base sheet and insulation board

4.0 SYSTEM MODIFICATIONS

No modifications were made to the system as shown respectively in Appendix A, B & C.

5.0 CONCLUSION

Siplast Inc., adhesive applied membrane roof system identified as “PARADIENE 30 ADHERED GYPSUM COVER BOARD SYSTEM” as outlined in this report was tested in accordance with CSA A123.21-2020 standard (*Method 2*) and completed Level A sequence at a design pressure of 2.873 kPa (60.00 PSF) [*tested using a 1.5 safety factor = 4.309 kPa (90.00 PSF)*].

“PARADIENE 30 ADHERED GYPSUM COVER BOARD SYSTEM” Summary:	
Roof Membrane (Cap):	Paradiene 30 FR, 3.3 mm (130 mils thick) with 76.2 mm (3.0”) overlap, PA-311 R Adhesive – full coverage
Roof Membrane (Base):	Paradiene 20, 2.5 mm (0.10” thick) with 76.2 mm (3.0”) overlap, PA-311 R Adhesive – full coverage
Support Panel:	DensDeck® Prime, 6.4 mm (1/4” thick), 1219 mm x 2438 mm (4 x 8’), Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)
Insulation (Top Layer):	Paratherm, 38.1 mm (1.5” thick), 1219 x 1219 mm (4 x 4’), Staggered from bottom layer, Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)
Insulation (Bottom Layer):	Paratherm, 38.1 mm (1.5” thick), 1219 x 1219 mm (4 x 4’), Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)
Vapour Barrier:	Siplast SA Vapor Retarder, 0.81 mm (32 mils thick) with 76.2 mm (3”) overlap, Self-adhered to substrate
Thermal Barrier:	DensDeck® Prime, 12.7 mm (1/2” thick), 1219 mm x 2438 mm (4 x 8’), Parafast Insulation Adhesive C, 2 Part Component applied every 152 mm (6” O/C)
Decking:	Steel Deck, 22 ga, RD938, 230 MPa (33.4 ksi), Mechanically attached at every flute
Dynamic Uplift Resistance:	2.873 kPa (60.00 PSF) (<i>Test Pressure of 4.309 kPa (90.00 PSF), reduced to 2.873 kPa (60.00 PSF) with Safety Factor of 1.5 as Published Dynamic Uplift Resistance “DUR”</i>)

6.0 REVISION HISTORY

<u>Date:</u>	<u>Revision:</u>	<u>Comments:</u>
September 14, 2021	21-06-B0047-1 DRAFT 1	N/A

Reviewed by:

Reported & Authorized by:

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APPENDIX A

PARADIENE 30 ADHERED GYPSUM COVER BOARD SYSTEM

*(Element Specimen No.: 21-06-B0047-1) Components
(As Documented By Client)*

(12 Pages)

PARADIENE 30 FR



Commercial Product Data Sheet

Product Description

Paradiene 30 FR is a high performance, modified bitumen finish ply designed for use in homogeneous multi-layer modified bitumen roof membrane systems. Paradiene 30 FR consists of a lightweight random fibrous glass mat impregnated and coated with high quality styrene-butadiene-styrene (SBS) modified bitumen, and surfaced with ceramic granules.

Paradiene 30 FR is available with Siplast RoofTag RFID roof asset technology on a Special-Made-To-Order basis. See RoofTag Commercial Product Data Sheet for more information.

Product Uses

Paradiene 30 FR is the finish ply of the Siplast Paradiene 20/30 FR System, and is lapped 3 inches (7.6 cm) side and end. Paradiene 30 FR can be applied in approved Type IV asphalt, Siplast PA-311 Adhesives or SFT Adhesive. Contact Siplast for specific approval on other product uses.

Product Approvals

Contact Siplast for specific information regarding FM Class 1 windstorm resistance classifications.

Paradiene 30 FR is classified by Underwriters Laboratories for use in μ UL Classified Siplast Paradiene 20/30 FR Roof Systems. Siplast Paradiene 20/30 FR has been classified by Underwriters Laboratories as a Class A roofing system over non-combustible, insulated non-combustible, and insulated combustible decks, and as a Class B roofing system over combustible decks.

Paradiene 30 FR meets or exceeds the requirements of ASTM D6183 Type I, Grade G, and CSA A123.23-15 Type A, Grade 1 for SBS-modified bituminous sheet materials using glass fiber reinforcements.

Siplast Roof Systems also have received the approval of many regional and local authorities. Please contact Siplast for specific information as required.

Current copies of all Siplast Commercial Product Data Sheets are posted on the Siplast Web site at www.Siplast.com.

COMMERCIAL PRODUCT INFORMATION

Unit:	Roll	
Coverage:	1.0 Square	(9.3 m ²)
Coverage Weight Per Square:	Min: 90 lb	(4.4 kg/m ²)
Roll Length:	Min: 33.5 ft	(10.21 m)
Roll Width:	Avg: 3.28 ft	(1.00 m)
Thickness:	Avg: 130 mils	(3.3 mm)
Thickness at Selvage:	Avg: 98 mils	(2.5 mm)
	Min: 94 mils	(2.4 mm)

Selvage Surfacing: Silica parting agent

Top Surfacing: No. 11 ceramic granules, standard color finish is #A-720 Bone White. Contact Siplast for other available colors.

Back Surfacing: Silica Parting Agent

Lines: A laying line is placed 3 in (7.6 cm) from selvage edge of the material. The line color for this material is orange.

Packaging: Rolls are wound onto a compressed paper tube. The rolls are placed upright on ends opposite the selvage on pallets cushioned with corrugated cardboard and are adhered with adhesive at the labels. The top of the palletted rolls is covered with Kraft paper. The palletted material is protected by a heat shrink polyethylene shroud.

Pallet: 41 in X 48 in (104 cm X 122 cm) wooden pallet
Number Rolls Per Pallet: 23
Number Pallets Per Truckload: 18
Minimum Roll Weight: 90 lb (40.8 kg)

Storage and Handling: All Siplast roll roofing products should be stored on end on a clean flat surface. Care should be taken that rolls are not dropped on ends or edges and are not stored in a leaning position. Deformation resulting from these actions will make proper installation difficult. All roofing should be stored in a dry place, out of direct exposure to the elements, and should not be double stacked. Material should be handled in such a manner as to ensure that it remains dry prior to and during installation.

Rev 6/2019

PARADIENE 30 FR

Physical and Mechanical Properties

UNITED STATES TEST STANDARDS			CANADA TEST STANDARDS	
Property (as Manufactured)	Values/Units	Test Method	Property (as manufactured)	Test Method CSA A123.23-15 Values/Units
Thickness (average)	130 mils (3.3 mm)	ASTM D5147 section 6	Thickness (average)	3.3 mm (130 mils)
¹ Thickness at selvage (minimum) (average)	94 mils (2.4 mm) 98 mils (2.5 mm)	ASTM D5147 section 6	¹ Thickness at selvage (minimum) (average)	2.4 mm (94 mils) 2.5 mm (98 mils)
² Peak Load @ 73.4°F (23°C) (average)	30 lbf/inch (5.3 kN/m)	ASTM D5147 section 7	² Peak Load @ 23°C (73.4°F) (average)	5.3 kN/m (30 lbf/inch)
² Peak Load @ 0°F (-18°C) (average)	75 lbf/inch (13.2 kN/m)	ASTM D5147 section 7	² Peak Load @ -18°C (0°F) (average)	13.2 kN/m (75 lbf/inch)
² Elongation @ Peak Load, 73.4°F (23°C)(average)	3%	ASTM D5147 section 7	² Elongation @ Peak Load, 23°C (73.4°F) (average)	3%
² Elongation @ Peak Load, 0°F (-18°C) (average)	3%	ASTM D 5147 section 7	² Elongation @ Peak Load, -18°C (0°F) (average)	3%
² Ultimate Elongation @ 73.4°F (23°C) (average)	55%	ASTM D5147 section 7	² Ultimate Elongation @ 23°C (73.4°F) (average)	55%
² Tear Strength (average)	40 lbf (0.18 kN)	ASTM D5147 section 8		N/A
Water Absorption (maximum)	1%	ASTM D5147 section 10		N/A
Dimensional Stability (maximum)	0.1%	ASTM D5147 section 11	Dimensional Stability (maximum)	0.1%
Low Temperature Flexibility (maximum)	-15°F (-26°C)	ASTM D5147 section 12	Low Temperature Flexibility (maximum)	-26°C (-15°F)
Granule Embedment Max. avg. loss Max. individual loss	1.5 grams per sample 2.0 grams per sample	ASTM D5147 section 15	Granule Embedment Max. avg. loss Max. individual loss	1.5 grams per sample 2.0 grams per sample
Compound Stability (minimum)	250°F (121°C)	ASTM D5147 section 16	Compound Stability (minimum)	121°C (250°F)
Cyclic Fatigue	Paradiene 30 FR, bonded to an acceptable Paradiene 20 base ply with an approved method of attachment, passes ASTM D5849 both as-manufactured and after heat conditioning according to ASTM D5147.			

1. Measured on the selvage edge excluding the granule surfacing.
2. The value reported is the lower of either MD or XD.



The above properties have been validated by PRI and are under continuous follow-up to ensure compliance. The product has been validated to meet ASTM D6163-08, TYPE I, GRADE G.

PARADIENE 20



Commercial Product Data Sheet

Product Description

Paradiene 20 is a high performance modified bitumen base ply designed for use in homogeneous multi-layer modified bitumen roof membrane systems. Paradiene 20 consists of a lightweight random fibrous glass mat impregnated and coated with high quality styrene-butadiene-styrene (SBS) modified bitumen.

Paradiene 20 is available with Siplast RoofTag RFID roof asset technology on a Special-Made-To-Order basis. See RoofTag Commercial Product Data Sheet for more information.

Product Uses

Paradiene 20 is the first ply of all standard Siplast Paradiene 20/30 Systems, and is lapped 3 inches (7.6 cm) side and end. Paradiene 20 can be applied in approved Type III or Type IV asphalt, PA-1000 Polymer Asphalt, Siplast PA-311 Adhesives, or SFT Adhesive. Contact Siplast for specific approval on other product uses.

Product Approvals

Contact Siplast for specific information regarding FM Class 1 windstorm resistance classifications.

Paradiene 20 is classified by Underwriters Laboratories for use in cULus Classified Siplast Paradiene 20/30, Paradiene 20/30 FR, and Paradiene 20/20 PR Roof Systems. Siplast Paradiene 20/30 FR has been classified by Underwriters Laboratories as a Class A roofing system over non-combustible, insulated non-combustible, and insulated combustible decks; and as a Class B roofing system over combustible decks. Siplast Paradiene 20/20 PR has been classified by Underwriters Laboratories as a Class A roofing system over non-combustible and insulated non-combustible decks when surfaced with roofing gravel. Siplast Paradiene 20/30 has been classified as a Class C roofing system over combustible, non-combustible, and insulated combustible decks.

Paradiene 20 meets or exceeds the requirements of ASTM D6163 Type I, Grade S, and CSA A123.23-15 Type A, Grade 2 for SBS-modified bituminous sheet materials using glass fiber reinforcements.

Siplast Roof Systems have also received the approval of many regional and local code authorities. Contact Siplast for more information.

COMMERCIAL PRODUCT INFORMATION

Unit	Roll	
Coverage:	1.5 Squares	(13.9 m ²)
Coverage Weight Per Square:	Min: 62 lb	(3.0 kg/m ²)
Roll Length:	Min: 50 ft	(15.24 m)
Roll Width:	Avg: 3.28 ft	(1.00 m)
Thickness:	Avg: 91 mils	(2.3 mm)
	Min: 87 mils	(2.2 mm)
Selvage Width:	N/A	
Selvage Surfacing:	N/A	
Top Surfacing:	Silica Parting Agent	
Back Surfacing:	Silica Parting Agent	

Lines: Two laying lines are placed 3 in (7.6 cm) and 4 in (10.2 cm) from each edge of the material. The line color for this material is white.

Packaging: Rolls are wound onto a compressed paper tube. The rolls are placed upright on pallets cushioned with corrugated cardboard and are adhered with adhesive at the labels. The top of the palleted rolls is covered with Kraft paper. The palleted material is protected by a heat shrink polyethylene shroud.

Pallet: 41 in X 48 in (104 cm X 122 cm) wooden pallet
Number Rolls Per Pallet: 25
Number Pallets Per Truckload: 18
Minimum Roll Weight: 93 lb (42.2 kg)

Storage and Handling: All Siplast roll roofing products should be stored on end on a clean flat surface. Care should be taken that rolls are not dropped on ends or edges and are not stored in a leaning position. Deformation resulting from these actions will make proper installation difficult. All roofing should be stored in a dry place, out of direct exposure to the elements, and should not be double stacked. Material should be handled in such a manner as to ensure that it remains dry prior to and during installation.

Current copies of all Siplast Commercial Product Data Sheets are posted on the Siplast Web site at www.Siplast.com.


Rev 6/2019

PARADIENE 20

Physical and Mechanical Properties

UNITED STATES TEST STANDARDS			CANADA TEST STANDARDS	
Property (as Manufactured)	Values/Units	Test Method	Property (as manufactured)	Test Method CSA A123.23-15 Values/Units
Thickness (minimum)	87 mils (2.2 mm)	ASTM D5147 section 6	Thickness (minimum)	2.2 mm (87 mils)
Thickness (average)	91 mils (2.3 mm)	ASTM D5147 section 6	Thickness (average)	2.3 mm (91 mils)
¹ Peak Load @ 73.4°F (23°C) (average)	30 lbf/inch (5.3 kN/m)	ASTM D5147 section 7	¹ Peak Load 23°C (73.4°F) (average)	5.3 kN/m (30 lbf/inch)
¹ Peak Load @ 0°F (-18°C) (average)	70 lbf/inch (12.3 kN/m)	ASTM D5147 section 7	¹ Peak Load @ -18°C (0°F) (average)	12.3 kN/m (70 lbf/inch)
¹ Elongation @ Peak Load, 73.4°F (23°C) (average)	3%	ASTM D5147 section 7	¹ Elongation @ Peak Load, 23°C (73.4°F) (average)	3%
¹ Elongation @ Peak Load, 0°F (-18°C) (average)	3%	ASTM D5147 section 7	¹ Elongation @ Peak Load, -18°C (0°F) (average)	3%
¹ Ultimate Elongation @ 73.4°F (23°C) (average)	55%	ASTM D5147 section 7	¹ Ultimate Elongation @ 23°C (73.4°F) (average)	55%
¹ Tear Strength (average)	40 lbf (0.18 kN)	ASTM D5147 section 8	N/A	N/A
Water Absorption (maximum)	1%	ASTM D5147 section 10	N/A	N/A
Dimensional Stability (maximum)	0.1%	ASTM D5147 section 11	Dimensional Stability (maximum)	0.1%
Low Temperature Flexibility (maximum)	-15°F (-26°C)	ASTM D5147 section 12	Low Temperature Flexibility (maximum)	-26°C (-15°F)
Compound Stability (minimum)	250°F (121°C)	ASTM D5147 section 16	Compound Stability (minimum)	121°C (250°F)
Cyclic Fatigue	Paradiene 20 bonded to Paradiene 30 FR with an approved method of attachment, passes ASTM D5849 both as-manufactured and after heat conditioning according to ASTM D5147.			

1. The value reported is the lower of either MD or XD.

	The above properties have been validated by PRI and are under continuous follow-up to ensure compliance. The product has been validated to meet ASTM D6163-08, TYPE I, GRADE S.
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PARATHERM & PARATHERM CG POLYISOCYANURATE INSULATION



Commercial Product Data Sheet

Product Description

Paratherm is a rigid roof insulation board comprised of a closed cell polyisocyanurate foam core bonded on each side to fiber-reinforced organic felt facer. Paratherm CG has a coated fiberglass facer. The product provides high thermal R-value, code compliance, and superior physical properties at a low installed cost. Standard product has a compressive strength of 20 psi (Grade 2). Paratherm and Paratherm CG are also available in 25 psi (Grade 3).

Product Uses

Paratherm is used in combination with coverboards approved in advance by Siplast for all constructions requiring a single-source guarantee. Each panel of Paratherm must be secured to the roof deck with Factory Mutual Approved fasteners (appropriate to the deck type) and plates installed in accordance with current FM requirements. Alternatively, maximum 4 ft x 4 ft (1.22 m x 1.22 m) panels of Paratherm may be adhered to a prepared existing concrete deck with a full mopping of hot asphalt or approved insulation adhesive. Paratherm CG (coated fiberglass facer - non-organic) is required over new concrete substrates due to the anticipated high moisture content. This includes all layers where multiple layers of Paratherm are used. Contact Siplast for approvals on applications over new concrete decks or other product uses.

Product Approvals

Paratherm meets or exceeds the requirements of ASTM C 1289 Type II, Class 1, Grade 2. Paratherm CG meets or exceeds ASTM C 1286 Type II Class 2, Grade 2 and Grade 3 product (25 psi) is also available. Paratherm is Factory Mutual Approved for use in Class 1 constructions when installed according to FM requirements. Paratherm has been classified by Underwriters Laboratories, Inc. as an approved roof insulation in all Siplast Class A roof constructions and Roof/Ceiling hourly fire-rated assemblies, and is classified by Underwriters Laboratories Canada.

Mechanical and physical properties are on the back side of this data sheet.

Current copies of all Siplast Commercial Product Data Sheets are posted on the Siplast Web site at www.Siplast.com.

COMMERCIAL PRODUCT INFORMATION

Panel Size - Flat Panels: Available in 4' x 8' (1.22 m x 2.43 m) and 4' x 4' (1.22 m x 1.22 m) panels.

Thickness - Flat Panels: 1 inch (2.54 cm) to 4 inches (10.16 cm)

Multiple Layer Configurations: A maximum individual flat-stock panel thickness of 2.7 inches is recommended. For configurations requiring more than 2.7 inches of Paratherm, a multiple layer configuration is recommended.

Panel Size - Tapered Panels: Available in 4' x 4' (1.22 m x 1.22 m) panels.

Thickness - Tapered Panels: Panel thickness varies with taper/slope of the panel. Tapered panels are available to provide 1/8, 1/4, or 1/2 inch per foot slope.

Packaging:

Paratherm is shipped to the job site protected by a plastic wrap, plastic bag, or both. This factory packaging is intended for handling the Paratherm in the manufacturing plant and during transit; it should not be relied upon as job site protection from the elements.

Storage & Handling:

Material delivery should be carefully coordinated with the schedule for roofing operations to minimize job site storage time. Interior storage offering dry, well-ventilated conditions should be considered when the product is to be stored for more than 14 days prior to installation. When short-term job site storage is necessary, Paratherm should be stored flat on raised pallets or platforms at least 4 inches above the ground. Pallets should be stored on a finished surface rather than on dirt or grass to avoid upward transpiration of moisture. Pallets should be covered with a waterproof covering, preferably using a breathable material such as canvas.

Rev 5/2018

PARATHERM POLYISOCYANURATE INSULATION

Physical and Mechanical Properties

TYPICAL PROPERTIES AND CHARACTERISTICS

Nominal Thickness inch (mm)	LTTR* ASTM C 1289-11 (CAN/ULC-S770 -09)	LTTR** (CAN/ULC-S770 -03)	Flute Span (max.) inch (mm)
1.0 (25)	5.6	6.0	2 5/8 (67)
1.2 (30)	6.7	7.2	2 5/8 (67)
1.5 (38)	8.5	9.0	3 3/8 (86)
1.8 (46)	10.2	10.9	3 3/8 (86)
2.0 (51)	11.4	12.1	3 3/8 (86)
2.2 (56)	12.6	13.4	3 3/8 (86)
2.3 (58)	13.2	14.0	3 5/8 (92)
2.5 (64)	14.4	15.3	3 5/8 (92)
2.6 (66)	15.0	15.9	3 5/8 (92)
2.7 (69)	15.6	16.6	3 5/8 (92)
The following are not recommended for use in a single layer application.			
2.8 (71)	16.2	17.2	3 5/8 (92)
3.0 (76)	17.4	18.5	3 5/8 (92)
3.1 (78)	18.0	19.1	3 5/8 (92)
3.2 (81)	18.6	19.8	3 5/8 (92)
3.5 (89)	20.5	21.7	3 5/8 (92)
3.8 (97)	22.3	23.7	3 5/8 (92)
4.0 (102)	23.6	25.0	3 5/8 (92)

Information on other thicknesses available upon request.

- * Long-term Thermal Resistance (LTTR) Value determined in conformance with ASTM C 1289-11 effective Jan. 1, 2014 (CAN/ULC-S770 -09).
- ** Long-term Thermal Resistance (LTTR) Values determined in conformance with CAN/ULC-S770-03.

HIGH THERMAL VALUE COMBINATIONS

LTTR	ASTM C 1289-11 (CAN/ULC-S770 -09)
20 (20.4)	2 layers of 1.8" Paratherm or Paratherm CG
25 (25.2)	2 layers of 2.2" Paratherm or Paratherm CG
30	2 layers of 2.6" Paratherm or Paratherm CG
35 (36)	2 layers of 3.1" Paratherm or Paratherm CG
40 (41)	2 layers of 3.5" Paratherm or Paratherm CG



SIPLAST SA VAPOR RETARDER® Commercial Product Data Sheet

Siplast SA Vapor Retarder is a self-adhesive vapor retarder sheet used in single and multi-ply roof systems. Siplast SA Vapor Retarder consists of a self-adhesive blend that is laminated to a tri-laminate woven polyethylene film top surface. The back of the sheet is lined with a split, silicone-treated polyolefin release film. Siplast SA Vapor Retarder is intended for use as a vapor retarder in insulated Siplast Roof Systems. The composition of Siplast SA Vapor Retarder allows for application beneath materials such as perimeter metal components that can reach high temperatures.

Contact Siplast for information on approved product uses.

**USES:
VAPOR RETARDER
TEMPORARY ROOF**

Roll Length	Min: 134 ft (40.84 m)
Roll Width	Avg: 45 in (1.14 m) Min: 44.75 in (1.13 m)
Coverage per Roll (approx.)	502.5 sf (46.68 m ²)
Net Coverage Per Roll (approx.)	468 sf (43.47 m ²)
Laps	3" (3.93 cm) side & end
Roll Weight (minimum)	78 lbs (35.38 kg)
Top Surfacing	Tri-laminate woven polyethylene
Back Surfacing	Silicone-treated polyolefin release film

PRODUCT INFORMATION

Application

Refer to Siplast Specifications and applicable Installers Guides for detailed application information. Siplast SA Vapor Retarder can be exposed to the weather for up to 90 days. Installed sheets must be provided with positive drainage without exception.



Storage and Handling

Siplast SA Vapor Retarder should be stored in factory packaging in a horizontal orientation. Rolls may deform if in a leaning position and deformation resulting from these actions will make proper installation difficult. Store product in a cool, dry place out of direct exposure to the elements. Material should be handled so that it remains dry prior to and during installation.

Packaging

Rolls: Individually packaged in boxes
Pallet: 44 in x 44 in (1.11 m x 1.11 m) wooden pallet
Rolls Per Pallet: 25 (upright orientation of boxes/rolls)

Listings, Approvals & Certifications



Current copies of all Siplast Commercial Product Data Sheets are posted on our website at www.siplast.com
Rev Date 3/2021

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1.800.922.8800 www.siplast.com

SIPLAST SA VAPOR RETARDER®
Physical and Mechanical Properties



U.S. TEST STANDARDS

Property	Values / Units	Test Method
Thickness (average)	32 mils (0.81 mm)	ASTM D1970
Thickness (minimum)	31 mils (0.78 mm)	ASTM D1970
Coating Thickness - Back Surface	≥ 23 mils (0.58 mm)	ASTM D1970
Weight per ft ² (minimum)	0.155 lb/sf (0.021 kg/m ²)	N/A
*Peak Load @ 73.4°F (23°C) (average)	70 lbf/inch (0.095 kN/m)	ASTM D5147
Cold bend (minimum)	-22°F (-30°C)	ASTM D5147
Static Puncture	90 lbf (400 kN)	ASTM D154
Lap Adhesion (after one day)	24 lbf/ft (0.033 kN/m)	ASTM D1876
*Tear Strength (average)	95 lbf (422.2 kN)	ASTM D5147
Water Absorption (maximum)	0.01%	ASTM D5147
Peel Resistance on Steel @ 10°C (minimum)	25 lbf/ft (0.034 kN/m)	ASTM D903
Adhesion to Plywood (minimum)	16 lbf/ft (0.022 kN/m) @ 40°F 20 lbf/ft (0.027 kN/m) @ 70°F	ASTM D1970
Water Vapor Permeance (maximum)	0.03 perms	ASTM E96
Air Permeability	0.001 L/s m ²	ASTM E2178

*The value reported is the lower of either MD or XD.

PA-311 R ADHESIVE



Commercial Product Data Sheet

Product Description

PA-311 R Adhesive is a specially formulated cold process adhesive designed for use with Siplast Paradiene 20/30, Paradiene 40 FR, and Parafor 50 LT Roofing Systems. PA-311 R Adhesive is an asphalt outback adhesive containing non-asbestos fibers and special bond enhancing modifiers.

Product Uses

PA-311 R Adhesive is designed for use with Siplast Paradiene 20/30, Paradiene 40 FR, and Parafor 50 LT Roofing Systems at roof inclines in excess of 1/4 inch (2%) per foot. PA-311 R Adhesive is not approved for use with Siplast Veral Roofing and Flashing Systems. Contact Siplast for specific approval on other product uses.

PA-311 R Adhesive can be applied by brush, roller, squeegee, Paraflow Adhesive Spreader, or spray unit. Base ply application rates will vary over irregular or porous substrates. Inter-ply applications typically require approximately 1½ to 2 gallons per square (0.6 - 0.8 liters per square meter). On granule-surfaced materials, end lap usage of PA-311 R Adhesive should be approximately double that of the field sheet application.

Temperature Considerations and Limitations

In ambient temperatures below 50°F (10°C), materials should be stored in a warm environment and the use of pre-heaters or in-line heaters may be required in order to obtain the minimum desired material temperature of 70°F (21°C) at point of application. Membrane materials should be stored in a warm place prior to application in order to facilitate proper installation and avoid wrinkling. Additionally, rolls may be unrolled and relaxed and/or cut into shorter lengths to avoid wrinkling.

Product Approvals

PA-311 R Adhesive is approved by Factory Mutual Research (FM Standard 447D) for use as a Siplast Paradiene 20/30 and Paradiene 20/30 FR adhesive in Class 1 insulated steel roof deck constructions and insulated and non-insulated concrete roof deck constructions, subject to FM conditions and limitations.

PA-311 R Adhesive is Listed by Underwriters Laboratories as a substitute for Type IV asphalt for all cULus Classified Siplast Paradiene and Parafor Roof Systems.

PA-311 R Adhesive meets current regional VOC regulations.

VOC content: This product contains an average 239 g/l VOC.

COMMERCIAL PRODUCT INFORMATION

Unit: 5-Gallon Pail
4.7 gallons (17.8 liters) net content
Unit: 55-Gallon Drum
53 gallons (200.8 liters) net content
Unit: 350-Gallon Tote
340 gallons (1,287 liters) net content

Coverage:		
Base Ply	1½ - 2½ gal/sq	(0.6-1.0 L/m ²)
Inter-ply	1½ - 2 gal/sq	(0.6-0.8 L/m ²)
Thickness @ 1½ gal/sq:	24 mils	(0.6 mm)
Thickness @ 2 gal/sq:	32 mils	(0.8 mm)
	wet film gauge	wet film gauge

Coverage Weight		
@ 1½ gal/sq coverage:	14 lb / square	(0.7 kg/m ²)
@ 2 gal/sq coverage:	19 lb / square	(0.8 kg/m ²)
	wet film weight	wet film weight

Flash Point, Cleveland Open Cup: >105°F min. (41°C)

Recommended adhesive temperature for application - 70°F (21°C) (minimum)

Packaging: The pails are stacked three high on pallets and stretch wrapped.

Pallet: 44 in X 48 in (112 cm X 122 cm) wooden pallet
Number Pails Per Pallet: 42
Number Drums Per Pallet: 4
Number Pallets Per Truckload: 22

Weight Per Pail: 50 lb (22.7 kg)
Weight Per Drum: 563 lb (255 kg)
Weight Per Tote (Full): 4025 lb (1826 kg)

Shipping Classification: White Label (combustible)
Totes shipments require Registered Hazardous Material Carrier and Driver (HazMat).

Storage and Handling: All containers of PA-311 R Adhesive should be stored upright on a clean, flat surface. Care should be taken that containers are not dropped and container seals are not broken prior to use. All containers should be stored in a dry place, out of direct exposure to the elements, and should be kept away from excessive heat, fire, or open flames.

Current copies of all Siplast Commercial Product Data Sheets are posted on the Siplast Web site at www.Siplast.com.

Rev 5/2018

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Parafast Insulation Adhesive C

(Regular and Winter Grade)

Commercial Product Data Sheet

Product Description

Siplast Parafast Insulation Adhesive C is a quick curing, two-component, bead-applied polyurethane adhesive used to adhere approved rigid insulation board stock. Parafast Insulation Adhesive C is packaged in a box containing four (4) 1,500 ml cartridge sets of regular or winter grade formulas. The adhesive is applied using a manual hand applicator, a manual stand-up applicator or cordless power gun applicator. For larger scale applications, consider using Siplast Parafast Insulation Adhesive, which is packaged in bulk and is dispensed using a PaceCart 20.

Product Uses

Siplast Parafast Insulation Adhesive C is used to adhere approved rigid insulation panels to rigid insulation panels and substrates approved in advance by Siplast in roof constructions requiring a single-source guarantee. Approved insulation panels include Paratherm, DensDeck®, DensDeck Prime®, SECUROCK®, and high-density fiberboard. Approved substrates include previously-applied insulations as listed above, cured poured-in-place concrete, pre-cast concrete, approved ply sheets and approved nailed base sheets. The minimum product temperature for Parafast Insulation Adhesive C at the point of application is 72°F (22°C). Ambient and substrate temperatures must be a minimum 40°F (5°C) and rising for regular grade product and between 0°F (-17°C) and 65°F (19°C) for winter grade product. Once applied, the A/B mix cures chemically in approximately 10-12 minutes, depending on ambient and substrate conditions. Polyisocyanurate insulation panels applied in Parafast Insulation Adhesive C must have a maximum panel size of 4 ft x 4 ft (1.22 m x 1.22 m). Contact Siplast for specific approvals on other substrates and insulation products. See the *Siplast Insulation Adhesive Usage and Estimating Guide* for further information.

Product Approvals

Parafast Insulation Adhesive C may be used as a component in roof constructions requiring a rating for exterior fire resistance as outlined in the latest edition of the *UL Roofing Materials & Systems Directory*. Parafast Insulation Adhesive C is FM Global Approved as a component for use in Class 1 rated constructions when used according to FMG requirements. Contact Siplast for further information on uplift approvals, specific listings, and other agency approvals.

Safety

Protective clothing, including gloves and protective eyewear, should be used when Parafast Insulation Adhesive is being dispensed. See MSDS for detailed information.

COMMERCIAL PRODUCT INFORMATION

Unit: Parafast Insulation Adhesive C (regular) - 19 lb (8.0-kg) gross weight (4-1500 ml cartridges plus packaging)
Parafast Insulation Adhesive C (winter) - 19 lb (8.0-kg) gross weight (4-1500 ml cartridges plus packaging)

Packaging: Box of four 4-1500 ml cartridges plus 4 static mixing tips.

Number of units per pallet: 40 units per pallet

Storage and Handling: Parafast Insulation Adhesive C has a shelf life of 18 months from the date of manufacture. Parafast Insulation Adhesive should be stored in a cool dry location at temperatures between 55°F (13°C) and 85°F (30°C). Do not allow Parafast Insulation Adhesive to freeze under any circumstances. Store materials out of direct exposure to the elements. All material stored on the roof overnight should be stored on pallets. When storing materials on the roof, do not overload the deck or structural assembly.

Disposal: Do not discharge uncured product into lakes, streams, ponds or other bodies of water. Spilled, uncured product and unused containers should be neutralized and disposed of in accordance with local, state and federal regulations.

Rev 7/2018



Technical Service Hotline 1.800.225.6119 or
www.densdeck.com

Manufacturer

Georgia-Pacific Gypsum Georgia-Pacific Canada
133 Peachtree Street 2180 Meadyswale Boulevard, Suite 200
Atlanta, GA 30303 Mississauga, ON L5N 5S3
Technical Service Hotline: 1-800-225-6119

Description

DensDeck® Prime Roof Board has been enhanced to provide a broader compatibility and higher performance with roofing adhesives. Face mat enhancements allow adhesives to be applied more uniformly and consistently. In adhered, single ply membrane testing, enhanced DensDeck Prime demonstrated an average of 24% better bond than the original products, when using solvent based adhesives. (Average based on 60 sq.ft./gal coverage rates)* Choose DensDeck Prime Roof Boards for adhered and self-adhered "peel & stick" roofing systems, as well as hot mopped, cold mastic and torch-applied modified bitumen roofs. Enhanced DensDeck Prime Roof Boards create a stronger and more economical installation by reducing the amounts of mastic or adhesive used and potentially eliminates the field primer. Consult with membrane manufacturer for actual priming requirements.

DensDeck Prime Roof Boards are the first and only fiberglass mat gypsum roof boards with a 90-day weather exposure limited warranty when applied vertically on a parapet wall.** (Limited to 1/2" and 5/8" products only.)

Primary Uses

Roof system manufacturers and designers have found DensDeck Prime Roof Board to be compatible with many types of roofing systems, including: modified asphalt, single-ply, metal systems, recover board, as well as an overlayment for polyisocyanurate and polystyrene insulation. DensDeck Prime Roof Board can also be used as a form board for poured gypsum concrete deck in roof applications as well as a substrate for spray foam roofing systems. 1/2" (12.7 mm) and 5/8" (15.9 mm) DensDeck Prime Roof Board may also be used in vertical applications as a becker board or liner for the roof side of parapet walls.

DensDeck Prime Roof Board may allow the bonding of cold mastic modified bitumen and torching directly to the surface. *Consult with the system manufacturer for recommendations on this application.*

DensDeck Prime Roof Board is the preferred substrate for vapor retarders.

Standards and Code Approvals

DensDeck Prime Roof Boards are manufactured to meet ASTM C1177 and have the following approvals:

- Florida Product Approved
- Miami-Dade County Product Control Approved

Recommendations and Limitations

DensDeck Prime Roof Boards are manufactured to act with a properly designed roof system following good roofing practices. The actual use of DensDeck Prime Roof Board as a roofing component in any system or assembly is the responsibility of the roofing system's design authority. Consult with the appropriate system manufacturer and/or design authority for system and assembly specifications and instructions on applying other products to DensDeck Prime Roof Board. Georgia-Pacific does not warrant and is not responsible for any systems or assemblies utilizing DensDeck Prime Roof Board or any component in such systems or assemblies other than DensDeck Prime Roof Board.

The need for a separator sheet between the DensDeck Prime Roof Board and the roofing membrane must be determined by the roof membrane manufacturer or roofing system designer.

* Testing was done in accordance with FM approvals 4470, Appendix C: Small Scale Tests, Membrane Determination Tests for Roofing Membranes and Substrates Using Tensile Loading.

** For complete warranty details, visit www.DensDeck.com. (Limited to 1/2" and 5/8" products only.)

Confirm any priming requirements with the membrane manufacturer. When applying solvent-based adhesives or primers, allow sufficient time for the solvent to flash off to avoid damage to roofing components.

DensDeck Prime Roof Boards should not be subjected to abnormal or excessive loads or foot traffic, such as, but not limited to, use on plaza decks or under steel-wheeled equipment that may fracture or damage the panels. Provide suitable roofing system protection when required.

When using DensDeck Prime Roof Boards for hot-mopped applications, Georgia-Pacific recommends maximum asphalt application temperatures of 425°F (218°C) to 450°F (232°C). Application temperatures above these recommended temperatures may adversely affect roof system performance. Consult and follow the roofing system manufacturer's specifications for full mopping applications and temperature requirements.

When using DensDeck Prime Roof Board as a substrate for torch applications, ensure that the product is dry and that the proper torching technique is used. Limit the heat to the DensDeck Prime Roof Board. Maintain a majority of the torch flame directly on the roll. Conditions beyond the control of Georgia-Pacific, such as weather conditions, dew, leaks, application temperatures and techniques may cause adverse effects with roofing systems.

Handling and Use-CAUTION

This product contains fiberglass facings which may cause skin irritation. Dust and fibers produced during the handling and installation of the product may cause skin, eye and respiratory tract irritation. Avoid breathing dust and minimize contact with skin and eyes. Wear long sleeve shirts, long pants and eye protection. Always maintain adequate ventilation. Use a dust mask or NIOSH/MSHA approved respirator as appropriate in dusty or poorly ventilated areas.

Moisture Management

DensDeck Prime Roof Boards, like other components used in roofing systems, must be protected from exposure to moisture before, during and after installation.

Remove the plastic packaging from all DensDeck Prime Roof Board immediately upon receipt of delivery. Failure to remove the plastic packaging may result in entrapment of condensation or moisture. DensDeck Prime Roof Board stored outside must be stored level and off the ground and protected by a breathable waterproof covering. Provide means for air circulation around and under stored bundles of DensDeck Prime Roof Board. DensDeck Prime Roof Board must be covered the same day as installed.

Avoid application of DensDeck Prime Roof Boards during rain, heavy fog and any other conditions that may deposit moisture on the surface, and avoid the overuse of non-vented, direct-fired heaters during winter months. When roofing systems are installed on new poured concrete or light weight concrete decks or when re-roofing over an existing concrete deck, a vapor barrier should be installed above the concrete to retard the migration of water from the concrete into the roof assembly. Always consult the roofing system manufacturer or design authority for specific instructions for applying other products to DensDeck Prime Roof Boards.

Moisture vapor movement by convection must be eliminated, and the flow of water by gravity through imperfections in the roof system must be controlled. After a leak has occurred, no condensation on the upper surface of the system should be tolerated, and the water introduced by the leak must be dissipated to the building interior in a minimum amount of time.

Although DensDeck Prime Roof Boards are engineered with fiberglass facings and high density gypsum cores, the presence of free moisture can have a detrimental effect on the performance of the product and the installation of roofing membranes. For example, hot asphalt applications can blister, torched modified bitumen may not properly bond, and adhesives for single ply membranes may not dry properly.

Submittal Approvals

Job Name _____

continued →

Contractor _____

Date _____

Stamps / Signatures



Technical Service Hotline 1.800.225.6119 or
www.densdeck.com

Moisture accumulation may also significantly decrease wind uplift and vertical pull resistance in the system or assembly. DensDeck® Prime Roof Boards containing excessive free moisture content may need to be evaluated for structural stability to assure wind uplift performance.

Fire Resistance Classifications

DensDeck Prime Roof Boards are excellent fire barriers over combustible and noncombustible roof decks, including steel decks.

UL 790 Classification. DensDeck Prime Roof Boards have been classified by Underwriters Laboratories LLC (UL) for use as a fire barrier over combustible and noncombustible decks in accordance with the ANSI/UL 790 and ULC CAN-S114 test standard. The UL classification includes a comprehensive Class A, B or C rating. For additional information concerning the UL 790 classification, consult the UL Certification Directory.

UL 1256 Classification. DensDeck Prime Roof Boards have also been classified by UL in roof deck constructions for internal (under deck) fire exposure in accordance with the ANSI/UL 1256 Steiner Tunnel test. For additional information concerning the UL 1256 classification, consult the UL Certification Directory.

FM Class 1 Approvals. DensDeck Prime Roof Boards are included in numerous roofing assemblies with a Factory Mutual (FM) Class 1 fire rating. 1/4" (6.4 mm) DensDeck

Prime Roof Boards have passed testing under the FM Calorimeter Standard 4450 and have been approved by FM as such for insulated steel deck roofs when installed according to the conditions identified by FM. For more information concerning FM Approvals and FM Class 1 assemblies with DensDeck Prime Roof Boards, consult FM or RoofNav®.

Type X. 5/8" (15.9 mm) DensDeck® Prime Fireguard® Roof Boards are manufactured to meet the "Type X" requirements of ASTM C1177 for increased fire resistance beyond regular gypsum board.

UL Fire Resistance Ratings. 5/8" (15.9 mm) DensDeck Prime Fireguard Roof Boards are designated as **Type DD** by UL and included in assembly designs investigated by UL for hourly fire resistance ratings. 5/8" (15.9 mm) DensDeck Prime Fireguard Roof Boards may also replace any unclassified 5/8" (15.9 mm) gypsum board in an assembly in the UL Fire Resistance Directory under the prefix "P".

Flame Spread and Smoke Developed. When tested in accordance with ASTM E84, DensDeck Prime Roof Boards had Flame Spread 0, Smoke Developed 0.

Wind Uplift

DensDeck Prime Roof Boards are included in numerous assemblies evaluated by FM or other independent laboratories for wind uplift performance. For information concerning such assemblies, please visit www.roofnav.com.

Physical Properties

Properties	1/4" (6.4 mm)	1/2" (12.7mm)	5/8" (15.9 mm)
Thickness, nominal	1/4" (6.4 mm) ± 1/16" (1.6 mm)	1/2" (12.7 mm) ± 1/32" (.8 mm)	5/8" (15.9 mm) ± 1/32" (.8 mm)
Width, standard	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)
Length, standard	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)
Weight, nominal, lbs./sq. ft. (Kg/m²)	1.2 (5.9)	2.0 (9.8)	2.5 (12.2)
Surfacing	Fiberglass mat with non-asphaltic coating	Fiberglass mat with non-asphaltic coating	Fiberglass mat with non-asphaltic coating
Flexural Strength ¹ , parallel, lbf. min. (N)	≥ 40 (178)	≥ 80 (356)	≥ 100 (444)
Flute Spanability ²	2-5/8" (66.7 mm)	5" (127 mm)	8" (203 mm)
Permeance ³ , perms (ng/Pa·S·m²)	>30 (>1710)	>23 (>1300)	>17 (>870)
R Value ⁴ , ft²·°F·hr/BTU (m²·K/W)	.26	.56	.67
Linear Variation with Change in Temp., in/in °F (mm/mm/°C)	8.5 x 10 ⁻⁶ (15.3 x 10 ⁻⁶)	8.5 x 10 ⁻⁶ (15.3 x 10 ⁻⁶)	8.5 x 10 ⁻⁶ (15.3 x 10 ⁻⁶)
Linear Variation with Change in Moisture	6.25 x 10 ⁻⁶	6.25 x 10 ⁻⁶	6.25 x 10 ⁻⁶
Water Absorption ⁵ , % max	5	5	5
Compressive Strength ⁶ , psi nominal	900	900	900
Surface Water Absorption, grams, nominal	1.0	1.0	1.0
Flame Spread, Smoke Developed (ASTM E84)	0/0	0/0	0/0
Bending Radius	4' (1219 mm)	6' (1829 mm)	8' (2438 mm)

1. Tested in accordance with ASTM C473 method B.
2. Tested in accordance with ASTM E661.
3. Tested in accordance with ASTM E96 (dry cup method).

4. Tested in accordance with ASTM C516 (fast flow meter).
5. Specified values per ASTM C1177.
6. Tested in accordance with ASTM C473.



U.S.A. GP Gypsum LLC
Canada Georgia-Pacific Canada LP

SALES INFORMATION AND ORDER PLACEMENT

U.S.A. West: 1-800-824-7503
Midwest: 1-800-876-4746
South Central: 1-800-231-6060
Southeast: 1-800-327-2344
Northeast: 1-800-947-4497

CANADA Canada Toll Free: 1-800-387-6823
Quebec Toll Free: 1-800-361-0486

DENSDECK 1-855-647-3325

TECHNICAL INFORMATION

U.S.A. and Canada: 1-800-225-6119, www.gpgypsum.com

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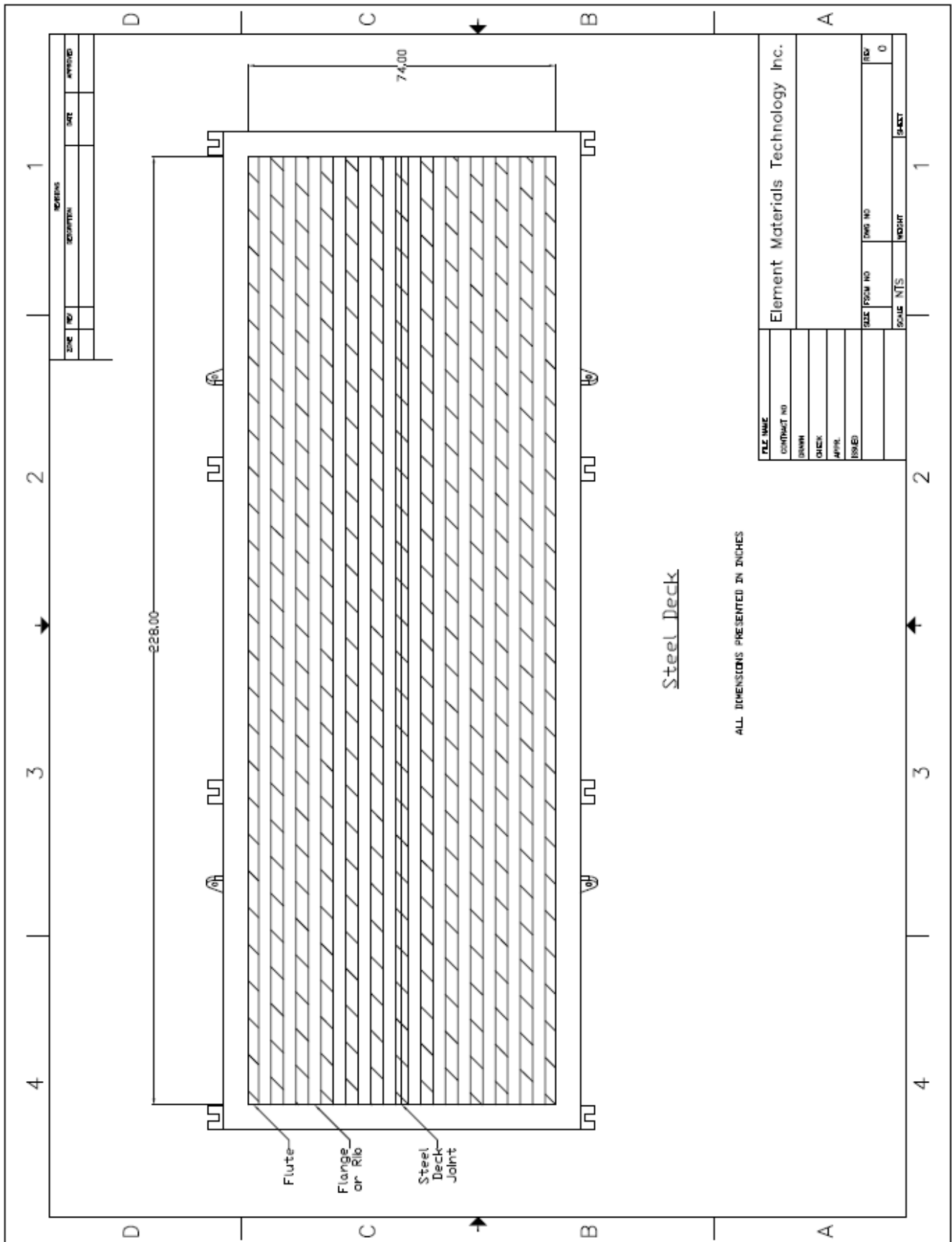
APPENDIX B

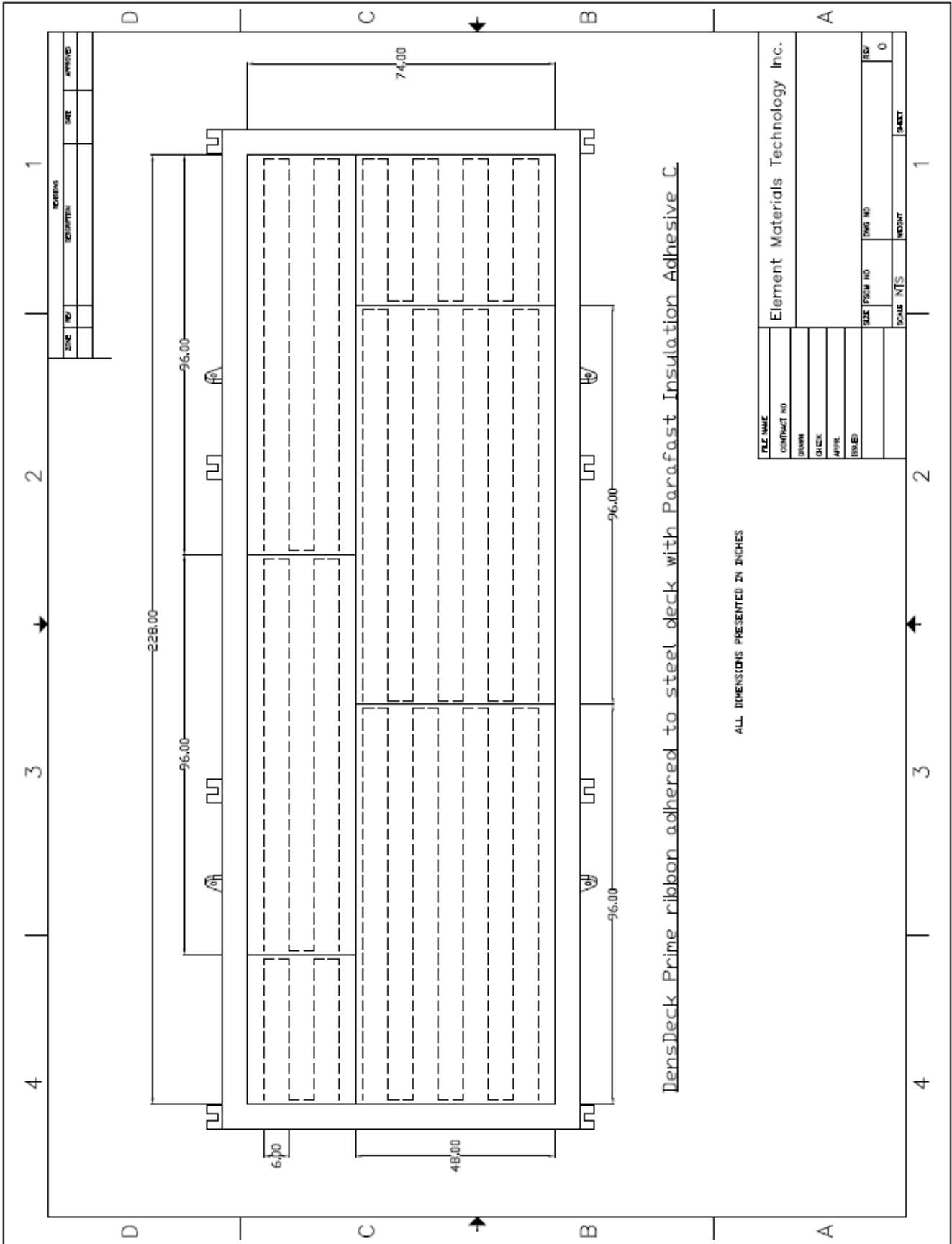
PARADIENE 30 ADHERED GYPSUM COVER BOARD SYSTEM

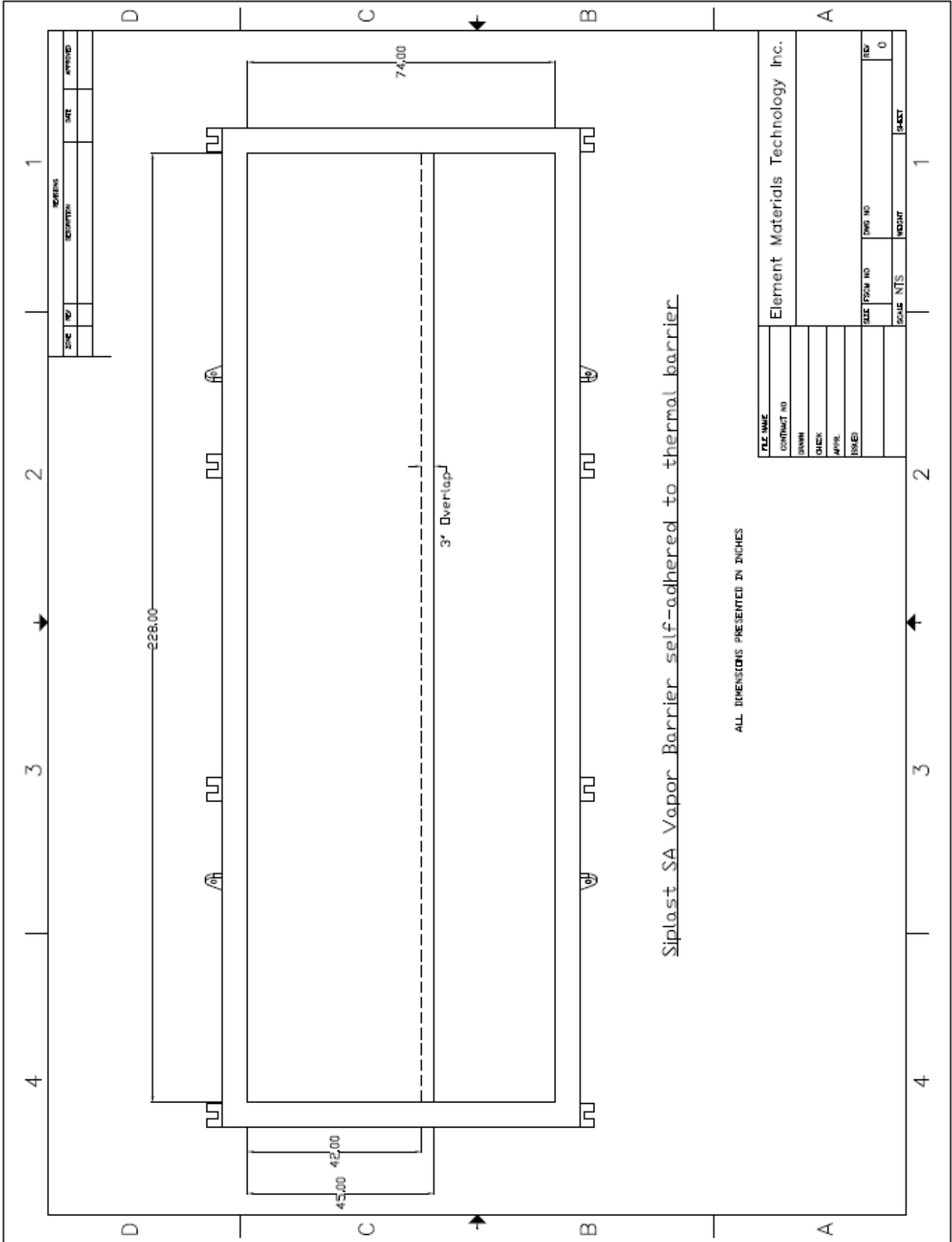
(Element Specimen No.: 21-06-B0047-1)

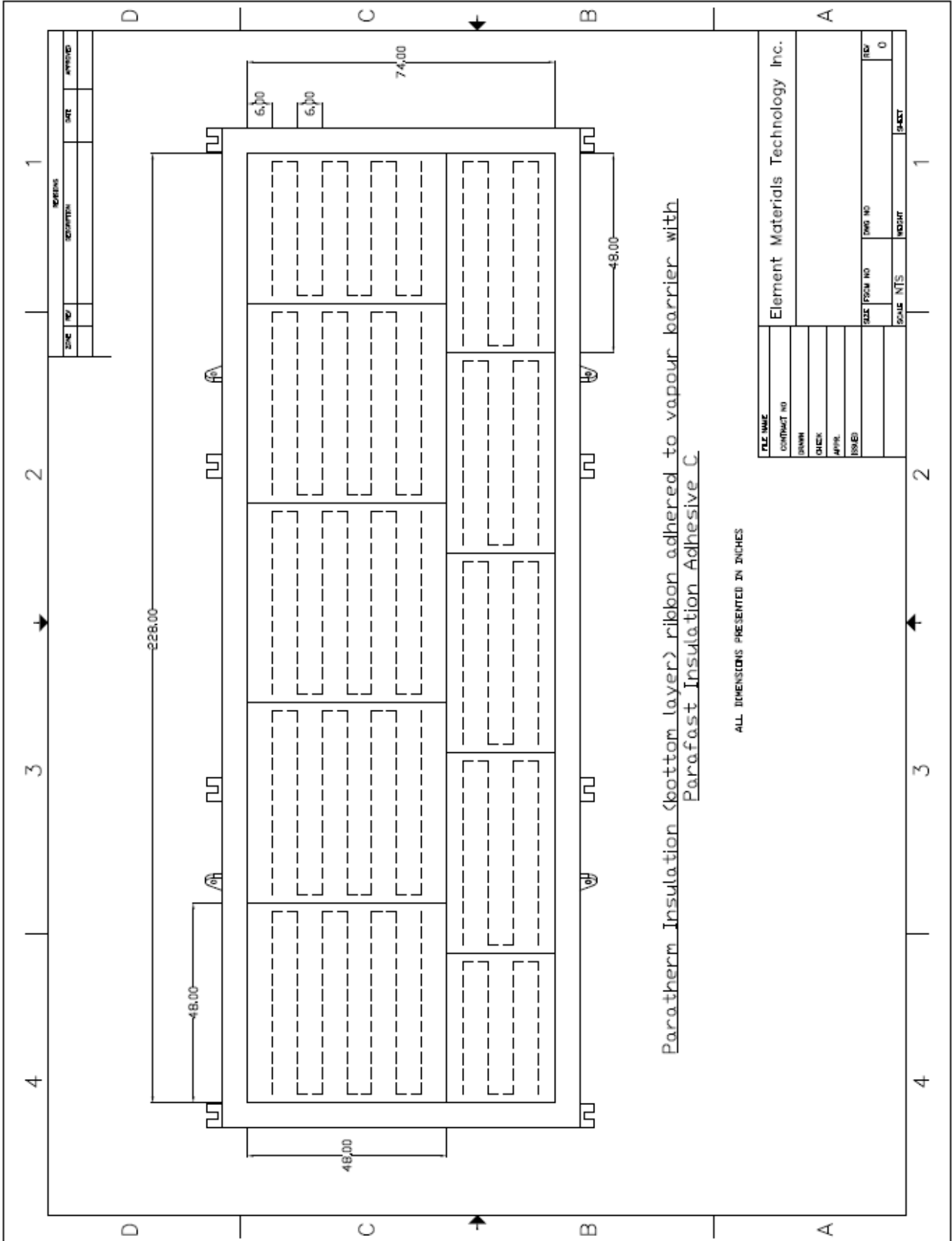
Detail Drawings provided by Element

(10 Pages)



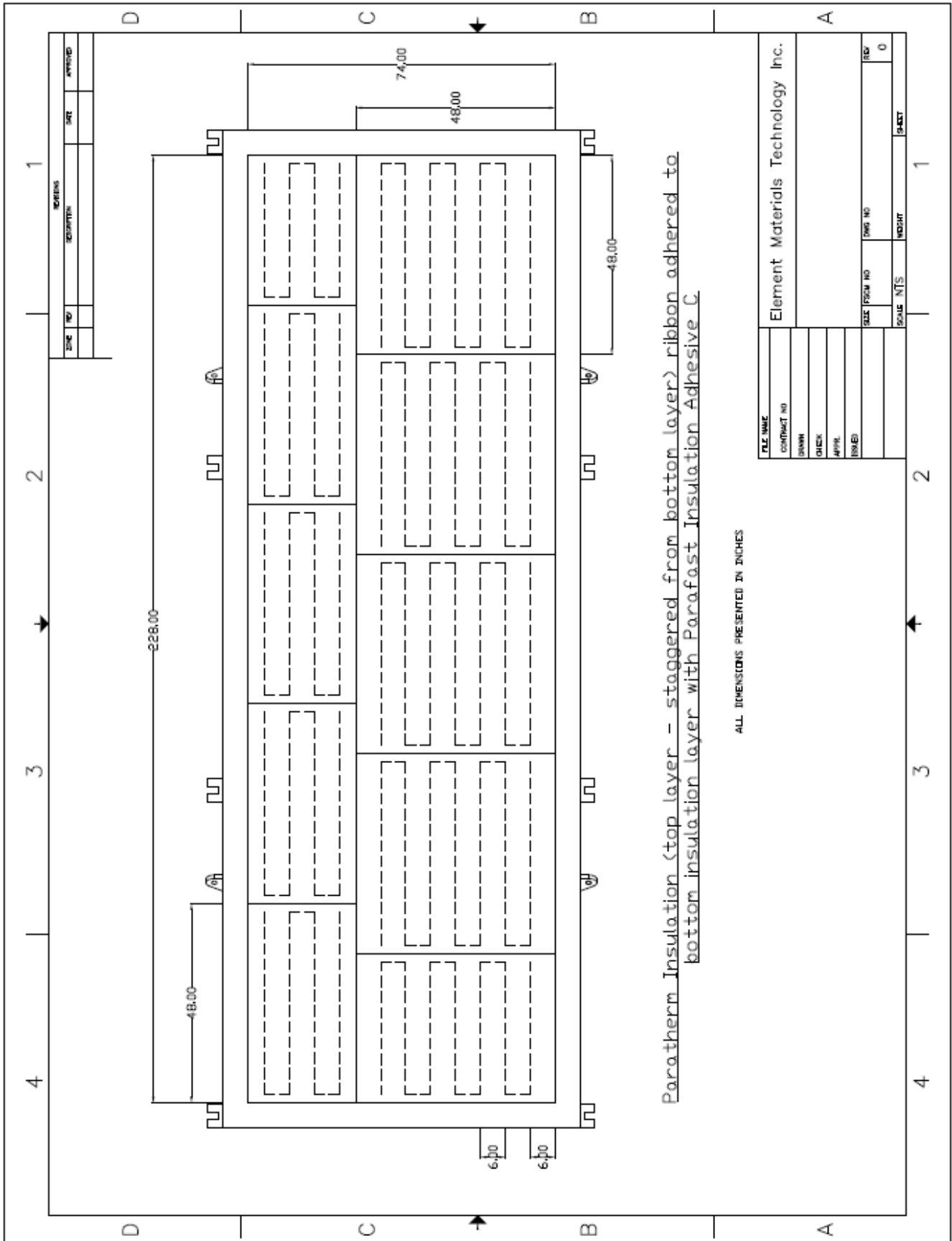


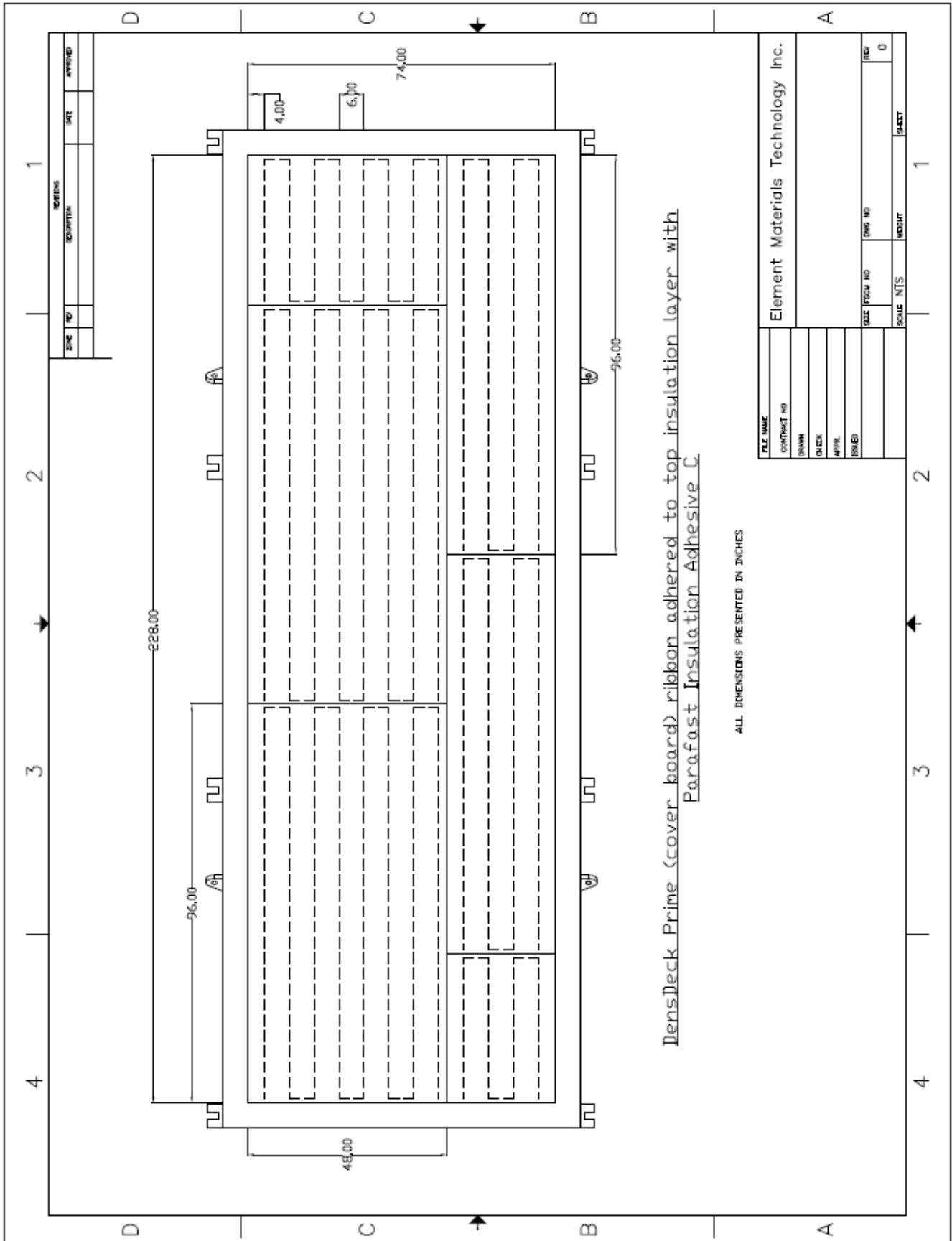


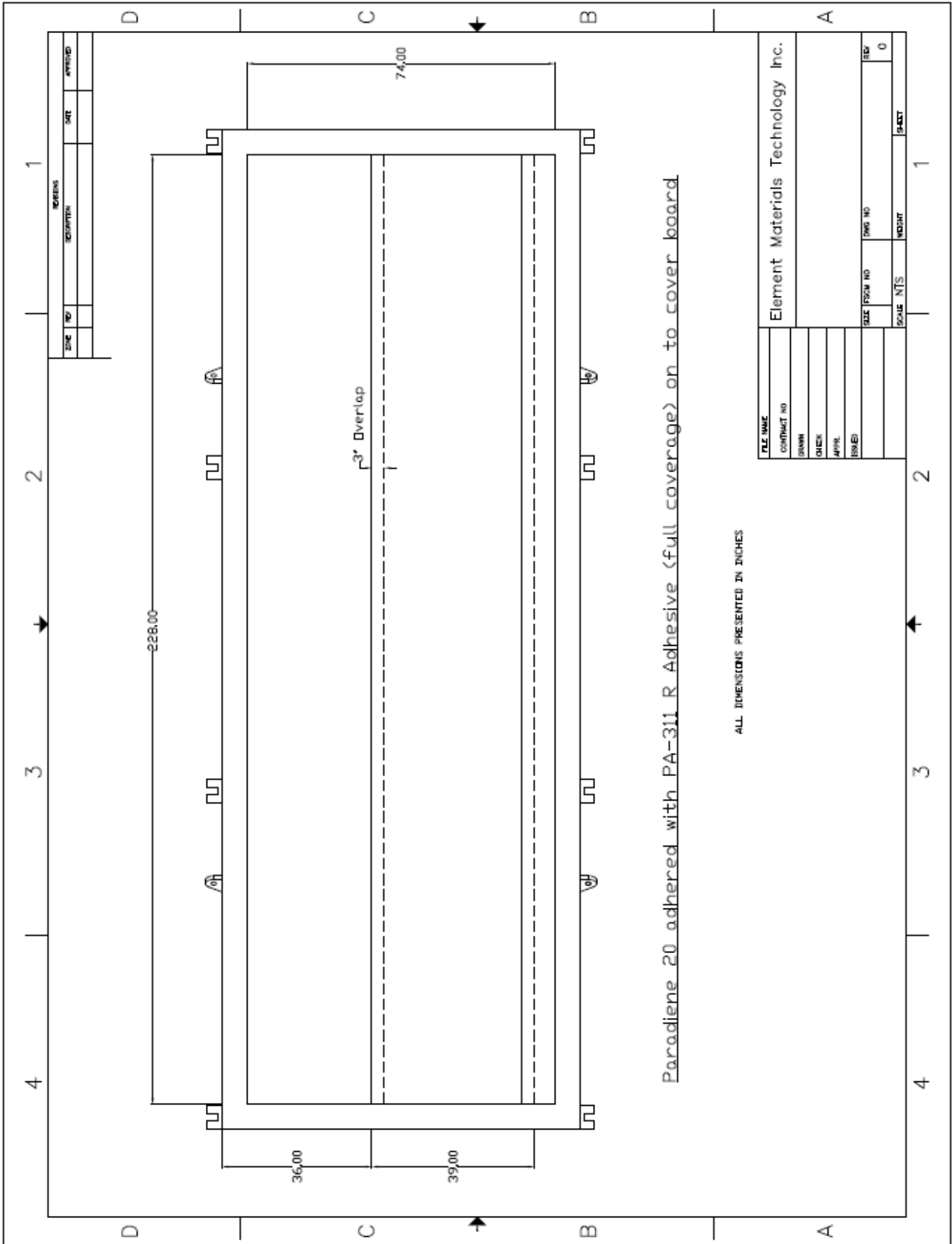


Paratherm Insulation (bottom layer) ribbon adhered to vapour barrier with Parafast Insulation Adhesive C

ALL DIMENSIONS PRESENTED IN INCHES

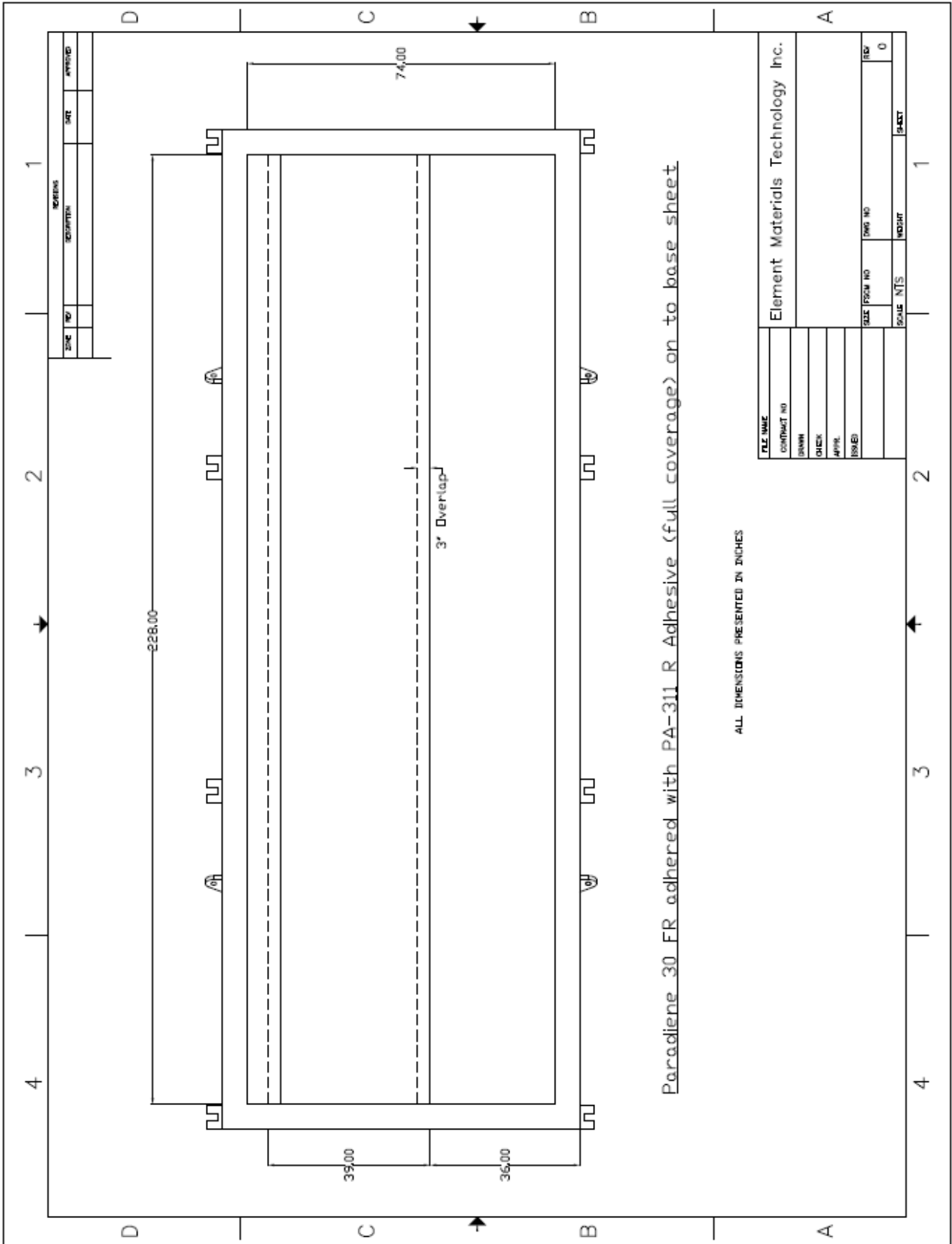






Paradiene 20 adhered with PA-311 R Adhesive (full coverage) on to cover board

ALL DIMENSIONS PRESENTED IN INCHES



ALL DIMENSIONS PRESENTED IN INCHES

Paradiene 30 FR adhered with PA-311 R Adhesive (full coverage) on to base sheet

Element Specimen No.: 21-06-B0047-1
Client Specimen Description: Paradiene 30 Adhered Gypsum Cover Board System #1

Structural Deck	
Type	Profiled Metal Sheeting, 22 ga. RD938
Nominal Thickness	0.86 mm (0.034")
Overall Depth	38 mm (1.5")
Flute Spacing, c/o	152 mm (6.0")
Fastener Pullout as per ANSI/SPRI FX-1	Not Available
Manufacturer	Agway Metals Inc.

Thermal Barrier	
Type	DensDeck® Prime
Dimensions	12.7 x 1220 x 2440 mm (1/2" x 4' x 8')
Attachment Method	Ribbon adhered with Parafast Insulation Adhesive C
Fastening Rate	152 mm (6") o.c.
Manufacturer	Georgia Pacific

Vapour Barrier / Vapour Retarder(s)	
Type	Siplast SA Vapor Retarder
Sizes	Roll width 1.14 m (45"), roll length 40.84 m (134"), 0.81 mm (32 mils) thick
Overlap	76.2 mm (3")
Attachment Method	Self-adhered to substrate
Manufacturer	Siplast Inc.

Thermal Insulation (Bottom Layer)	
Type	Paratherm
Dimensions	38 x 1220 x 1220 mm (1.5" x 4' x 4')
Attachment Method	Ribbon adhered with Parafast Insulation Adhesive C
Fastening Rate	152 mm (6") o.c.
Compressive Strength as per ASTM D1621	20 psi / 140 kPa
Manufacturer	Siplast Inc.

Thermal Insulation (Top Layer)	
Type	Paratherm
Dimensions	38 x 1220 x 1220 mm (1.5" x 4' x 4')
Attachment Method	Ribbon adhered with Parafast Insulation Adhesive C
Fastening Rate	152 mm (6") o.c.
Compressive Strength as per ASTM D1621	20 psi / 140 kPa
Manufacturer	Siplast Inc.

Support Panel/Roofing Membrane - Method 2	
Type	DensDeck® Prime
Dimensions	6.4 x 1220 x 2440 mm (1/4" x 4' x 8')
Attachment Method	Ribbon adhered with Parafast Insulation Adhesive C
Fastening Rate	152 mm (6") o.c.
Manufacturer	Georgia Pacific

Roof Membrane - Method 2	
Base Sheet	Paradiene 20
Dimensions	Roll width 1 m (39.36"), roll length 15.24 m (50.0'), 2.3 mm (91 mils) thick
Overlap	76.2 mm (3")
Attachment Method	Adhered to substrate with PA-311 R Adhesive – full coverage
Manufacturer	Siplast Inc.

Membrane Seam Details - Method 2	
Type	Heat Welded
Details	NA

Roof Membrane - Method 2	
Cap Sheet	Paradiene 30 FR
Dimensions	Roll width 1 m (39.4"), roll length 10.21 m (33.5'), 3.3 mm (130 mils) thick
Overlap	76.2 mm (3")
Attachment Method	Self-adhered to base sheet with PA-311 R Adhesive – full coverage
Manufacturer	Siplast Inc.

Membrane Seam Details - Method 2	
Type	Heat Welded
Details	NA

APPENDIX C

PARADIENE 30 ADHERED GYPSUM COVER BOARD SYSTEM

(Element Specimen No.: 21-06-B0047-1)

Test Specimen Photographs

(9 Pages)



Photo C-1 – Element test frame with steel deck mechanically attached at every flute



Photo C-2 – DensDeck® Prime thermal barrier ribbon adhered with Parafast Insulation Adhesive C



Photo C-3 – Siplast SA Vapor Retarder self-adhered to thermal barrier

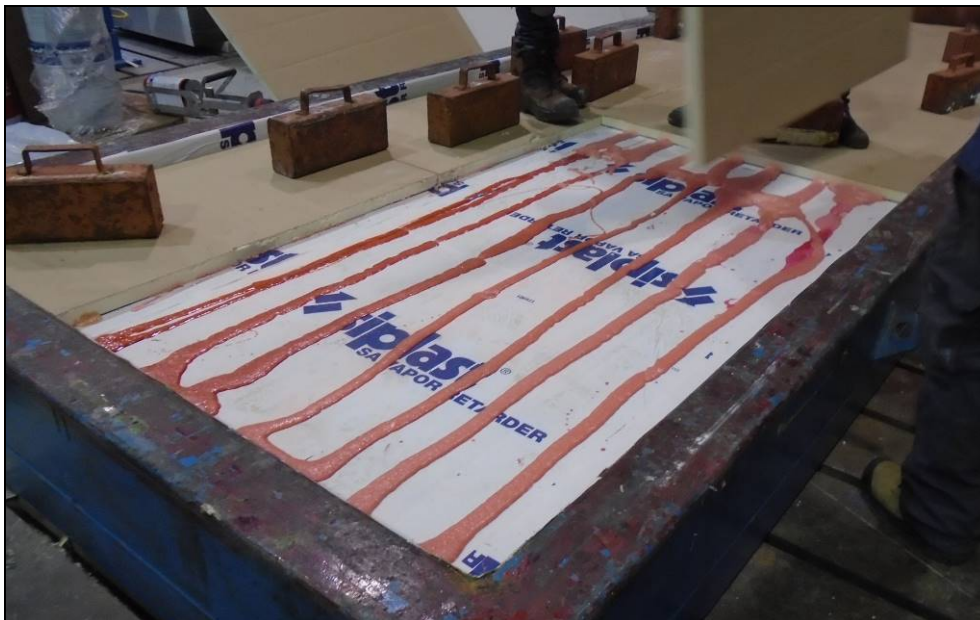


Photo C-4 – Paratherm Insulation (bottom layer) ribbon adhered with Parafast Insulation Adhesive C and weights applied on top



Photo C-5 – Paratherm Insulation (top layer – staggered from bottom layer) ribbon adhered with Parafast Insulation Adhesive C and weights applied on top



Photo C-6 – DensDeck® Prime cover board ribbon adhered with Parafast Insulation Adhesive C and weights applied on top



Photo C-7 – Paradiene 20 adhered to cover board with PA-311 R Adhesive

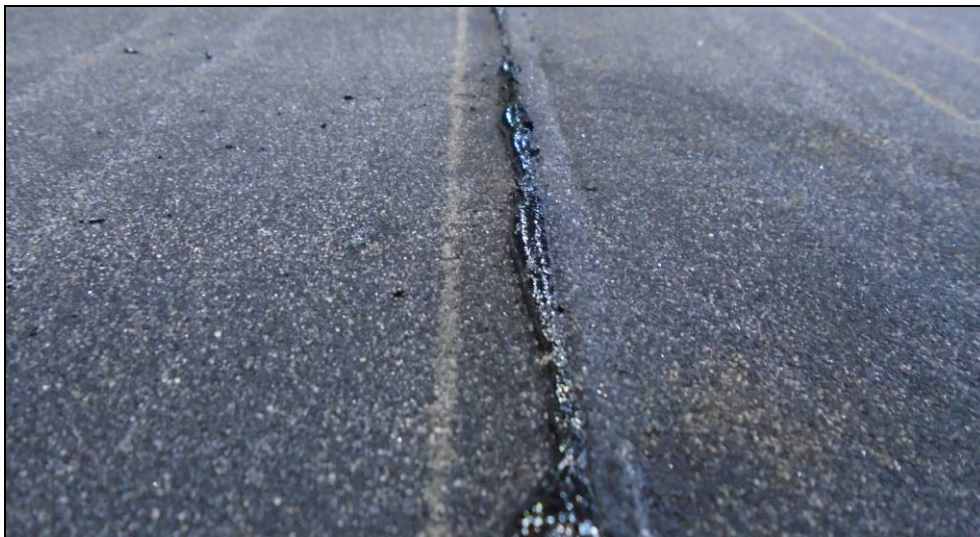


Photo C-8 – Base sheet overlap joint heat welded



Photo C-9 – Paradiene 30 FR adhered to base sheet with PA-311 R Adhesive



Photo C-10 – Cap sheet overlap joint heat welded



Photo C-11 – Complete AARS specimen in roof test frame

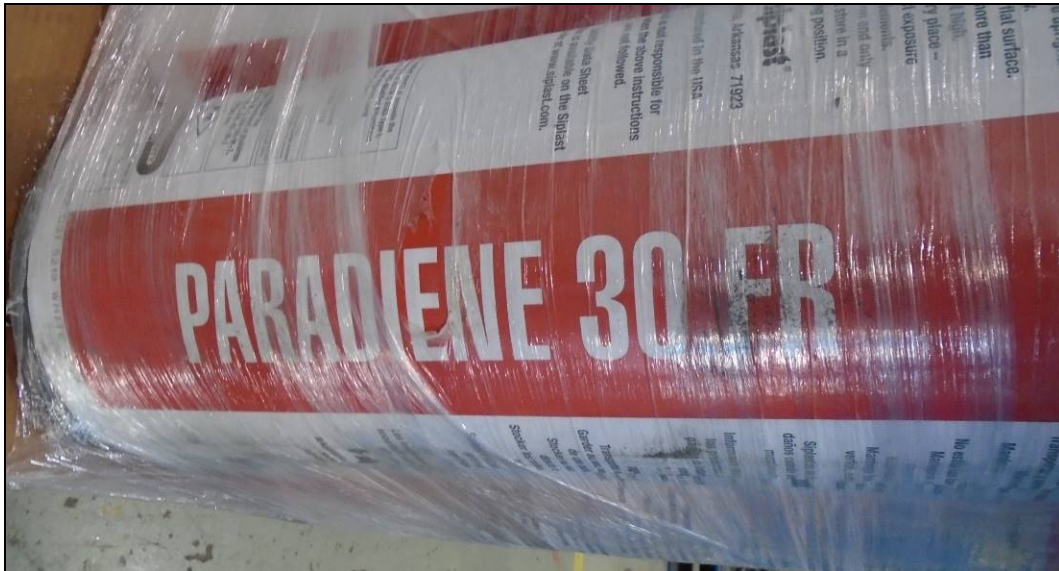


Photo C-12 – Paradiene 30 FR cap roll

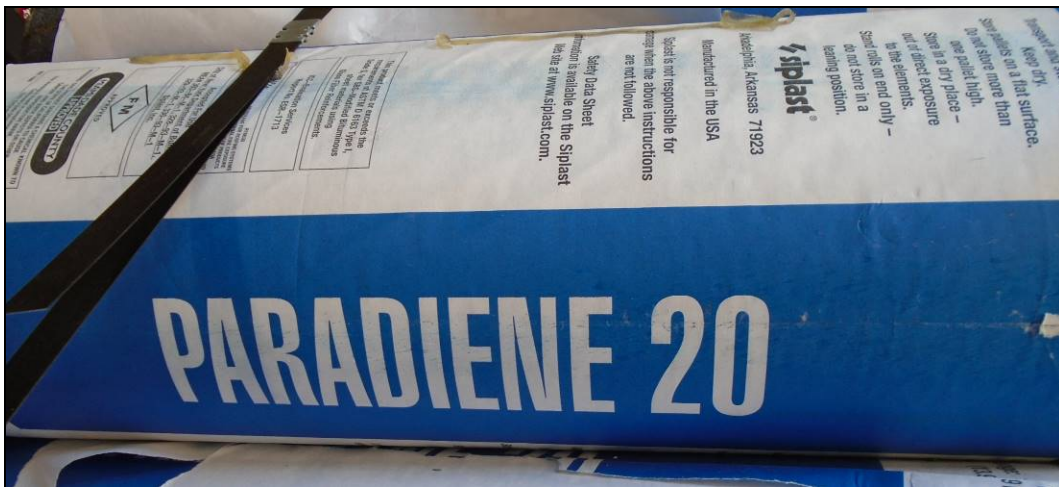


Photo C-13 – Paradiene 20 base roll

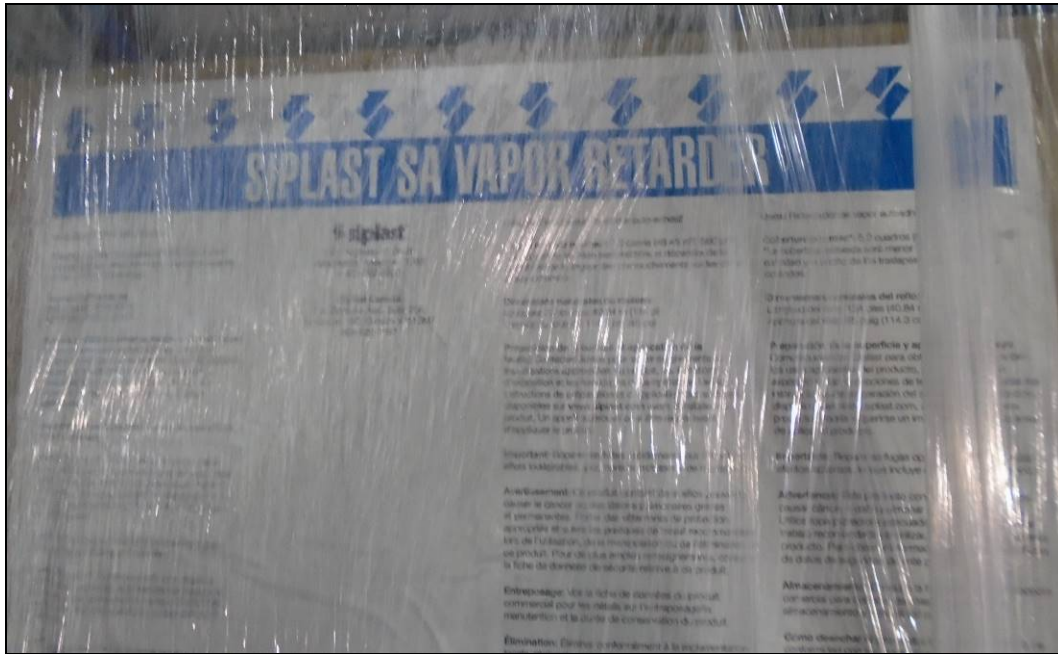


Photo C-14 – Siplast SA Vapor Retarder



Photo C-15 – Paratherm Insulation board



Photo C-16 & C-17 – PA-311 R Adhesive and Parafast Insulation Adhesive C



Photo C-18 – GP DensDeck® Prime