BEAVERTON SCHOOL DISTRICT

Business Services
Procurement and Contracting
16550 SW Merlo Road
Beaverton, OR 97003
(503) 356-4324

March 9, 2021

SOLICITATION ADDENDUM NO. 1
ITB 20-0030
International School of Beaverton Roof & HVAC
General Contractor

THE FOLLOWING CHANGES/ADDITIONS TO THE ABOVE CITED SOLICITATION ARE ANNOUNCED:

This Addendum modifies the Invitation to Bid (ITB) document(s) only to the extent indicated herein. All other areas not changed or otherwise modified by this Addendum shall remain in full force and effect. This Addendum is hereby made an integral part of the ITB document. Bidder must be responsive to any requirements of this Addendum as if the requirements were set forth in the ITB. Failure to do so may result in Bid rejection. See the ITB regarding requests for clarification or change and protests of this Addendum, and the deadlines for the foregoing.

This addendum is to be acknowledged in the space provided on the Bidder Certification form supplied in the solicitation document. Failure to acknowledge receipt of this addendum may be cause to reject your offer.

The closing date **REMAINS UNCHANGED: March 23, 2021 at 2:00 PM Pacific Time**

CLARIFICATONS:

1) **At the Pre-Bid Conference, District Staff announced that the current April 5, 2021 Board Approval of Contract date listed in the ITB would be changed to April 26, 2021. Since then, the District was able to secure board consideration of the Contract on the April 5, 2021 date. The District expects the Contract to be executed on, or very soon after April 5, 2021 to allow for pre-construction work to begin as soon as possible.**

CHANGES:

1) **The Drawing, Speficiation, and Substitution Request Responses attached to this Solicitaion are hereby included in the Solicitation and modify ATTACHMENT J Drawings and ATTACHMENT K Specifciations. Any such changes, clarifications, and substitution request responses are summarized on the Project Memorandum dated March 5, 2021.**

Question: Can you double-check that the Solicitaion documents correctly indicate which of RTUs 1-4 will stay, and which RTUs will be replaced in the base scope vs. if the Alternate is selected.

Answer: **RTU's 1-4 are tagged with keynote No. 14 on Sheet A1.2, which indicates that the existing RTU's and curbs are to remain as part of the base scope. Detail 5/S3.6 is referenced and also denotes the same scope of work. Alternate No. 01 description includes removal and replacement of curbs and RTU's. The demolition keynote 6 on Sheet AD1.2 also aligns with the same scope of work.**

On the mechanical drawings, M1.0 and keynote No. 01 for RTU's 1-4 describe all work on this RTU is an additive alternate. Keynote 2 is also includes and describes the installation of a new curb, and references the detail on M0.1.

Question: What areas are available for staging and access (e.g., for a crane, etc.)

Answer: **Back of school at covered play area and courtyard between the A & B wings building and the modular building**

Question: What is the engineers estimate?

Answer: **The engineer's estimate for the Project, including the Additive Altnerate is $1,696,950.**

Question: Due to the delayed project start, is there a possibility of the District pre-purchasing the RTUs included in the ITB?

Answer: **As noted in the CLARIFICATION 1) above, the project start date is no longer expected to be delayed. Therefore, the District will not be pre-purchasing any materials/items included in the Solicitation.**

Question: Will the portables be re-roofed?

Answer: **No.**

Question: Do you have core samples?

Answer: **Yes as part of the investigative work included in Appendix A of the Specifications.**

-END of Addendum
Peter Madaus
Contract Specialist

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SUITE 200
PORTLAND, OR 97224
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Project Memorandum

Date Issued: March 5, 2021
Project Name: BSD International School of Beaverton: Re-Roof
Architects Project No: 20Y105.01
BSD ITB No.: 20-0030
Subject: Bid Addendum No. 01
Issued By: Erik Winter on behalf of CIDA, Inc.

NOTICE TO ALL BIDDERS

The following changes and or clarifications apply to the bidding and contract documents pertaining to the above listed solicitation. **Acknowledge receipt of this addendum by inserting its number and date in the approved bid form as described in the Initiation to Bid;** failure to do so may subject Offeror/Bidder to disqualification.

Specification Clarification(s) and/or changes:

1. **REVISE Specification Section 000110 – Table of Contents.** REVISE Specification Section Dated February 9, 2021 with the attached Section, dated March 5, 2021.
   - DELETE Section 092400 Cement Plastering
   - ADD Section 074646 Fiber-Cement Siding

2. **REVISE Specification Section 072500 – Weather Barriers.** REVISE Specification Section Dated February 9, 2021 with the attached Section, dated March 5, 2021.

3. **ADD Specification Section 074646 – Fiber-Cement Siding.** ADD Specification Section Dated March 5, 2021 in its entirety.

4. **DELETE Specification Section 092400 – Cement Plastering.** DELETE Section in its entirety.

5. **REVISE Specification Section 099113 – Exterior Painting.** REVISE Specification Section Dated February 9, 2021 with the attached Section, dated March 5, 2021.

Drawing Clarification(s) and/or changes:

1. **Cover Sheet.** Revise and update Release Matrix.

2. **Sheet A4.0.** Revise exterior elevations and references pertaining to parapet cladding, including but not necessarily limited to:
   - REVISE General Note F.
   - REVISE General Note G.
   - REVISE Keynote 9.
   - ADD Keynote 13.
   - REVISE parapet wall joint symbol (from CJ to PJ).
   - DELETE reference to an existing light fixture at the southeast corner of the south elevation (no light exists at this location).

3. **Sheet A4.1.** Revise existing details to remove references of cement plaster cladding at both existing and proposed parapet wall modifications. Parapet walls scheduled to be modified will receive new fiber cement panel siding to match existing panel configuration. Details revised include:
   - REVISE Detail 1/A4.1
   - REVISE Detail 2/A4.1
   - REVISE Detail 9/A4.1
   - REVISE Detail 11/A4.1

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4. **Sheet A4.2** Revise existing details to remove references of cement plaster cladding at both existing and proposed parapet wall modifications. Parapet walls scheduled to be modified will receive new fiber cement panel siding to match existing panel configuration. Details revised include:
   - ADD General Sheet Notes.
   - REVISE Detail 3/A4.2
   - REVISE Detail 4/A4.2
   - REVISE Detail 6/A4.2
   - REVISE Detail 7/A4.2
   - REVISE Detail 8/A4.2
   - REVISE Detail 10/A4.2
   - REVISE Detail 11/A4.2
   - REVISE Detail 12/A4.2

5. **Sheet A4.4.** Revise existing details to remove references of cement plaster cladding at both existing and proposed parapet wall modifications. Parapet walls scheduled to be modified will receive new fiber cement panel siding to match existing panel configuration. Details revised include:
   - REVISE Detail 1/A4.4.
   - REVISE Detail 9/A4.4

Substitution Requests:

1. **General.** The following substitution request(s) have been received and evaluated prior to the issuance of this Addendum. Should the awarded Bidder elect to proceed with any approved acceptable alternates that differ from the basis-of-design indicated in the Bid Documents, the awarded Bidder will be responsible for all changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

2. **Section 075423 Thermoplastic Polyolefin (TPO) Membrane Roofing.** Request to substitute the following system in lieu of the specified basis-of-design system has been **approved as an acceptable alternate by the Owner**.

   - GAF 60 mil Everguard TPO roof membrane with Drill-Tec™ RhinoBond® Attachment System and accessories – see attached.

3. **Section 075423 Thermoplastic Polyolefin (TPO) Membrane Roofing.** Request to substitute the following system in lieu of the specified basis-of-design system has been **rejected.** The proposed alternate does not utilize a comparable induction welded installation method as the basis-of-design specified.

   - Carlisle SynTec: Sure-Weld 60 mil TPO M.F. Roofing System.

Attachments:

1. Specification Section 000110 – Table of Contents.
2. Specification Section 072500 – Weather Barriers.
3. Specification Section 074646 – Fiber-Cement Siding.
4. Specification Section 092400 – Cement Plastering.
5. Specification Section 099113 – Exterior Painting.
6. Sheet CS1.
7. Sheet A4.0.
8. Sheet A4.1.
9. Sheet A4.2.
10. Sheet A4.4.
11. Substitution Request – GAF 60 Mil Everguard TPO roof membrane
12. Substitution Request - Sure-Weld 60 mil TPO M.F. Roofing System

ARCHITECTURE
ENGINEERING
PLANNING
INTERIORS

cc:
CIDA File
Beaverton School District (Owner)

BSD INTERNATIONAL SCHOOL OF BEAVERTON: RE-ROOF

BEAVERTON, OREGON

BEAVERTON SCHOOL DISTRICT

OWNER

16550 SW MERLO ROAD
BEAVERTON, OREGON 97003
(T): (503) 863-9083
CONTACT: DOAA EL HAGGAN | doaa_el_haggan@beaverton.k12.or.us

TBD

GENERAL CONTRACTOR

LICENSE No.: TBD

CIDA, INC.

ARCHITECT | STRUCTURAL ENGINEER

15895 SW 72ND AVENUE, SUITE 200
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(T): (503) 226-1285
CONTACT: ERIK WINTER | ewinter@cidainc.com

R&W ENGINEERING

MECHANICAL AND ELECTRICAL ENGINEER

9715 SW ALLEN BOULEVARD, SUITE No. 117
BEAVERTON, OREGON 97239
(T): (503) 292-6000
CONTACT: ED CARLISLE | ecarlisle@rweng.com

RDH BUILDING SCIENCE

ROOFING CONSULTANT

5331 SOUTH MACADAM AVENUE, SUITE No. 314
PORTLAND, OREGON 97224
(T): (503) 867-8519
CONTACT: SCOTT MECALIS | smecalis@rdh.com

LEGAL DESCRIPTION AND ZONING SUMMARY

SITE ADDRESS:	17770 SW BLANTON STREET | BEAVERTON, OREGON | 97078
MAP AND TAXLOT No.:	1S118BA00600
REAL PROPERTY ACCOUNT No:	R152792
CITY:	BEAVERTON
COUNTY:	WASHINGTON COUNTY - **AUTHORITIES HAVING JURISDICTION FOR THIS PROJECT**
ZONING DESIGNATION:	INSTITUTIONAL DISTRICT (INST)
ZONING OVERLAY(S):	NONE

PROJECT DESCRIPTION

IN BRIEF AND WITHOUT FORCE AND EFFECT ON THE REQUIREMENTS OF THE CONTRACT DOCUMENTS, THE PROJECT CONSISTS OF THE FOLLOWING: THE WORK INCLUDES THE REMOVAL AND REPLACEMENT OF THE EXISTING ROOF MEMBRANE SYSTEM(S) AT THE AREAS NOTED HEREIN, AS WELL AS ASSOCIATED STRUCTURAL IMPROVEMENTS RELATED TO THE ROOF ASSEMBLY. EXTERIOR WORK ALSO INCLUDE REMOVAL AND REPLACEMENT OF EXISTING ROOF TOP MECHANICAL UNITS AS NOTED HEREIN. NO INTERIOR WORK IS INCLUDED, EXCEPT AS REQUIRED TO PERFORM ROOF AND EQUIPMENT WORK.

DEFERRED SUBMITTAL (DELEGATED DESIGN)

NOTE: DEFERRED SUBMITTAL(S) INDICATED BELOW WILL BE PREPARED BY OTHERS AND SUBMITTED UNDER SEPARATE COVER.

1. SHORING (TEMPORARY), AS REQUIRED.

WORK UNDER SEPARATE CONTRACT(S) (BY OTHERS)

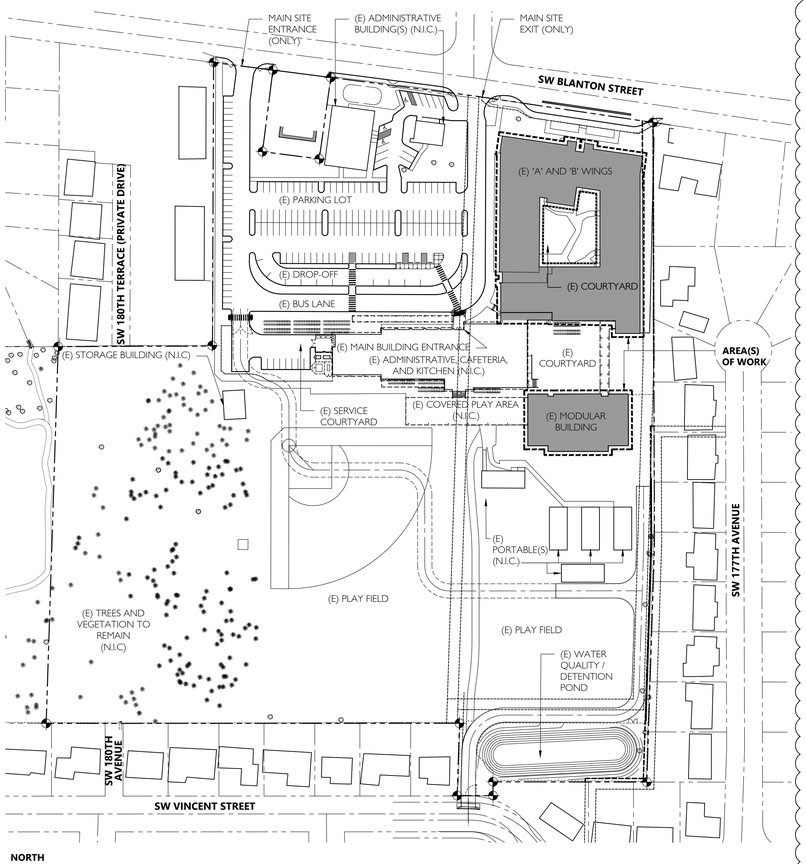
NOTE: DESIGN ELEMENTS INDICATED BELOW WILL BE PREPARED BY OTHERS.

1. SHORING (TEMPORARY), AS REQUIRED.

BUILDING CODE SUMMARY

- DESIGN CODE(S): 2019 OREGON STRUCTURAL SPECIALTY CODE (OSSC)
  2019 OREGON ZERO ENERGY READY COMMERCIAL CODE
- OCCUPANCY: E (EDUCATION)
- CONSTRUCTION TYPE:
  - A/B WINGS & GYMNASIUM: TYPE V-B (ASSUMED)
  - MODULAR BUILDING: TYPE V-B (ASSUMED)
- FIRE PROTECTION (SPRINKLERS):
  - A/B WINGS & GYMNASIUM: YES (EXISTING)
  - MODULAR BUILDING: YES (EXISTING)
- ROOFING CLASS: CLASS A ROOF ASSEMBLY AT ALL LOCATIONS
- THERMAL INSULATION (AT ROOF):
  - ROOF AREA 'A': EXISTING THERMAL INSULATION (BLOWN-IN INSULATION) LOCATED BELOW ROOF DECK TO REMAIN. NO NEW THERMAL INSULATION TO BE ADDED BELOW OR ABOVE ROOF DECKING.
  - ROOF AREA 'B': EXISTING THERMAL INSULATION (BATT INSULATION) LOCATED BELOW ROOF DECK BETWEEN ROOF FRAMING MEMBERS, TO REMAIN. NO NEW THERMAL INSULATION TO BE ADDED BELOW OR ABOVE ROOF DECKING.
  - ROOF AREA 'C': EXISTING THERMAL INSULATION (BATT INSULATION) LOCATED BELOW ROOF DECK BETWEEN ROOF FRAMING MEMBERS, TO REMAIN. NEW RIGID BOARD THERMAL INSULATION TO BE ADDED ABOVE ROOF SHEATHING. CONTRACTOR SHALL VERIFY EXISTING BELOW ROOF DECKING INSULATION VALUE(S). FINAL INSTALLED ROOF THERMAL INSULATION (BELOW AND ABOVE DECK INSULATION COMBINED) SHALL NOT BE LESS THAN R-49.
- AREAS OF WORK (APPROXIMATE):
  - ROOF AREA 'A': ± 37,100 GSF
  - ROOF AREA 'B': ± 7,025 GSF
  - ROOF AREA 'C': ± 11,250 GSF

NOTE: ESTIMATED AREAS PROVIDED FOR REFERENCE AND BIDDERS CONVENIENCE. BIDDERS ARE RESPONSIBLE FOR PERFORMING THEIR OWN TAKE-OFFS AND CONFIRMING AREAS AND QUANTITIES OF ITEMS REQUIRED TO COMPLETE THE SCOPE OF WORK DESCRIBED WITHIN THESE CONTRACT DOCUMENTS.



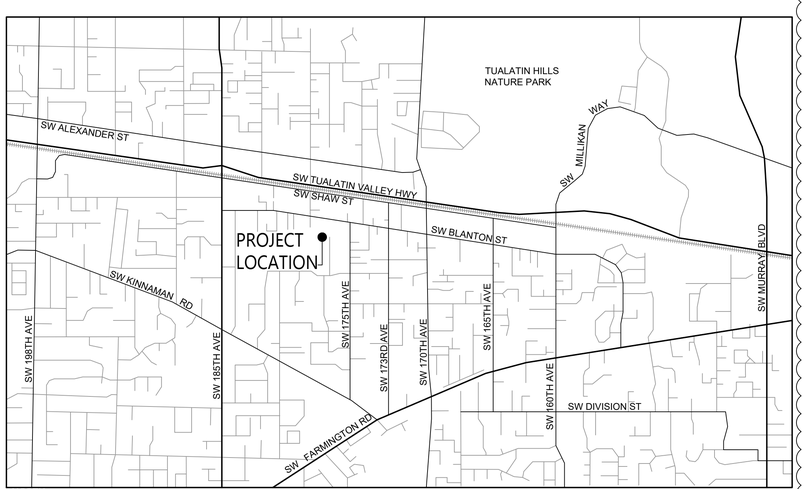
NORTH

1 CS1

SITE PLAN - ARCHITECTURAL - OVERALL

SCALE: 1" = 100'

(PROVIDED FOR REFERENCE ONLY - NO SITE WORK UNDER THIS CONTRACT)



NORTH

2 CS1

VICINITY MAP

NTS

RELEASES

● CURRENT RELEASE
○ CURRENT RELEASE - NO CHANGES
◍ PRIOR RELEASE

	4	3	2	1
			BID SET: 2021.03.05	BID SET: 2021.02.09

COVER SHEET

			●	●
CS1	COVER SHEET			
			●	●
G1.0	GENERAL NOTES			

ARCHITECTURAL

			●	●
AD0.1	EXISTING CONDITIONS FLOOR PLAN			
			●	●
AD0.2	EXISTING CONDITIONS ROOF PLAN			
			●	●
AD1.1	DEMOLITION FLOOR PLAN			
			●	●
AD1.2	DEMOLITION ROOF PLAN			
			●	●
A1.1	FLOOR PLAN			
			●	●
A1.2	ROOF PLAN			
			●	●
A2.1	ROOF PLAN - FALL RESTRAINT			
			●	●
A3.0	DETAILS - A & B WINGS, GYM			
			●	●
A3.1	DETAILS - A & B WINGS, GYM			
			●	●
A3.2	DETAILS - A & B WINGS, GYM			
			●	●
A3.3	DETAILS - A & B WINGS, GYM			
			●	●
A3.4	DETAILS - A & B WINGS, GYM			
			●	●
A3.5	DETAILS - A & B WINGS, GYM			
			●	●
A3.6	DETAILS - A & B WINGS, GYM			
			●	●
A3.7	DETAILS - A & B WINGS, GYM			
			●	●
A3.8	DETAILS - A & B WINGS, GYM			
			●	●
A3.9	DETAILS - A & B WINGS, GYM			
			●	●
A4.0	DETAILS - MODULAR BUILDING			
			●	●
A4.1	DETAILS - MODULAR BUILDING			
			●	●
A4.2	DETAILS - MODULAR BUILDING			
			●	●
A4.3	DETAILS - MODULAR BUILDING			
			●	●
A4.4	DETAILS - MODULAR BUILDING			

STRUCTURAL

			●	●
S1.1	ROOF PLAN			
			●	●
S2.1	DETAILS			

MECHANICAL

			●	●
M0.1	MECHANICAL LEGEND & SCHEDULES			
			●	●
M0.2	MECHANICAL SCHEDULES			
			●	●
M1.0	ROOF PLAN - MECHANICAL			

ELECTRICAL

			●	●
E0.1	ELECTRICAL COVER SHEET			
			●	●
E1.0	SITE PLAN - ELECTRICAL			
			●	●
E2.1	ENL. FLOOR PLANS - ELECTRICAL			
			●	●
E4.1	ELECTRICAL ONE-LINE DIAGRAM			
			●	●
E4.2	ELECTRICAL PANEL SCHEDULES			

REGISTERED ARCHITECT
ERIK J. WINTER
6035
PORTLAND, OR
STATE OF OREGON

ISSUED DATE
1 BID SET: 2021.02.09
2 ADDENDA No. 01: 2021.03.05

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RENOVATION FOR:

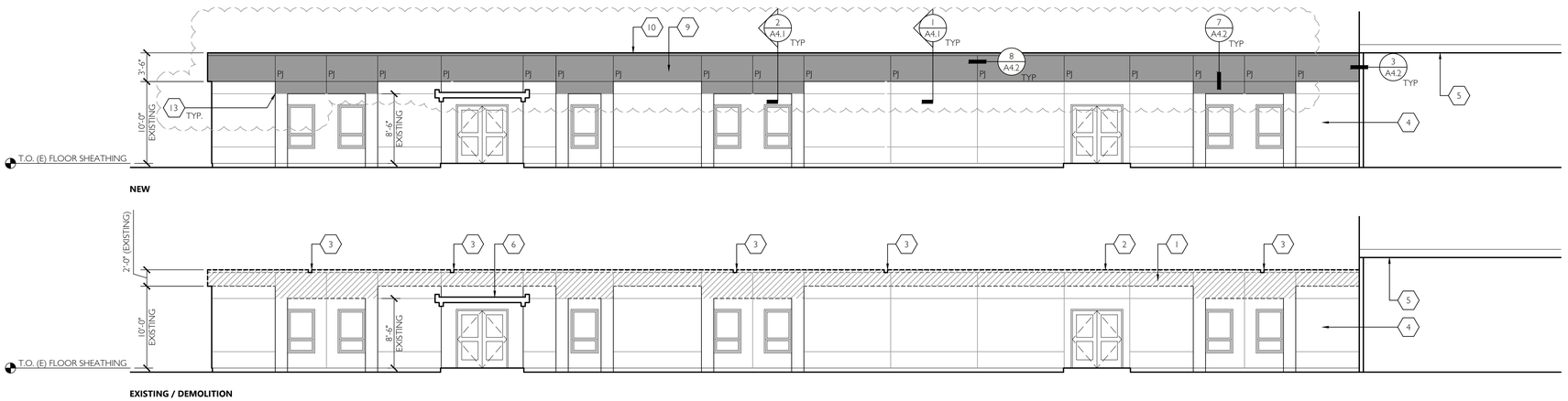
BSD - INTERNATIONAL SCHOOL OF BEAVERTON

17770 SW BLANTON STREET
BEAVERTON, OREGON 97078

COVER SHEET

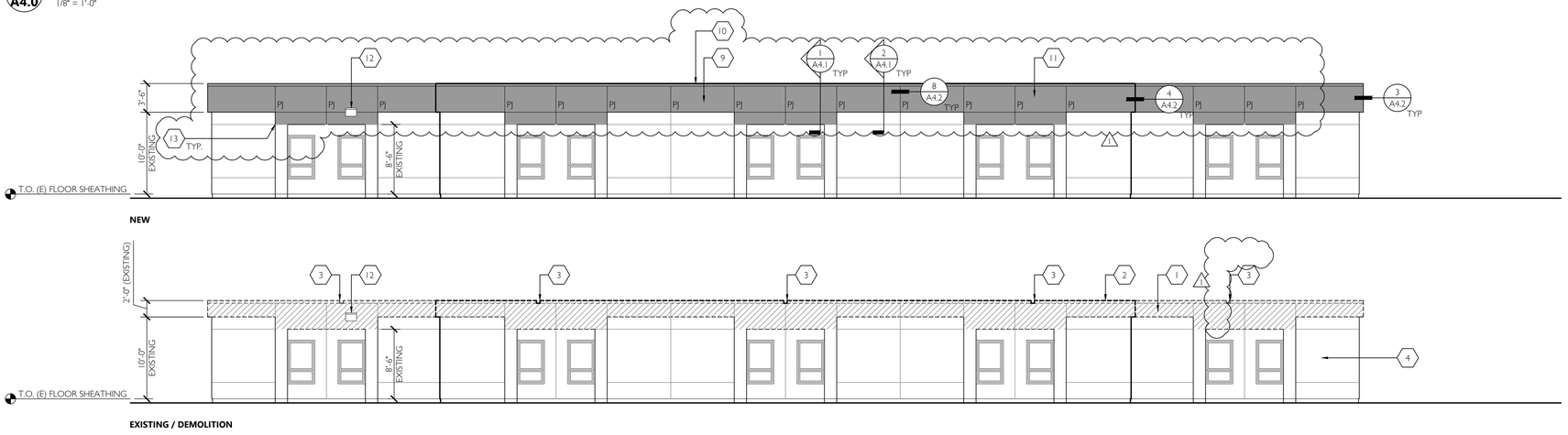
CS1

JOB NO. 20Y105.01



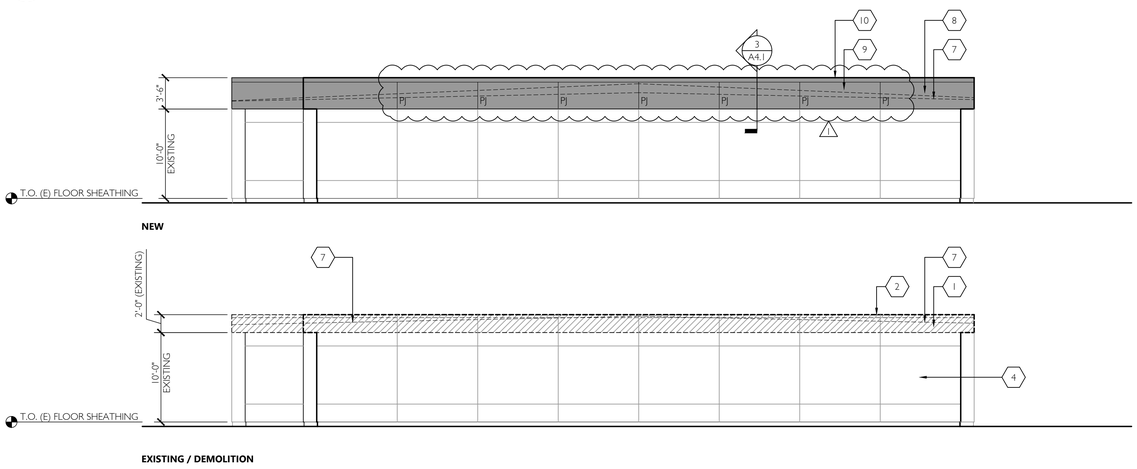
1 A4.0 EXTERIOR ELEVATION - MODULAR BUILDING - NORTH

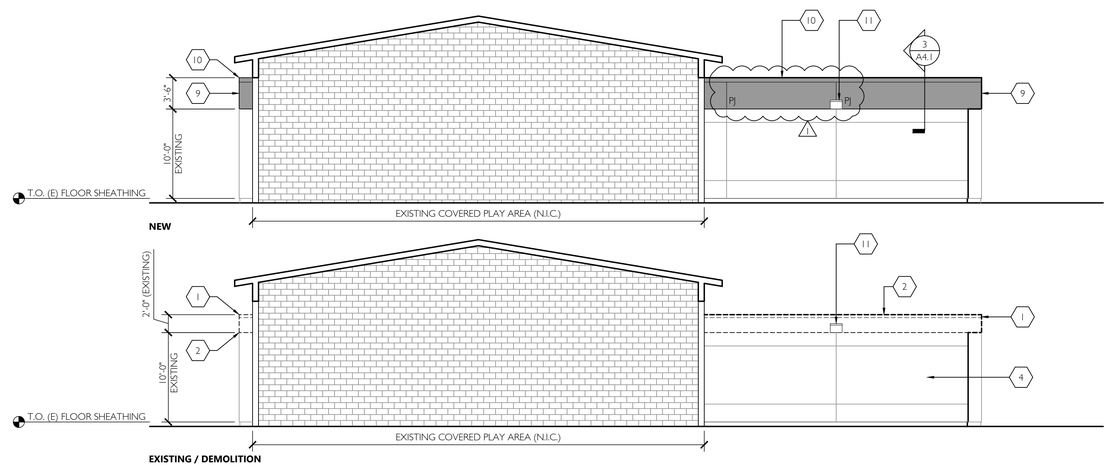
1/8" = 1'-0"



2 A4.0 EXTERIOR ELEVATION - MODULAR BUILDING - SOUTH

1/8" = 1'-0"





3 A4.0 EXTERIOR ELEVATION - MODULAR BUILDING - EAST

1/8" = 1'-0"

4 A4.0 EXTERIOR ELEVATION - MODULAR BUILDING - WEST

1/8" = 1'-0"

GENERAL NOTES

A. REFER TO **SHEET G1.0** FOR ADDITIONAL GENERAL PROJECT NOTES.
B. CONTRACTOR SHALL VERIFY & CONFIRM EXISTING CONDITIONS SHOWN OR IMPLIED ON DRAWINGS PRIOR TO START OF CONSTRUCTION. NOTIFY ARCHITECT, IN WRITING, OF ANY DISCREPANCIES.
C. EXISTING APPURTENANCES NOT SHOWN - FIELD VERIFY EXISTING LOCATIONS. NOTIFY ARCHITECT, IN WRITING, IF EXISTING APPURTENANCES PREVENT MODIFICATIONS TO PARAPET WALL FRAMING AND DRAINAGE ILLUSTRATED.
D. PATCH AND REPAIR EXISTING EXTERIOR CLADDING AND BUILDING ENVELOPE COMPONENTS WHERE NEW WORK IS TO TIE INTO EXISTING CONDITIONS. NEW WORK TO MATCH EXISTING UNLESS OTHERWISE NOTED.
E. ITEMS NOT INDICATED TO BE REMOVED SHALL REMAIN AND BE PROTECTED WELL WORK IS IN PROGRESS.
F. PAINT ALL MODIFIED PARAPET CLADDING TO MATCH EXISTING.
G. WHERE FEASIBLE, ALIGN NEW FIBER CEMENT PANEL JOINTS WITH EXISTING CONTROL JOINTS.
H. REMOVE AND RELOCATE EXISTING EXTERIOR LIGHT FIXTURES WHEN LOCATED ADJACENT TO AND/OR UNDER THROUGH-WALL SCUPPER LOCATIONS (NOT ALL FIXTURES MAY BE SHOWN IN THESE DRAWINGS). VERIFY LOCATIONS AND QUANTITIES AND COORDINATE WITH OWNER REGARDING APPROVED LOCATIONS TO RELOCATED FIXTURES.
I. VERIFY EXISTING JUNCTION BOXES ADJACENT TO OR NEAR THROUGH-WALL SCUPPERS OR NOT ACTIVE (NOT SHOWN ON THESE DRAWINGS). IF ACTIVE, COORDINATE WITH OWNER FOR APPROVED LOCATIONS TO RELOCATE JUNCTION BOXES.

LEGEND

AREA OF DEMOLITION

AREA OF OF NEW WORK

PJ PANEL JOINT
(E) EXISTING

KEYNOTES

1. REMOVE EXISTING PARAPET WALL ASSEMBLY AND FINISH CLADDING.
2. REMOVE EXISTING PARAPET COPING.
3. REMOVE EXISTING THROUGH-WALL SCUPPER AND INTERNAL ROOF DRAIN (BEYOND).
4. EXISTING CEMENT PLASTER AND CONTROL JOINTS TO REMAIN (N.I.C.)
5. EXISTING COVERED ENCLOSURE (N.I.C.).
6. EXISTING COVERED WALKWAY TO REMAIN (N.I.C.).
7. LINE OF EXISTING ROOF SLOPE BEYOND (APPROXIMATE).
8. LINE OF NEW NEW ROOF SLOPE BEYOND (APPROXIMATE).
9. NEW PARAPET WALL ASSEMBLY WITH NEW FIBER CEMENT PANEL CLADDING.
10. NEW PARAPET COPING.
11. EXISTING LIGHT FIXTURE TO REMAIN.
12. EXISTING LIGHT FIXTURE TO BE RELOCATED.
13. PROVIDE NEW REGLET TRIM AT TRANSITION BETWEEN EXISTING PANEL(S) TO REMAIN AND NEW PANEL(S) ABOVE - INTEGRATE NEW WEATHER BARRIER (BEYOND PANEL) INTO EXISTING WEATHER BARRIER SYSTEM IN WEATHERBOARD FASHION - REFER TO **DETAIL 7/A4.2** FOR SIMILAR CONDITION

REGISTERED ARCHITECT
ERIK J. WINTER
6035
PORTLAND, OR
STATE OF OREGON

ISSUED DATE
1 BID SET: 2021.02.09
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RENOVATION FOR:
BSD - INTERNATIONAL SCHOOL OF BEAVERTON
17770 SW BLANTON STREET
BEAVERTON, OREGON 97078

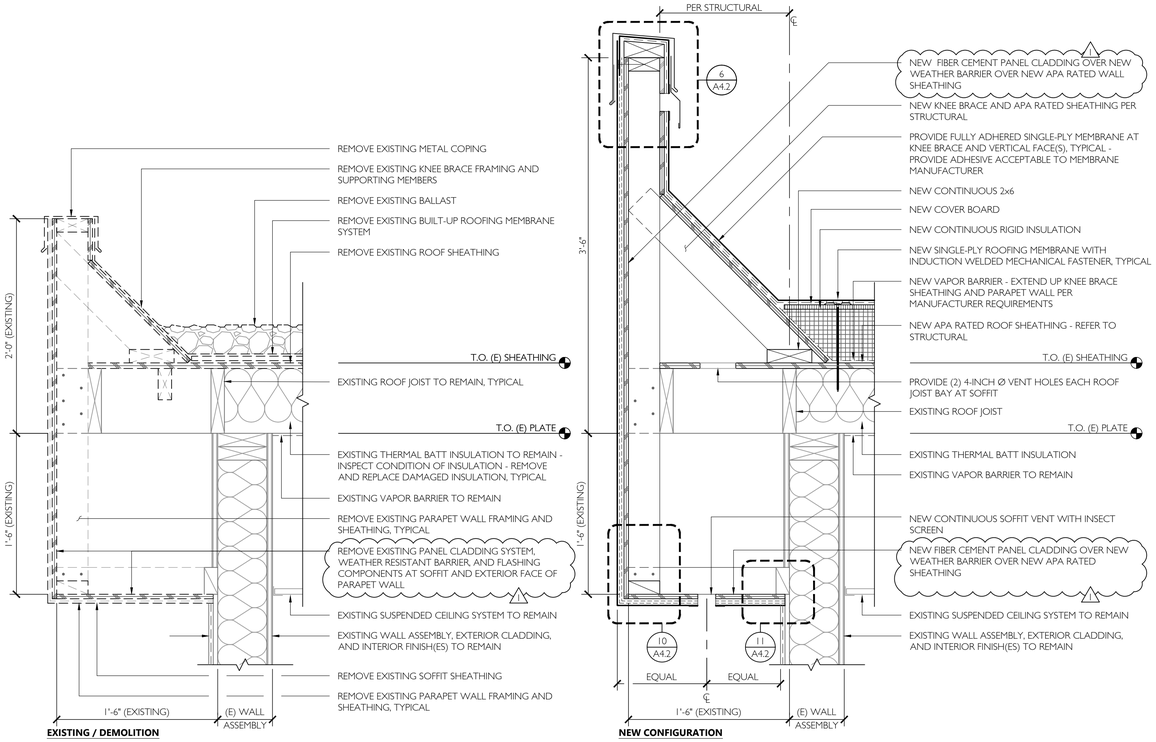
DETAILS
MODULAR BUILDING

A4.0

JOB NO. 20Y105.01

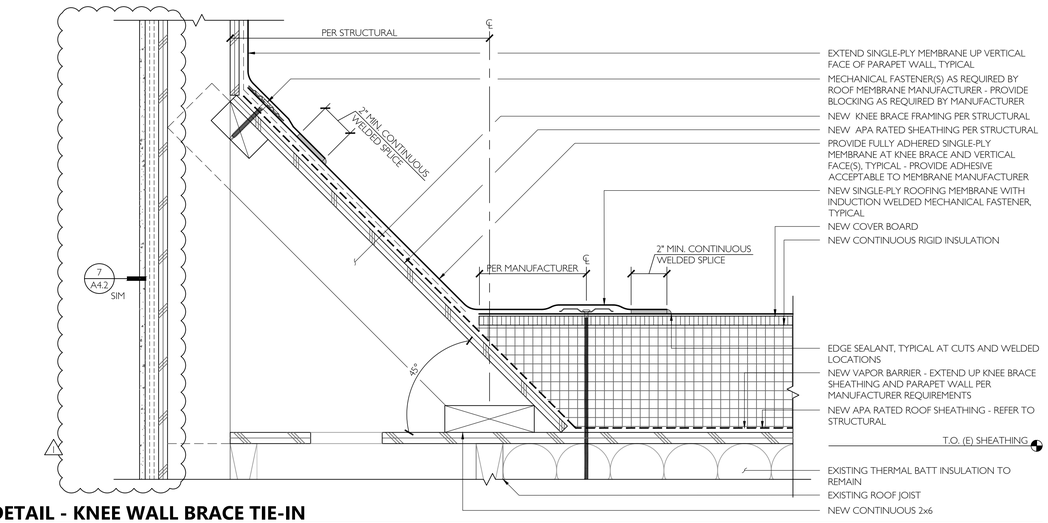
GENERAL DETAIL NOTES

A. THESE GENERAL NOTES SHALL APPLY TO THE ENTIRE PROJECT UNLESS SPECIFICALLY NOTED OTHERWISE WITHIN THE CONTRACT DOCUMENTS.
B. REFER TO GENERAL PROJECT NOTES ON **SHEET G1.0** FOR ADDITIONAL REQUIREMENTS.
C. EXISTING CONCEALED ASSEMBLY(S) AND ASSEMBLY COMPONENTS/INSTALLATION(S) SHOWN ARE DIAGRAMMATIC AND ILLUSTRATE THE ASSUMED, EXISTING CONDITIONS. CONTRACTOR SHALL VERIFY, IN FIELD, ALL EXISTING CONDITIONS REQUIRED TO COMPLETE THE SCOPE OF WORK DESCRIBED WITHIN THESE CONTRACT DOCUMENTS AND NOTIFY THE ARCHITECT, IN WRITING, WHEN EXISTING CONDITIONS DIFFER THAN THOSE DESCRIBED HEREIN.
D. CONTRACTOR SHALL VERIFY CONDITION(S) OF EXISTING WALL AND ROOF SHEATHING COMPONENTS, WHERE VISIBLE OR WHEN MADE VISIBLE AS PART OF THE REPAIR SCOPE OF WORK DESCRIBED WITHIN THESE CONTRACT DOCUMENTS. CONTRACTOR SHALL NOTIFY THE ARCHITECT, IN WRITING, OF ANY KNOWN DEFECTS IN EXISTING SYSTEM COMPONENTS PRIOR TO INSTALLING NEW WORK.
E. AT REMOVED AND/OR DEMOLISHED ITEMS, ELEMENTS, SYSTEMS, ASSEMBLIES AND THE LIKE, CONTRACTOR SHALL PATCH AND REPAIR EXISTING SURFACES, SYSTEMS, SUBSTRATES, AND THE LIKE, TO REMAIN. PATCH AND REPAIR WORK TO MATCH SURFACES, SYSTEMS, SUBSTRATES, FINISHES, AND THE LIKE, OF EXISTING ADJACENT SURFACES TO REMAIN.
F. PROVIDE BOND-BREAKER TAPE AT ALL NEW SEALANT LOCATIONS WHERE THREE-POINT ADHESION MAY OCCUR.
G. ALL TRIM AND CLADDING COMPONENTS END CUTS TO BE PRIMED TO RECEIVING PAINT, TYPICAL.



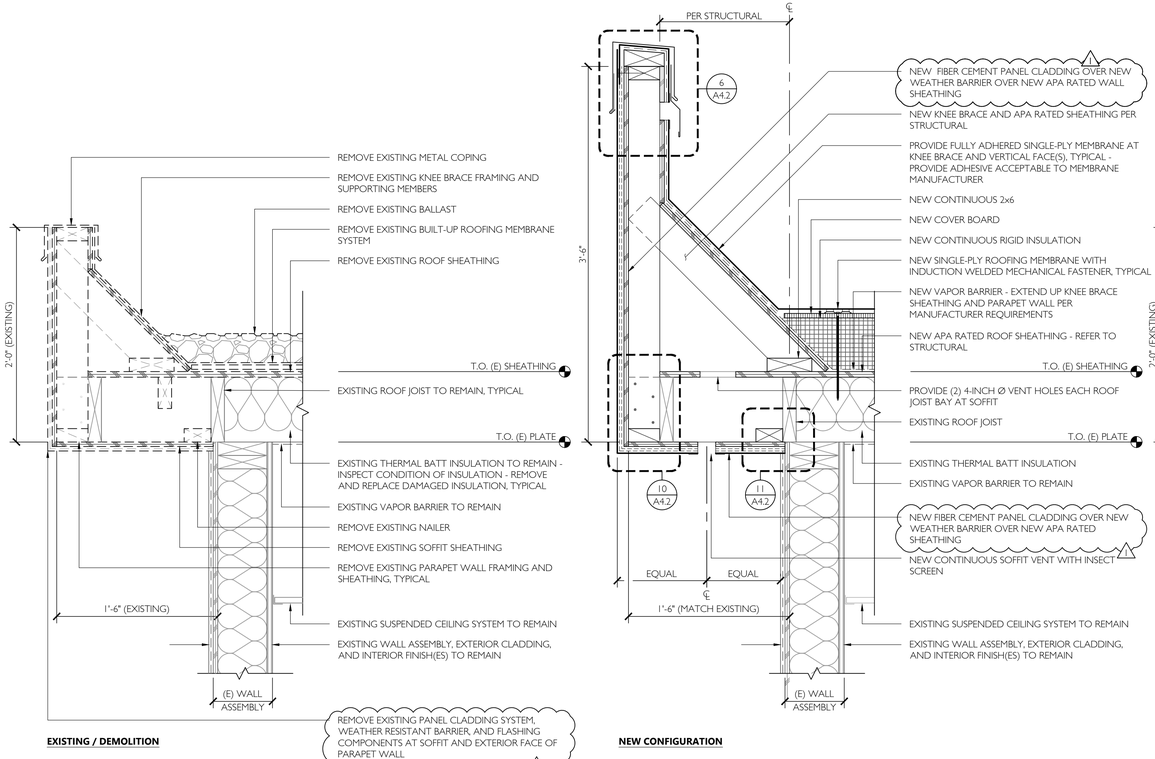
1 A4.1 DETAIL - PARAPET WALL

1 1/2" = 1'-0" (SECTION)



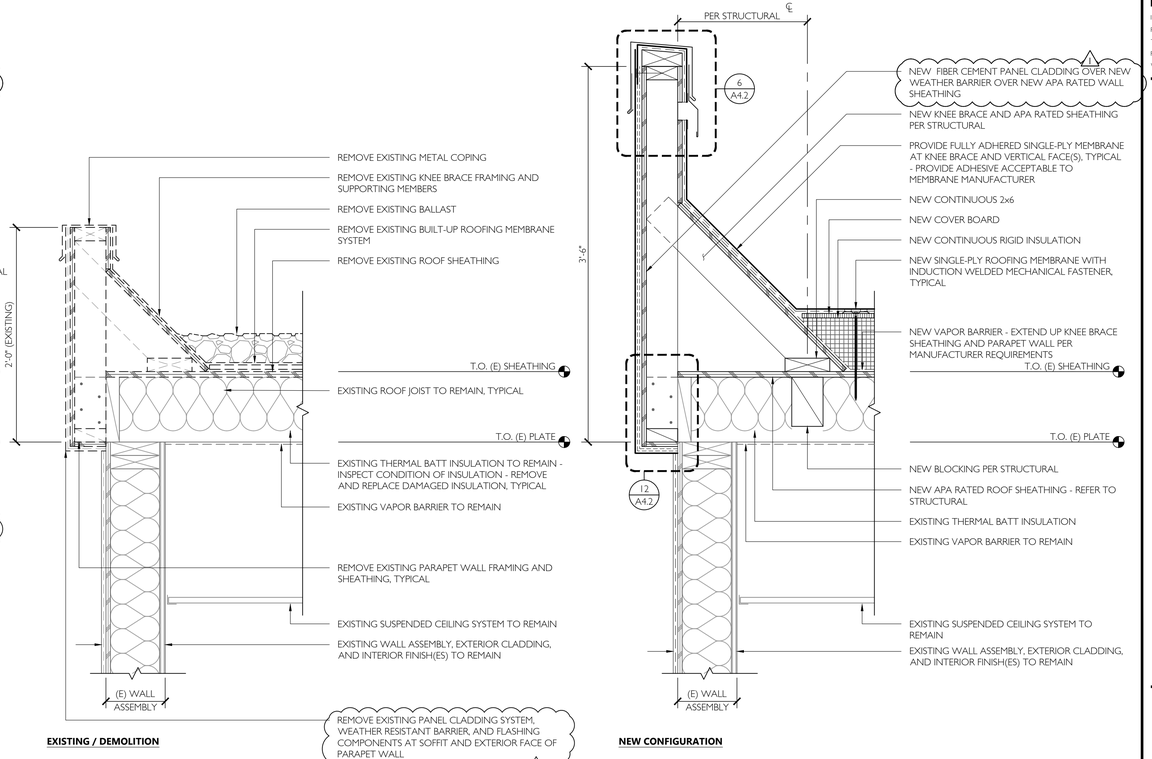
2 A4.1 DETAIL - KNEE WALL BRACE TIE-IN

3" = 1'-0" (SECTION)



9 A4.1 DETAIL - PARAPET WALL

1 1/2" = 1'-0" (SECTION)



11 A4.1 DETAIL - PARAPET WALL

1 1/2" = 1'-0" (SECTION)

REGISTERED ARCHITECT
ERIK J. WINTER
6035
PORTLAND, OR
STATE OF OREGON

ISSUED DATE
1 BID SET: 2021.02.09
2 ADDENDA No. 01: 2021.03.05

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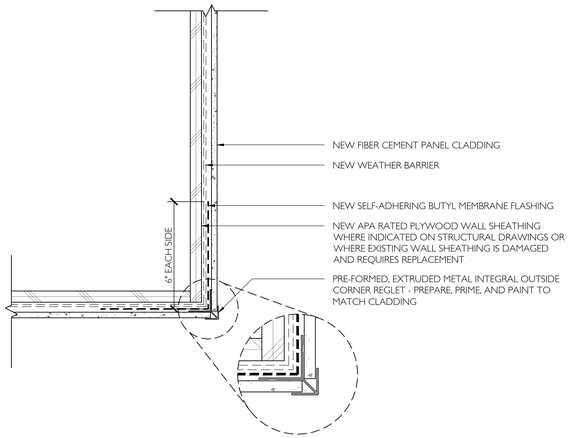
RENOVATION FOR:
BSD - INTERNATIONAL SCHOOL OF BEAVERTON
17770 SW BLANTON STREET
BEAVERTON, OREGON 97078

DETAILS
MODULAR BUILDING
A4.1
JOB NO. 20Y105.01

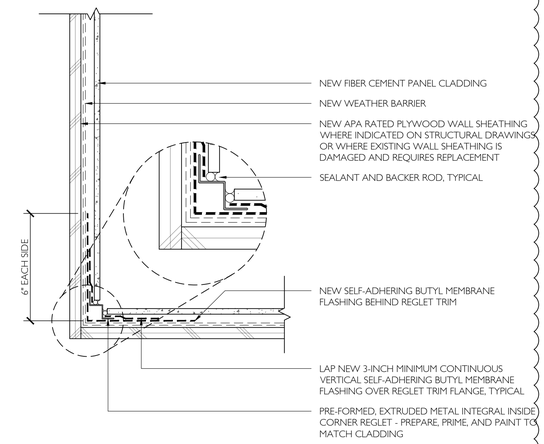
GENERAL DETAIL NOTES

A. THESE GENERAL NOTES SHALL APPLY TO THE ENTIRE PROJECT UNLESS SPECIFICALLY NOTED OTHERWISE WITHIN THE CONTRACT DOCUMENTS.
B. ALIGN NEW PANELS AND PANEL JOINTS WITH EXISTING PANEL AND PANEL JOINTS.
C. MAINTAIN EXISTING VERTICAL PANEL PLANE, TYPICAL. NOTIFY ARCHITECT IN WRITING IF EXISTING CONDITIONS DIFFER FROM THOSE SHOWN WITHIN THESE DOCUMENTS.
D. PROVIDE CONTINUOUS SELF-ADHERING, HIGH TEMP BUTYL MEMBRANE FLASHING BEHIND ALL VERTICAL AND HORIZONTAL REGLET TRIM.
E. PROVIDE CONTINUOUS SELF-ADHERING, HIGH TEMP BUTYL MEMBRANE FLASHING BEHIND ALL VERTICAL AND HORIZONTAL FASTENERS.
F. BLIND CAULK ALL PANEL JOINTS AT REGLET TRIM.
G. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL ASSEMBLE A FULL-SIZE MOCK-UP ILLUSTRATING ALL PANEL AND PANEL JOINT CONDITIONS APPLICABLE TO THIS PROJECT FOR REVIEW AND APPROVAL BY THE ARCHITECT. MOCK-UP SHALL INCLUDE, BUT IS NOT LIMITED TO, SHEATHING, WEATHER BARRIER, FLASHING SYSTEMS AND COMPONENTS, REGLETS, AND PANEL CLADDING. TRANSITIONS TO EXISTING CLADDING AND WEATHER BARRIER SYSTEMS SHALL ALSO BE INCLUDED.



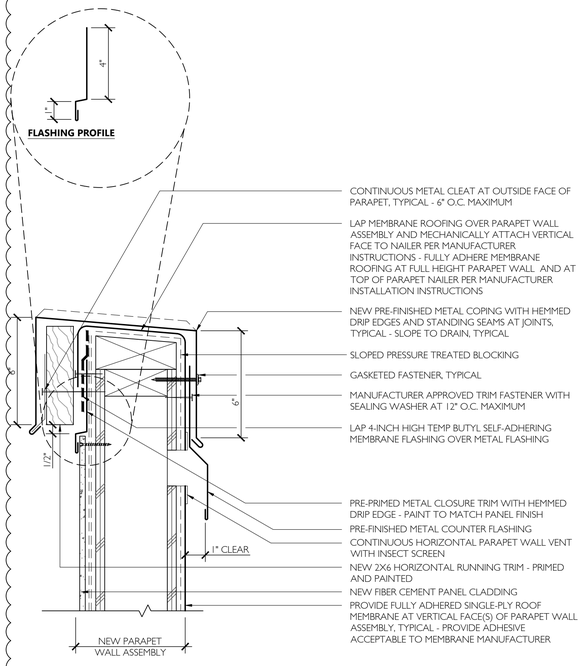
3 A4.2 DETAIL - PANEL OUTSIDE CORNER

3" = 1'-0" (PLAN)



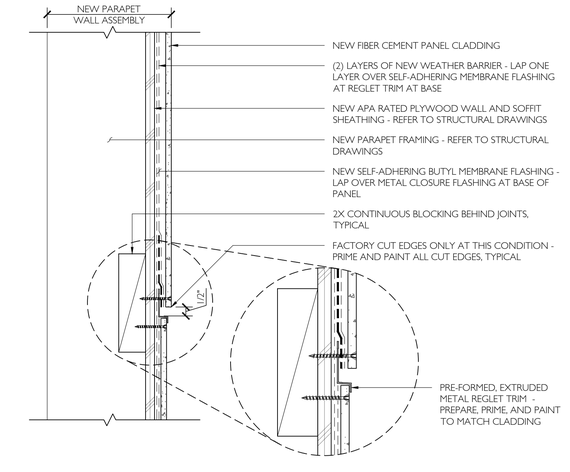
4 A4.2 DETAIL - PANEL INSIDE CORNER

3" = 1'-0" (PLAN)



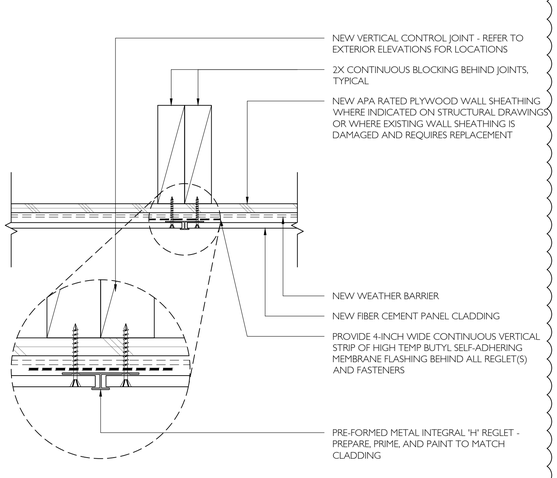
6 A4.2 DETAIL - PARAPET COPING AT PANEL SIDING

3" = 1'-0" (SECTION)



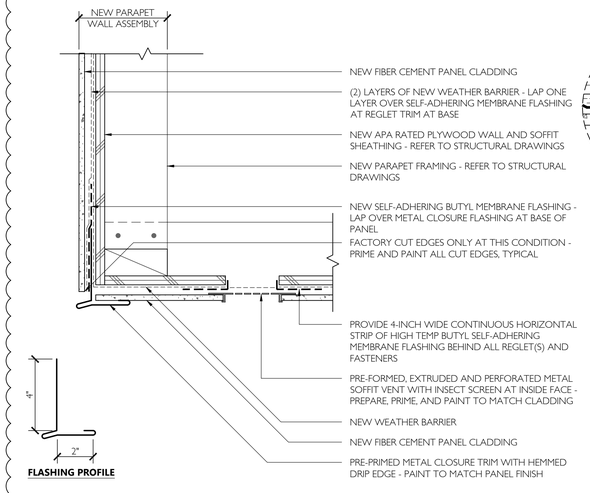
7 A4.2 DETAIL - HORIZONTAL PANEL JOINT

3" = 1'-0" (SECTION)



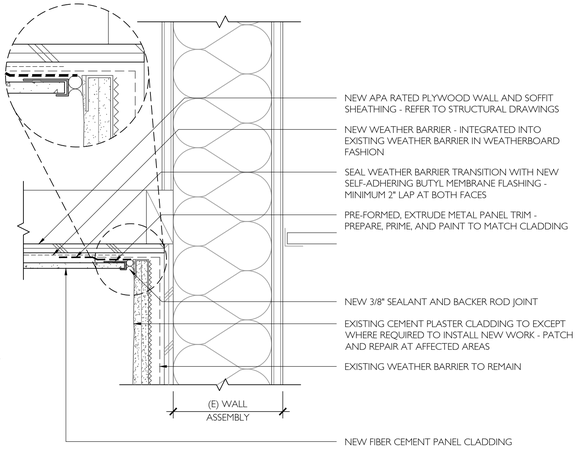
8 A4.2 DETAIL - PANEL VERTICAL CONTROL JOINT

3" = 1'-0" (PLAN)



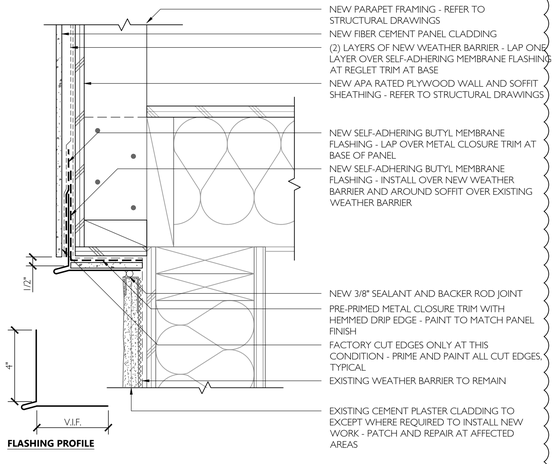
10 A4.2 DETAIL - PANEL SOFFIT

3" = 1'-0" (SECTION)



11 A4.2 DETAIL - PANEL SOFFIT

3" = 1'-0" (SECTION)



12 A4.2 DETAIL - PANEL SOFFIT

3" = 1'-0" (SECTION)

REGISTERED ARCHITECT
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DETAILS
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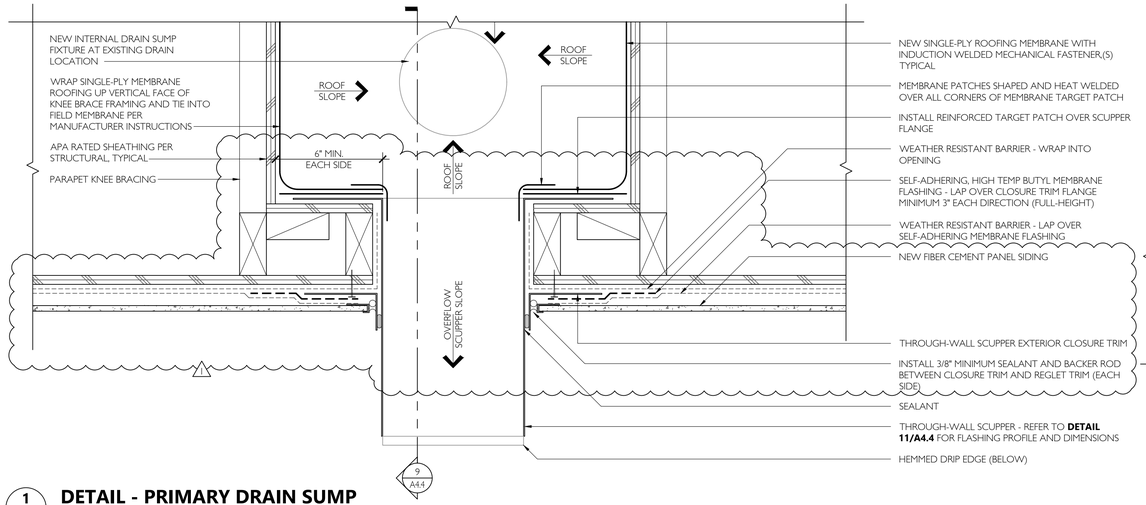
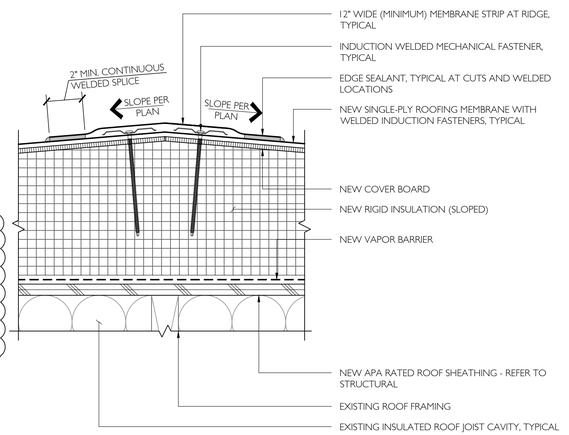


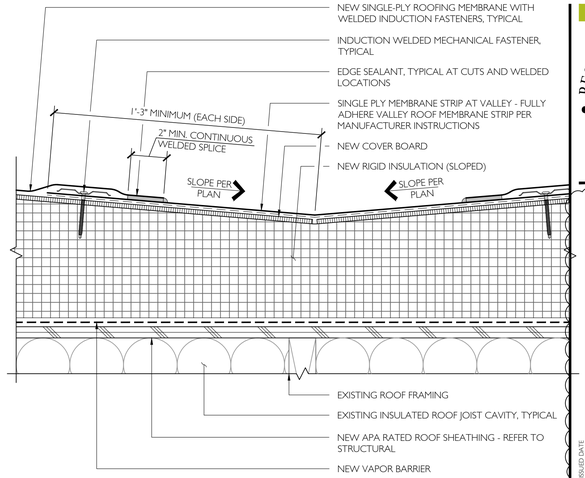
1 A4.4 DETAIL - PRIMARY DRAIN SUMP

3" = 1'-0" (PLAN)



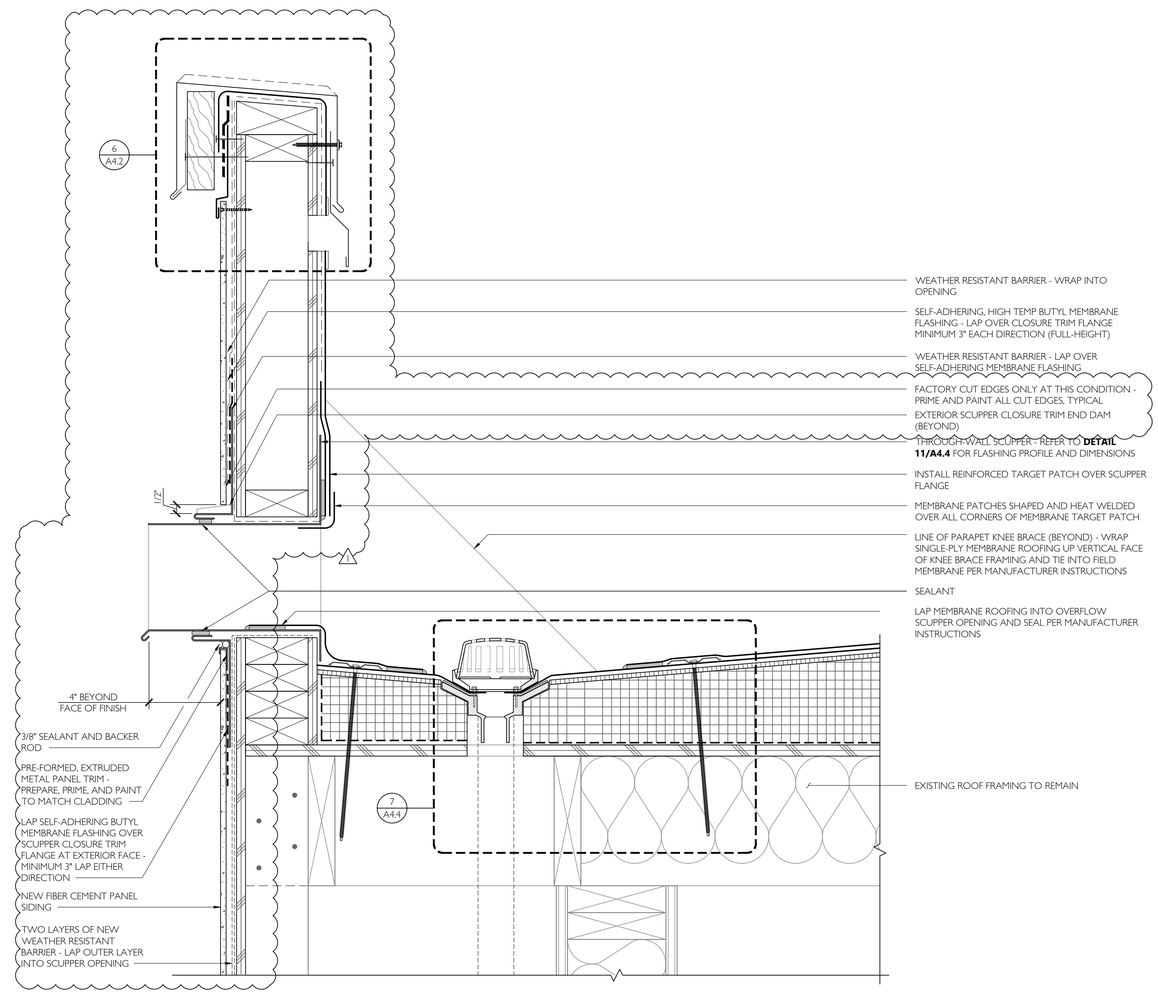
3 A4.4 DETAIL - MEMBRANE ROOFING RIDGE

3" = 1'-0" (SECTION)



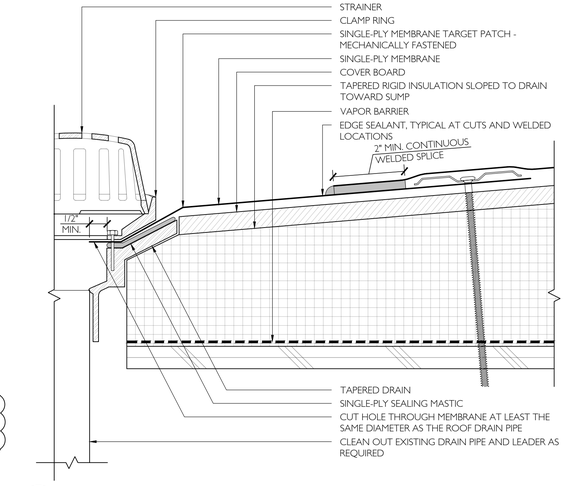
4 A4.4 DETAIL - MEMBRANE ROOFING VALLEY

3" = 1'-0" (SECTION)



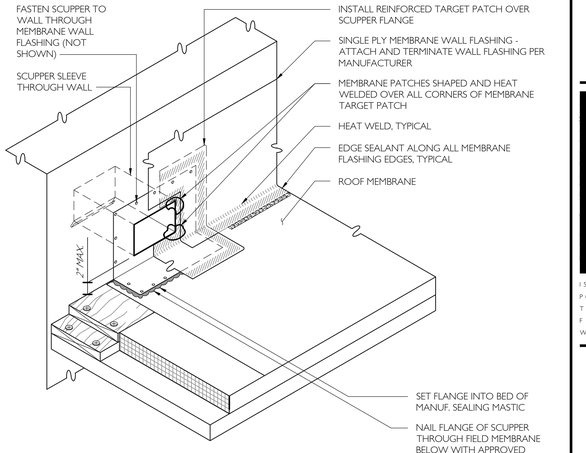
9 A4.4 DETAIL - THROUGH-WALL OVERFLOW SCUPPER

3" = 1'-0" (SECTION)



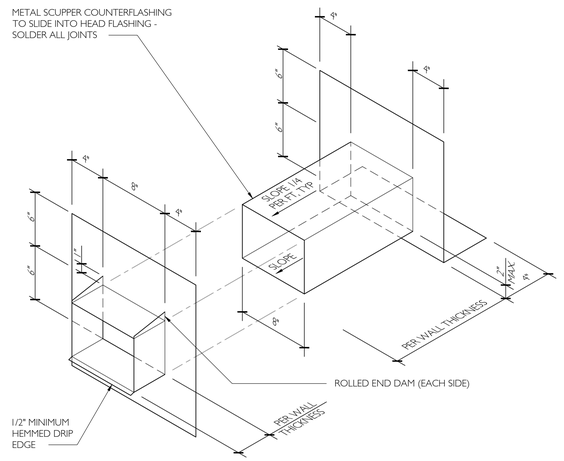
7 A4.4 DETAIL - PRIMARY DRAIN SUMP

6" = 1'-0" (SECTION)



8 A4.4 DETAIL - THROUGH WALL SCUPPER

NOT TO SCALE (ISOMETRIC)



11 A4.4 DETAIL - SCUPPER FLASHING

1 1/2" = 1'-0" (ISOMETRIC)

REGISTERED ARCHITECT
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DETAILS
MODULAR BUILDING

A4.4

JOB NO. 20Y105.01

SECTION 000110 – TABLE OF CONTENTS

STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR
Modified AIA Document A101, 2017 Edition *(BSD Document – Incorporated by reference only)*

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION
Modified AIA Document A201, 2017 Edition *(BSD Document – Incorporated by reference only)*

DIVISION 01 GENERAL CONDITIONS

DIVISION 02 EXISTING CONDITIONS

DIVISION 03 CONCRETE – Not Used

DIVISION 04 MASONRY – Not Used

APPENDIX A: ROOF MOISTURE SURVEY REPORT

- Prepared by RDH Building Science, dated 12/18/2020.

APPENDIX B: SUPPLEMENTAL ASBESTOS SURVEY REPORT

- Prepared by TRC, dated 10/27/2020.

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Weather resistant barrier and associated accessories.
2. Flexible flashing.

B. Related Requirements:

1. Division 01, Section "Unit Prices" for removal and replacement of unsatisfactory wall sheathing at exterior walls.
2. Division 01, Section "Quality Requirements" for additional mock-up requirements not noted within this Section.
3. ~~Division 01, Section "Fenestration System Testing" for coordination with fenestration testing requirements.~~ (DELETE)
4. Division 06, Section "Sheathing" for replacement of unsatisfactory wall sheathing at exterior walls.
5. Division 06, Section "Exterior Finish Carpentry" for exterior standing and running trim.
6. Division 07, Section "Sheet Metal Flashing and Trim" for metal flashings integrated into the building envelope.
7. Division 07, Section "Joint Sealants" for joint-sealant materials integrated into the building envelope.
8. Division 08, Section "Fixed Louvers" for fixed louver frame integration into the building envelope.
9. ~~Division 09, Section Cement Plaster for exterior cladding system coordination.~~ (DELETE)

1.3 DEFINITIONS

A. AAMA: American Architectural Manufacturers Association

B. AATCC: American Association of Textile Chemists and Colorists

C. ASTM: American Society for Testing and Materials

D. Back Dam: The rear upturned leg of a sill pan or subsill designed for the purpose of containing liquid water.

E. End Dam: The side upturned legs of a sill pan or subsill designed for the purpose of containing liquid water. End dams must of a height equal to the height of the back dam or higher.

F. Flexible Flashing: Refers to either Mechanically Attached Membrane flashing or Self Adhered Membrane flashing.

G. Mechanically Attached Membrane ("MAM") flashing: A type of flashing with low or no permeance that is designed to prevent liquid water from passing through it. When mechanically attached flashing is used, a roll width dimension of not less than 9 inches (230 mm) shall be required. Mechanically attached flashing shall meet the performance requirements in ICC Acceptance Criteria 148.

H. Self-Adhering Membrane ("SAM") flashing: Flexible facing materials coated completely, or partially, on at least one side with an adhesive material and which do not depend upon mechanical fasteners for permanent attachment. Self-adhering flashing shall meet the performance requirements of AAMA 711 or ICC Acceptance Criteria AC 148.

I. Pan Flashing (sill pan or threshold pan): A type of flashing used at the base of a rough opening to divert incidental water to the exterior or to the exterior surface of a concealed weather resistive barrier. Pan flashings have upturned legs at the rear interior edge (back dam) and right and left sides (end dam) to form a three-sided pan that has the front open for drainage. At metal pans, all seams to be fully welded and watertight. Sill pans shall be sloped to the exterior.

J. Weather Barrier Assembly: The collection of weather barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to provide vapor control, water resistance and wind resistance within the wall assembly.

1.4 REFERENCES

A. AAMA 100-07 – Standard Practice For Installation Of Windows With Flanges or Mounting Fins in Wood Frame Construction.

B. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test; 1998.

C. American Society for Testing and Materials (ASTM)

1. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E 96 – Standard Test Methods for Water Vapor Transmission of Materials; Compliant with Procedure B (Water Method) for interior to exterior testing.
3. ASTM D 779 – Standard Test Method for Water Resistance of Paper, Paperboard, and Other Sheet Materials by the Dry Indicator Method
4. ASTM D 882 – Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
5. ASTM 2112-07 – Standard Practice for Installation of Exterior Windows, Doors and Skylights.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For weather resistant barrier system and accessories, include data on air and water-vapor permeance based on testing according to referenced standards.

B. Shop Drawings: Show details of weather resistant barrier system and accessories at terminations, openings, and penetrations. Show details of flexible flashing applications.

1. Provide 1-1/2" scale drawings (or larger) showing relationship of membrane to:

a. Framing or blocking members
b. Thermal Insulation
c. Sheathing
d. All exterior cladding and corner conditions
e. Door and window frames
f. Pan flashing at doors
g. Sill flashing at windows
h. Through-wall metal flashing
i. Pipe, conduit and duct penetrations

1.6 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For weather-resistive barrier and flexible flashing, from ICC-ES.

B. Samples:

1. 8-1/2-x-11-inch square of weather-resistive barrier sheet.
2. Tapes (Single & Double sided).
3. 12" strip of Self Adhering Membrane Flashing
4. Pre-fabricated Corner Sill Pan Flashing.
5. Provide materials and fasteners for mock-up.

1.7 QUALITY ASSURANCE

A. Applicator Qualifications: A firm experienced in applying Weather Barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Mockups: Before beginning installation of Weather Barrier, build mockups of exterior wall assembly, incorporating backup wall construction, external cladding, window, door frame and sill, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of weather barrier membrane.

1. Include junction with building corner condition and foundation wall intersection.
2. If Owner and Architect determines mockups do not comply with requirements, reconstruct mockups and apply weather barrier until mockups are approved.

3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
4. Mockup(s) shall be reviewed and approved by the Owner and Architect prior to proceeding with the balance of the installation.
5. At mock up review provide 8½"x11" images of weather barrier installation and all areas not visible at time of the inspection.

C. Preinstallation Conference: Conduct conference at Project site.

1. Include installers of other construction connecting to Weather Barrier, such as waterproofing, concrete, joint sealants, windows, and door frames.
2. Review Weather Barrier requirements including surface preparation, substrate condition and pretreatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, mockups, installation procedures.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by Weather Resistant Barrier manufacturer.

B. Store rolls according to manufacturer's written instructions.

C. Protect stored materials from direct sunlight and excessive moisture.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Apply Weather Barrier within the range of ambient and substrate temperatures recommended by weather barrier manufacturer. Protect substrates from environmental conditions that affect performance of weather barrier. Do not apply weather barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.10 WARRANTY

A. Special Warranty: Standard form in which manufacturer agrees to repair or replace weather resistant barrier system, including accessory components, that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Manufacturing defects.
   b. Structural failures of system components.

2. Material Warranty Period: Fifteen (15) years from date of Substantial Completion.

B. Special Project Warranty: Installer's Warranty, signed by Installer, covering the Work of this Section, in which Installer agrees to repair or replace components of weather resistant barrier system that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Weather Barrier shall be capable of performing as a continuous breathable weather and air barrier. Weather Barrier assemblies shall be capable of accommodating substrate movement, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage.

2.2 WEATHER BARRIER ~~(Exterior Cement Plaster Locations)~~ (DELETE)

A. Vapor Permeable Weather Barrier: ~~Use vapor permeable weather resistive barrier.~~ (DELETE) **Polymeric nonwoven, non-perforated, Grade D wrap.**

1. Manufacturer and Product: Subject to compliance with requirements, provide products by the following basis-of-design manufacturer:

a. Basis-of-Design: ~~"Super Jumbo Tex 60 Minute"~~ (DELETE) **"WeatherSmart Commercial"** Weather Barrier by Fortifiber Building Systems Group.

2. ~~Layer(s): Two layers of asphalt saturated kraft Grade D breather type over wall sheathing, lapped per manufacturer instructions.~~ (DELETE) **Water-Vapor Permeance: ASTM E 96/E/ 96M, Procedure A (Dry Cup); Not less than 56g/sm/day (8 perms)**
3. Water Resistance (Boat Test): ASTM D779; not less than 60 minutes.
4. Allowable UV Exposure Time: Per Manufacturer.

B. Weather Barrier Tape: Pressure-sensitive plastic tape recommended by weather barrier manufacturer for sealing joints and penetrations in weather barrier.

2.3 FLEXIBLE FLASHING

A. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 20 mil, cold applied, self-adhering membrane.

1. Manufacturer and Product: Subject to compliance with requirements, provide products by the following basis-of-design manufacturer:

a. Basis-of-Design: "FortiFlash Butyl" self-adhering membrane flashing by Fortifiber Building Systems Group.
b. High Temperature: Minimum 30 mil, cold applied, self-adhering flashing.

B. Primer for Flexible Flashing: Product recommended in writing by flexible flashing manufacturer for substrate.

~~2.4 DRAINAGE MATERIAL (Exterior Cement Plaster Locations)~~ (DELETE)

~~A. Drainage Material: Provide product(s) that shall maintain a continuous open space between weather barrier and exterior cladding to create a drainage plane and shall be used under finish cladding.~~

~~a. General: Use ventilated rain screen with pre-installed mortar screen.~~
~~b. Basis-of-Design: "Delta-Dry Stucco & Stone" by Cosella Dorken.~~

2.5 ACCESSORIES

A. General: Auxiliary materials detailed in Drawings and as recommended by Weather Resistive Barrier manufacturer for intended use and compatible with weather barrier.

B. Sheathing Tape: Subject to compliance with requirements, provide products by the following basis-of-design manufacturer.

1. Basis-of-Design: Fortifiber Building Systems "Sheathing Tape."

C. Fasteners: 1-inch (25.4mm) plastic cap 0.019-inch-shank-diameter (2.11mm) galvanized steel or stainless steel nail. Fasteners shall be of sufficient length to penetrate through the sheathing.

D. Sealant: Subject to compliance with requirements, provide products by the following basis-of-design manufacturer:

1. Basis-of-Design: Fortifiber Building Systems "Moistop Sealant."
2. Reference Standards: AAMA 808.3-92 (exterior perimeter sealing compound); ASTM C-920, Type S, Grade NS, Class 25.
3. Primer for Sealant: Product recommended by manufacturer of sealant for substrate.

E. Pre-Manufactured Flashing Panels: Subject to compliance with requirements, provide products by the following manufacturer:

1. Basis-of-Design: Quickflash Weather Proofing Products, Inc.
2. Panels: As indicated for plumbing and electrical items at exterior building envelope appurtenances.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance. Notify Owner and Architect, in

writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
2. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of products indicates acceptance of surfaces and conditions.

3.2 SURFACE PREPARATION

A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for weather barrier application.

B. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks.

C. Verify that substrate is adequately secured to framing and remove all loose nails, other sharp protrusions or other matter that will hinder the installation of weather barrier or adhesion of flexible flashing.

D. Self-Adhering Membrane Flashing General: Verify substrate preparation and temperature tolerances with manufacture prior to installation of Self-Adhering Membrane Flashing(s). Self-Adhering Membrane Flashing installed at temperatures at or below 45 deg F (7.2 deg C) may require special preparation and use of butyl only.

E. Windows, Doors and Louvers:

1. Install in accordance with the recommendations of AAMA 100-07.
2. Install flexible flashing following the shingle principle of overlapping materials. Weather-Resistive Barrier installed after window installation: in accordance with ASTM E 2112.
3. Cover flexible flashing with finish material within the manufacturer’s recommended time.

3.3 WEATHER BARRIER INSTALLATION

A. General: Install all weather barrier products in accordance with manufacturer’s written recommendations and installation instructions.

B. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.

C. Secure weather barrier and accessories so that the subsurface is protected from weather until finish materials can be installed.

D. Apply weather barrier and accessories in a shingled manner to shed water.

E. Install weather barrier laid smooth without folds or bunches of materials.

1. First, wrap penetrations as indicated in Drawings.
2. Start from the bottom, unroll the weather barrier, mechanically fastening top and bottom, 2'-0" o.c. (and in compliance with manufacturer's written installation instructions).
3. Seal against jambs of openings with manufacturer recommended tape lapping weather barrier over flexible flashing at jambs and head. At sill, lap flexible flashing over weather barrier.

F. Inspect and repair membrane prior to application of finish material over membrane. Tape tears, perforations and similar damage.

3.4 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.

1. Prime substrates as recommended by flashing manufacturer.
2. Lap seams and junctures with other materials as recommended by manufacturer.
3. Lap flashing over water-resistive barrier at bottom and sides of openings.
4. Lap water-resistive barrier over flashing at heads of openings.
5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

3.5 DRAINAGE MATERIAL INSTALLATION

A. Install drainage material over building wrap and flashing to comply with manufacturer's written instructions.

3.6 FIELD QUALITY CONTROL

A. Inspections: Weather barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of weather barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Site conditions for application temperature and dryness of substrates have been maintained.
3. Maximum exposure time of materials to UV deterioration has not been exceeded.
4. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction.
5. Compatible materials have been used.

3.7 CLEANING AND PROTECTION

A. Protect weather barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

B. Clean spills, stains, and soiling from adjacent construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 072500

SECTION 074646 - FIBER-CEMENT SIDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes fiber-cement siding.

1. **Fiber-cement panel siding, factory primed.**
2. **Accessories.**

B. Related Requirements:

1. **Division 01, Section "Construction Waste Management and Disposal" for construction waste management and disposal requirements.**
2. **Division 02, Section "Selective Demolition".**
3. **Division 06, Section "Rough Carpentry" for wood furring, grounds, nailers, and blocking.**
4. **Division 06, Section "Sheathing".**
5. **Division 06, Section "Exterior Finish Carpentry" for standing and running exterior trim.**
6. **Division 07, Section "Weather Barriers" for weather-resistive barriers.**
7. **Division 07, Section "Sheet Metal Flashing and Trim".**
8. **Division 07, Section "Joint Sealants" for applying joint sealants at and around adjacent surfaces.**
9. **Division 09, Section "Exterior Painting" for field painting finish.**

1.3 COORDINATION

A. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project with Installer present.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. **Manufacturer's written preparation and installation recommendation and instructions.**
2. **Storage and handling requirements and recommendations.**
3. **Installation methods.**
4. **Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.**

B. Shop Drawings: Include Project related construction details which include plans, elevations, sections, accessories, rain and ventilation screens, and details of installation adjoining to adjacent surfaces, including anchor, flashing, and sealant installation.

1. **Provide detailed drawings of atypical, non-standard applications of products and materials which are outside the standard details and specifications provided by the manufacturer.**
2. **Details shall be drawing to scale, and at 3" = 1'-0".**

C. Samples: For each type, color, texture, and pattern required.

1. **12-inch- (300-mm-) long-by-actual-width Sample of siding.**
2. **24-inch- (600-mm-) wide-by-36-inch- (900-mm-) high Sample panel of siding assembled on plywood backing.**
3. **12-inch- (300-mm-) long-by-actual-width Samples of trim and accessories.**
4. **Each type of pre-formed, extruded metal reglet to be used.**

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of fiber-cement product from manufacturer.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding.

C. Research/Evaluation Reports: For each type of fiber-cement siding required, from ICC-ES.

D. Sample Warranty: For manufacturer and installer warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

B. Warranties: Include final warranties in Project Warranty manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. **Furnish full lengths of fiber-cement siding including related accessories, in a quantity equal to two (2) percent of amount installed.**

2. **Extra maintenance materials are not required for this Project.**

1.9 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for fabrication and installation.

1. **Contractor shall build a mockup of typical wall area which incorporates all components of entire assembly, at a location recommended by the Contractor and approved by the Architect and Owner.**
2. **Prior to constructing mockups, Contractor shall obtain Architect's approval of Contractor's recommended location and mutually agreed upon time for reviewing the mockups.**
3. **Build mockups for fiber-cement siding including accessories and the following.**

    a. **Size: As appropriate to fully demonstrate aesthetic effects and to set quality standards for fabrication and installation, but not less than 12'-0" long by 5'-0" high.**
    b. **Include outside corner on one end of mockup and inside corner on other end.**
    c. **Include sample of typical wall and soffit penetrations, intersections, reglet configurations, and flashings.**

4. **Contractor shall comply and coordinate demonstration of mockups with Division 01, Section "Quality Requirements" for full-size physical assemblies of mockups and Division 07, Section "Sheet Metal Flashing and Trim".**
5. **Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.**
6. **Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.**

B. Metal Trim Installation:

1. **Maximum allowable tolerance in horizontal planes:**

    a. **Variation from Level: +1/8" in 12'-0" length.**

2. **Maximum allowable tolerance in framed vertical construction:**

    a. **Position: +1/4" maximum variation from design position.**
    b. **Alignment: 1/8" in 8'-0"; ¼" maximum in any continuous wall, line, or surface.**

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with labels intact until time of use.

B. Store materials on elevated platforms, under cover, and in a dry location.

1.11 WARRANTY

A. Manufacturer's Warranty: Manufacturer shall provide written warranty which states that the manufacturer agrees to repair or replace products that fail in materials or workmanship, at no cost to the Owner, within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including cracking and deforming.
b. Deterioration of materials beyond normal weathering.
c. Damage due to hail and termite damage and defects in materials.

2. Warranty Period for all manufacturer provided products: Thirty (30) years from date of Substantial Completion.

B. Installer's Warranty/Guarantee: Provide written Warranty/Guarantee to Owner in which Installer agrees to repair or replace provided products (including demolition and haul-off) including but not limited to fiber-cement siding and systems, trim, flashings, sealants, fasteners and accessories against defective materials and/or workmanship, to remain watertight and weatherproof with normal usage, at no cost to the Owner, within specified warranty period.

1. Warrant/Guarantee Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain products, including related accessories, from single source from single manufacturer.

2.2 FIBER-CEMENT SIDING

A. General: ASTM C1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E136; with a Flame-Spread Index = 0, Smoke Developed Index = 5, when tested according to ASTM E84.

B. Manufacturer: Subject to compliance with requirements, provide products by:

1. Basis-of-Design Manufacturer: James Hardie, www.jameshardie.com.

C. Products: Subject to compliance with requirements, provide the following products:

1. Basis-of-Design Product: HardiePanel® Vertical Siding:

a. Pattern: Vertical.
b. Width: 4'-0" Nominal (3'-11 1/2-inch actual).
c. Exposure: 8'-0" Nominal (7'-11 1/2-inch actual).
d. Thickness: 0.312-inch
e. Texture: Smooth.
f. Panel Joint: Extruded metal reglet – refer to drawings for basis-of-design profile(s).
g. Panel Joint: Extruded metal reglet – refer to drawings for basis-of-design profile(s).
h. Factory Priming: Provide standard universal primer applied in factory by manufacturer.
i. Finish: Field paint finish.

D. Labeling: Provide fiber-cement siding that is tested and labeled according to ASTM C1186 by a qualified testing agency acceptable to authorities having jurisdiction.

2.3 ACCESSORIES

A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, flashing, rain screen clips and other items as recommended by siding manufacturer for building configuration.

1. Provide accessories matching color and texture of adjacent siding unless otherwise indicated.

B. Flashing: Provide flashing complying with Division 07, Section "Sheet Metal Flashing and Trim" at window and door heads and where indicated.

C. Metal Trim:

1. Manufacturer: Subject to compliance with requirements, provide products by:

a. Basis-of-Design Manufacturer: Fry Reglet Corporation.
b. Finish: Factory applied primed finish.
c. Profiles: As indicated on Drawings.

D. Fasteners:

1. Fasteners: For fastening to wood, use siding nails of sufficient length to penetrate a minimum of 1-inch into substrate as recommended by panel manufacturer, of equal or greater holding power than required by manufacturer's Code compliance reports, but not less than 1-3/4" fastener length.
2. For fastening fiber cement, use stainless-steel fasteners.

a. Fasteners shall be of high-quality stainless steel to ensure resistance to corrosion. For field painting, fasteners should be treated to accept paint adhesion

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement siding and related accessories. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

1. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION

A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

1. As a minimum, comply with manufacturer's instructions and recommendations for:
- **a. General Requirements.**
- **b. General Fastening Requirements.**
- **c. Joint Treatment installation.**
- **d. Flashing recommendations.**
- **e. Clearances.**
- **f. Requirements for Blind Nailing lap siding.**
- **g. Caulking and sealants.**
- **h. Fastener Requirements.**
- **i. Jointing Methods.**

2. Do not install damaged components.

3. Install fasteners no more than 24-inches (600 mm) o.c., or as recommended by manufacturer and approved shop drawings.

4. Pneumatic Fastening: Refer to manufacturer's written instructions and recommendations if Contractor elects to use pneumatic fastening tools.

B. Installation of Fiber Cement Vertical Panel System shall be per manufacturer's written recommendations and instructions, but not less than the following:

1. **Install panel system in accordance with manufacturer's instructions and approved Shop Drawings.**
2. **Provide not less than a minimum of 6-inches of clearance between panel system and finished grade.**
3. **Maintain not less than 2-inches clearance between panel system and horizontal surfaces other than at grade.**
4. **Install metal trim:**

    a. **Over openings in walls, over standing and running trim, at appurtenance blocks, at bottom of walls, and where noted on Drawings: Install Drainage Flashing Trim.**

5. **Leave ½-inch (13 mm) gap between horizontal drainage flashings and bottom of panel above. Do not seal this space.**
6. **Allow minimum vertical clearance between edge of panel system and adjacent materials in accordance with manufacturer's instructions.**
7. **Cut panels to fit around penetrations with maximum ¼-inch (6 mm) gaps. Smooth and seal cut edges.**
8. **Fasten panel system at maximum spacing per manufacturer's Code compliance reports. Place fasteners with heads recessed slightly below panel surface, minimum 3/8-inch (10 mm) from panel edges and 2-inches (50 mm) from top and bottom edges at panel corners, in orderly fastening pattern.**
9. **Fill fastener heads with filler; finish flush with panel surface.**
10. **Apply joint sealer between panel system and adjacent surfaces as specified in Division 07, Section "Joint Sealants" except at horizontal drainage and vent flashings.**

C. Installation of Metal Trim accessories shall be per manufacturer's written recommendations and instructions, but not less than the following:

1. **Install panel accessories in accordance with panel manufacturer's supplemental installation details for commercial applications.**

D. Install joint sealants as specified in Division 07, Section "Joint Sealants" and to produce a weathertight installation.

3.4 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074646

~~SECTION 092400 - CEMENT PLASTERING~~ (DELETE ENTIRE SECTION)

~~PART 1 - GENERAL~~

~~1.1 RELATED DOCUMENTS~~

~~A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.~~

~~1.2 SUMMARY~~

~~A. Section Includes:~~

~~1. Exterior portland cement plasterwork (stucco) on metal lath.~~

~~B. Related Sections:~~
~~1. Division 06, Section "Rough Carpentry", for wood framing at exterior wall assemblies.~~
~~2. Division 06, Section "Sheathing"a, for sheathing at exterior wall assemblies.~~
~~3. Division 07, Section "Thermal Insulation", for thermal insulation at exterior wall assemblies.~~
~~4. Division 07, Section "Weather Barriers" (WRB), for weather barriers, self-adhering membrane flashing and accessories at exterior wall assemblies.~~
~~5. Division 07, Section "Sheet Metal Flashing and Trim", for exterior flashing at exterior wall assemblies.~~
~~6. Division 07, Section "Joint Sealants", for joint sealant installation.~~

~~1.3 PREINSTALLATION MEETINGS~~

~~A. Preinstallation Conference: Conduct conference at the Project Site, with the Installer present.~~

~~1.4 ACTION SUBMITTALS~~

~~A. Product Data: For each type of product indicated, including the following:~~

~~1. Manufacturer's certification of compliance of materials and product literature.~~
~~2. Manufacturer's product literature for all additives and proprietary components.~~

~~B. Shop Drawings: Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work.~~

~~C. Samples for Initial Selection: For each type of factory-prepared finish coat indicated.~~

~~D. Samples for Verification: For each type of factory-prepared, colored and textured finish coat indicated; 12 by 12 inches (305 by 305 mm), and prepared on rigid backing.~~

~~E. Stucco Trim Accessories: Submit samples of each trim accessory (3 each, not less than 6" long).~~

~~F. Metal lath and backing: 12" x 12" (3 each).~~

~~1.5 QUALITY ASSURANCE~~

~~A. Fire Resistance Ratings: Where indicated for this Project, provide portland cement plaster assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.~~

~~1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.~~

~~B. Sound Transmission Characteristics: Where indicated, provide portland cement plaster assemblies identical to those of assemblies tested for STC ratings per ASTM E 90 and classified according to ASTM E 413 by a qualified testing agency.~~

~~C. Mockups: Before plastering, install mockups of at least 100 sq. ft. (9.3 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.~~

~~1. Install mockups for each type of finish indicated.~~
~~2. Build mockups at locations recommended by Contractor with approval of locations by Architect prior to building mockups.~~
~~3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.~~

~~D. Installer qualifications: The Installer shall meet the following requirements:~~

~~1. Specialize in this scope of work, with at least (10) years of experience installing the specified system successfully.~~
~~2. Have qualified and properly trained people to perform work.~~
~~3. Be licensed, bonded and insured.~~
~~4. Be in good financial standing and capable of meeting the financial obligations associated with the stucco scope of work on the Project.~~
~~5. Have documented experience in quality work of comparable scope.~~
~~6. Be recommended as a qualified installer by NWCB or national or regional Wall and Ceiling Association (Plastering Association) prior to Bid.~~
~~7. Contractor shall be able to meet schedule requirements set at time of Bid.~~

~~1.6 DELIVERY, STORAGE, AND HANDLING~~

~~A. Store materials inside under cover and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.~~

B. Materials at job site to be in original containers with labels intact and legible.

C. All trim accessories and lath and/or other specified products to be shipped to job site in original containers. Any damaged or bent materials shall be removed from site and replaced.

D. All sack materials to be stored above ground, dry and protected.

1.7 FIELD CONDITIONS

A. Comply with ASTM C 926 requirements, application of Portland Cement Based Plaster (latest edition).

B. Comply with ASTM C 1063 requirements, installation of Lathing and Furring to Received Exterior Portland Cement Based Plaster (latest edition).

C. All work to be performed per Northwest Wall and Ceiling Bureau and/or regional wall and ceiling association recommendations.

D. Exterior Plasterwork:

1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
2. Apply plaster when ambient temperature is greater than 40 deg F (4.4 deg C).
3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.
4. Do not apply cement plaster to any frozen surfaces or surfaces containing frost.
5. Do not use frozen materials.
6. Hoarding (tenting), heat and ventilation must be provided if cement plastering is done in a temperature below 35 deg F.
7. Protect the basecoats and finish coat of cement plaster from uneven and excessive evaporation in warm, windy weather.

E. Factory Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 METAL LATH

A. Expanded Metal Lath: ASTM C 847 with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized zinc coating.

1. 3/8 Inch (9.5 mm) Rib Lath (for use on horizontal exterior ceilings and/or soffits for this Project): 3.4 lb/sq. yd. (1.8 kg/sq. m).

~~B. Wire Fabric Lath:~~

~~1. Woven Wire Lath (for use on vertical exterior walls surfaces for this Project): ASTM C 1032; self furring, with stiffener wire backing, 1.4 lb/sq. yd. (0.8 kg/sq. m).~~

~~C. Paper Backing: As indicated in Division 07, Section "Weather Barriers".~~

~~2.2 ACCESSORIES~~

~~A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.~~

~~B. Metal Accessories:~~

~~1. Foundation Weep Screed: Fabricated from hot dip galvanized steel sheet, ASTM A 653/A 653M, G60 (Z180) zinc coating.~~
~~2. Cornerite: Fabricated from metal lath with ASTM A 653/A 653M, G60 (Z180), hot dip galvanized zinc coating.~~
~~3. Cornerbeads: Fabricated from zinc.~~

~~a. Small nose cornerbead with expanded flanges; use unless otherwise indicated.~~

~~4. Casing Beads: Fabricated from zinc; square edged style; with expanded flanges.~~
~~5. Control Joints: Fabricated from zinc; one piece type, folded pair of unperforated screeds in M shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.~~
~~6. Expansion Joints: Fabricated from zinc; folded pair of unperforated screeds in M shaped configuration; with expanded flanges.~~
~~7. Two Piece Expansion Joints: Fabricated from zinc; formed to produce slip joint and square edged reveal that is adjustable from 1/4 to 5/8 inch (6.34 to 16 mm) wide; with perforated flanges.~~

~~2.3 MISCELLANEOUS MATERIALS~~

~~A. Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.~~

~~B. Fiber for Base Coat: Alkaline resistant glass or polypropylene fibers, 1/2 inch (13 mm) long, free of contaminants, manufactured for use in portland cement plaster.~~

~~C. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.~~

~~D. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475 inch (1.21 mm) diameter, unless otherwise indicated.~~

~~2.4 PLASTER MATERIALS~~

~~A. Portland Cement: ASTM C 150, Type II.~~

~~1. Color for Finish Coats: Gray.~~

~~B. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.~~

~~C. Sand Aggregate: ASTM C 897.~~

~~1. Color for Job-Mixed Finish Coats: White.~~

~~D. Ready-Mixed Finish-Coat Plaster: Mill-mixed portland cement, aggregates, coloring agents, and proprietary ingredients.~~

~~1. Products: Subject to compliance with requirements, provide one of the following:~~

~~a. Bonsal American, an Oldcastle Company; Marblesil Stucco Mix.~~
~~b. California Stucco Products Corp.; Conventional Portland Cement Stucco.~~
~~c. El Rey Stucco Company, Inc., a brand of ParexLaHabra, Inc.; Premium Stucco Finish.~~
~~d. Florida Stucco; Florida Stucco.~~
~~e. LaHabra, a brand of ParexLaHabra, Inc.; Exterior Stucco Color Coat.~~
~~f. Omega Products International, Inc.; ColorTek Exterior Stucco.~~
~~g. QUIKCRETE; QUIKCRETE Finish Coat Stucco, No. 1201.~~
~~h. Shamrock Stucco LLC; Exterior Stucco.~~
~~i. SonoWall, BASF Wall Systems, Inc.; Thoro Stucco.~~
~~j. USG Corporation; Oriental Exterior Finish Stucco.~~

~~2. Color: Match Architect's sample and approved submittal.~~

~~2.5 PLASTER MIXES~~

~~A. General: Comply with ASTM C 926 for applications indicated.~~

~~1. Fiber Content: Add fiber only to base coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. (0.6 kg of fiber/cu. m) of cementitious materials.~~

~~a. Fibers: Polypropylene, nylon or alkali-resistant glass fibers.~~
~~b. Use only types specifically manufactured for a stucco basecoat and per manufacturer's recommendations.~~

~~B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:~~

~~1. Portland Cement Mixes:~~

a. ~~Scratch Coat: For cementitious material, mix 1 part portland cement and 3/4 to 1 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.~~
b. ~~Brown Coat: For cementitious material, mix 1 part portland cement and 3/4 to 1 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.~~

~~C. Factory Prepared Finish Coat Mixes: For ready mixed finish coat plasters, comply with manufacturer's written instructions.~~

~~PART 3 - EXECUTION~~

~~3.1 EXAMINATION~~

~~A. Examine areas of Work and associated substrates indicated to receive new finish plastering, with Installer present, for compliance with requirements for finish plaster installation, installation tolerances, and other conditions affecting performance of the Work. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.~~

1. ~~Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.~~

~~B. Proceed with installation only after unsatisfactory conditions have been corrected.~~

1. ~~Installation of products indicates acceptance of surfaces and conditions.~~

~~C. Ensure that Weather Resistive Barrier (WRB), flashings around all openings and Rainscreen assemblies are secure and properly installed prior to installing Portland Cement Plastering (stucco) assembly and stucco trims accessory components. Do not proceed until unsatisfactory conditions have been resolved. Notify Architect of unsatisfactory conditions.~~

~~3.2 PREPARATION~~

~~A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.~~

~~B. Prepare solid substrates for plaster that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.~~

~~C. Flashings shall be installed prior to start of lathing or may be required to be integrated at the time of lathing.~~

~~3.3 INSTALLATION, GENERAL~~

~~A. Fire-Resistance-Rated Assemblies (where indicated for Project): Install components according to requirements for design designations from listing organization and publication (where indicated on Drawings).~~

~~B. Acoustical Sealant: Where required, seal joints between edges of plasterwork and abutting construction with acoustical sealant.~~

~~3.4 INSTALLING METAL LATH~~

~~A. Expanded-Metal Lath: Install according to ASTM C 1063.~~

~~1. Partition Framing and Vertical Furring: Install woven-wire lath.~~
~~2. Flat Ceiling and Horizontal Framing: Install 3/8-inch (9.5-mm) rib lath lath.~~

~~3.5 INSTALLING ACCESSORIES~~

~~A. Install according to ASTM C 1063 and at locations indicated on Drawings.~~

~~B. Reinforcement for External Corners:~~
~~1. Install cornerbead at interior and exterior locations.~~

~~C. Control Joints: Install control joints as indicated on Drawings. When not indicated on Drawings, coordinate locations with Architect for approval prior to installation for visual effect as follows:~~

~~1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:~~

~~a. Vertical Surfaces: 144 sq. ft. (13.4 sq. m).~~
~~b. Horizontal and other Nonvertical Surfaces: 100 sq. ft. (9.3 sq. m).~~

~~2. At distances between control joints of not greater than 18 feet (5.5 m) o.c.~~
~~3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.~~
~~4. Where control joints occur in surface of construction directly behind plaster.~~
~~5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.~~

~~D. Verify that substrate and work by other trades are complete to the point at which installation of trim accessories may properly commence.~~

~~E. Attachments shall be firm enough to hold trim accessories in place without misalignment during plastering.~~

1. ~~Flanges or attachment points of trim accessories shall be secured to substrate in accordance with requirements of manufacturer's approved fasteners and written recommendations and installation instructions.~~

F. ~~Install individual trim accessory sections to each other at end joints for accurate alignment.~~

G. ~~Install trim accessories in a manner that ensures a true, level and plumb stucco surface, and moisture resistant.~~

H. ~~Install the trim accessories in accordance with the required thickness of stucco basecoat and finish coat requirements.~~

I. ~~Install the longest possible length of trim accessory sections.~~

J. ~~The Weather Resistive Barrier (WRB) must continue unbroken behind trim accessory joints in vertical or horizontal direction.~~

~~3.6 PLASTER APPLICATION~~

A. ~~General: Comply with ASTM C 926.~~

1. ~~Do not deviate more than plus or minus 1/4 inch in 10 feet (6.4 mm in 3 m) from a true plane in finished plaster surfaces, as measured by a 10-foot (3-m) straightedge placed on surface.~~
2. ~~Finish plaster flush with casing beads acting as grounds at window and door frames and other built-in items or accessories.~~
3. ~~Provide plaster surfaces that are ready to receive field-applied finishes indicated.~~

B. ~~Walls; Base Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork; 3/4 inch (19 mm) thickness total.~~

1. ~~Portland cement mixes.~~

C. ~~Ceilings; Base Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork; 3/4 inch (19 mm) thick.~~

1. ~~Portland cement mixes.~~

D. ~~Apply stucco first ("scratch") coat in a nominal thickness of 3/8 inch. First coat to completely embed the lath.~~

1. ~~Scoring of the first coat should be uniform and shallow, approximately 1/8-inch.~~
2. ~~Moist cure the first ("scratch") coat for a minimum of 48 hours before application of the second ("brown") coat. First coat to be hard and rigid before receiving the second coat.~~

E. ~~Apply stucco second ("brown") coat in a in a nominal thickness of 3/8 inch over stucco first coat. Second coat thickness to bring the combined basecoats (fist and second) thickness to a nominal thickness of 3/4 inch (19 mm) total thickness.~~

1. ~~Apply second coat over a damp fist coat. If required, apply a fine spray of clean water, so as to dampen only. Do not saturate. Allow water sheen to disappear before applying the second coat.~~
2. ~~Apply the second coat with sufficient material and pressure to ensure a tight uniform bond to the first coat. Apply second coat so as not to deform or crack the first coat.~~
3. ~~Rod the second coat to a true, even plane, filling surface defects with cement plaster.~~
4. ~~Trowel float the second coat surface uniformly. Float the basecoat after it has set and when moisture is still present in it.~~

F. ~~Plaster Finish Coats: Apply to provide sand float texture finish to match Architect's sample and approved submittal.~~

~~3.7 PLASTER REPAIRS~~

A. ~~Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.~~

B. ~~Replace damaged products that cannot be repaired in a manner approved by Architect prior to Substantial Completion.~~

~~3.8 PROTECTION~~

A. ~~Remove temporary protection and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.~~

B. ~~Replace damaged products that cannot be repaired in a manner approved by Architect before time of Substantial Completion.~~

C. ~~Provide protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that products are without damage or deterioration prior to Substantial Completion.~~

D. ~~Remove all debris by work of this Section off site in an approved manner and leave area in a clean an orderly manner.~~

~~END OF SECTION 092400~~

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. General: All labor, surface preparation, application, materials, tools and other equipment, services and supervision required to complete all work as indicated on and to the full extent of the Drawings, specifications, and "Exterior Finish Legend".

B. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Steel and iron.
2. Galvanized metal.
3. Wood.
4. **Fiber-cement board.**

C. Work under this Section shall also include, but not necessarily be limited to, the following:

1. Surface preparation of substrates as required for acceptance of painting, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to the limits defined under *MPI* preparation requirements.
2. Specific pre-treatments noted herein or specified in the *MPI* Architectural Painting Specification Manual.
3. Priming and painting of structural steel, miscellaneous metal, ornamental metal and primed steel equipment (except where pre-primed with an approved primer under other Sections of work).
4. Priming and back-priming of wood materials as noted herein or specified in the *MPI* Architectural Painting Specification Manual.
5. Painting of all semi-concealed areas (e.g. inside of light troughs and valances, behind grilles, and projecting edges above and below sight lines).
6. Refer to Mechanical, Plumbing, Electrical, and Fire Suppression Design-Build Drawings and Specifications (by others and under separate cover) for painting requirements, if any, for exposed plumbing, heating, fire protection, and electrical elements.

    a. All louvers and grilles to be painted to match adjacent surfaces.
    b. Labels: Do not paint over Underwriter's Laboratories, FMG or other code-required labels, or equipment name, identification, performance rating, or nomenclature plates.

7. Provision of safe and adequate ventilation as required over and above temporary ventilation supplied by others, where toxic and/or volatile / flammable materials are being used.
8. Refer to and coordinate with Drawings, specifications and "Interior Finish Legend" for location of finishes required, and include all touch-ups and field painting necessary to complete work shown, scheduled or specified.

D. NOTE: This specification Section is intended as a generic performance specification. Refer to Drawings and the approved submittal (which shall take precedence) for the following:

1. Areas to receive product(s) specified in this specification Section.
2. Product materials.
3. Manufacturer.
4. Color selections.
5. Gloss levels.

E. Related Requirements:

1. Division 05, Section "Metal Fabrications" for shop priming metal fabrications.
2. Division 06, Section "Exterior Finish Carpentry" for standing and running wood trim surface preparation, priming, and coating(s).
3. Division 07, Section "Fiber-Cement Siding" for exterior cladding surface preparation, priming, and coating(s).
4. Division 07, Section "Sheet Metal Flashing and Trim" for specialty finishes.
5. Division 07, Section "Joint Sealants".
6. ~~Division 08, Section "Hollow Metal Doors and Frames" for surface preparation, priming, and coating(s).~~ (DELETE)
7. ~~Division 09, Section "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on exterior wood substrates.~~ (DELETE)

1.3 REFERENCES

A. The latest edition of the following reference standards shall govern all painting work:

1. Architectural Painting Specification Manual by the Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List (hereafter referred to as the MPI Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
2. Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

1.4 DEFINITIONS

A. "Paint" includes coating systems materials, primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

B. Master Painters Institute (MPI): Definitions of MPI Gloss Levels below are from "MPI Architectural Painting Specification Manual" (hereafter, "MPI Manual").

C. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523. MPI Gloss Standard Description: A traditional "matte" finish – flat.

D. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523. MPI Gloss Standard Description: A traditional "egg-shell" finish.

E. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523. MPI Gloss Standard Description: A "satin-like" finish.

F. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523. MPI Gloss Standard Description: A traditional "semi-gloss" finish.

G. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523. MPI Gloss Standard Description: A traditional "gloss" finish.

H. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523. MPI Gloss Standard Description: A traditional "high gloss" finish.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site with Installer present.

1.6 SUBMITTALS, GENERAL

A. All submittals shall be in accordance with the requirements of Division 01, Section "Submittal Procedures".

1. Do not proceed with final painting until samples and mock-ups, when required, are approved.

1.7 ACTION SUBMITTALS

A. Product Data: For each specific type of product being provided and installed for this Project. Include preparation requirements and application instructions.

1. Include printout of current "*MPI* Approved Products List" for each product category specified, with the proposed product highlighted.
2. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8-inches (200 mm) square.
2. Apply coats on Samples in steps to show each coat required for system.

3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1. Printout of current "*MPI* Approved Products List" for each product category being provided, with the proposed product highlighted.
2. VOC content of each schedule product.

E. Painting Schedule: In a form similar to the schedule indicated outlining the type of paint to be used for each category, application, and color. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

1.8 INFORMATIONAL SUBMITTALS

A. Certifications: Manufacturer's statement that paint materials conform to current regulations relating to lead content and air pollution emission requirements.

B. Submit Material Safety Data Sheets (MSDS) prior to commencement of work and for posting at job site as required.

C. When or if requested by the General Contractor, Architect or Owner, submit work schedule for various stages of work when painting occupied areas for the Architect's review and Owner's approval.

D. Sample Warranty: For Painting Contractor (Installer) warranty. Upon final completion of the work, a signed and dated warranty shall be included in the Project's warranty manual.

1.9 WARRANTY

A. The Painting Contractor (Installer) shall provide a signed and dated written warranty that will guarantee to the Owner to appropriately repaint work provided due to product and/or workmanship failure, at no added cost to the Owner, for a period of:

1. Two (2) years from date of Substantial Completion.

1.10 CLOSEOUT SUBMITTALS

A. Maintenance and Product Data: Provide manufacturer's written recommended maintenance data and product data for each type of paint or stain indicated, including methods for maintaining as well as precautions for use of cleaning materials and methods that could be detrimental to finishes and performance. Include in operation and maintenance manuals.

B. Warranties: Include warranty in Project warranty manual.

C. Upon completion of work of this Section, provide Owner with all maintenance materials from work of this Section that are packaged with protective covering for Owner's storage and identified with labels describing contents.

1.11 MAINTENANCE MATERIAL SUBMITTALS

A. At project completion, furnish extra materials (including full unopened cans of surplus paint), from the same product run (batch mix), that match products installed and that are packaged with protective covering for storage and identified for Owner's later us in maintenance that are properly labeled describing contents. Store where indicated by Owner.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.12 QUALITY ASSURANCE

A. Installer Qualifications: An entity with not less than five (5) years of successful experience in installation of specified product(s) that employs installers and supervisors who are competent in techniques required by manufacturer.

1. Engage an installer who employs workers for this Project who are trained or certified by specified paint or stain manufacturer for installation techniques required.

B. Single-Source Responsibility: Obtain each type, color and finish of specified products and accessories from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the work.

C. Coordination of Work: Review Sections in which primers are provided to ensure compatibility of the total systems for various substrates.

D. Material Quality: Provide the manufacturer's best quality trade sale type paint material of the various types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable. Proprietary names used to designate colors or materials are not intended to imply that products named are required or to exclude of equal products of other manufacturers.

E. All materials, preparation and workmanship shall conform to requirements of the latest edition of the Architectural Painting Specification Manual by the Master Painters Institute (*MPI*) (hereafter referred to as the *MPI* Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.

1. Unless otherwise specified herein, all painting work shall be in accordance with *MPI* premium Grade finish requirements.

F. All paint manufacturers and products used shall be as listed under the Approved Product List section of the *MPI* Painting Manual, unless otherwise indicated or approved.

1. All such material shall be from a single manufacturer for each system used.

2. Other materials such as linseed oil, shellac, thinners, solvents, etc. shall be the highest quality product and shall be compatible with paint materials being used as required.
3. All materials used shall be lead and mercury free and shall have low VOC content where possible.
4. Where required, use only materials having a minimum *MPI* "Environmentally Friendly" rating based on VOC (EPA Method 24) content levels.

G. Where "special" painting, coating or decorating system applications (i.e. non-*MPI* listed products or systems) are to be used, the paint or coating manufacturer shall provide as part of this work, certification of all surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to the Owner.

H. The Painting Contractor (Installer) shall receive written confirmation of the specific surface preparation procedures and primers used for all fabricated steel items from the fabricator / supplier to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.

I. All paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes, sags, air entrapment, etc.

J. Unless otherwise specified herein or pre-approved, all paint shall be ready-mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.

K. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect and Owner will select surfaces to represent surfaces and conditions for application of each paint system.

    a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
    b. Other Items: Architect and Owner will designate items or areas required.

2. Final approval of color selections will be based on mockups.

    a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect and Owner at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect and Owner specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.13 DELIVERY, STORAGE, AND HANDLING

A. Deliver all painting materials in sealed, original labeled containers bearing manufacturer's name, brand name, type of paint or coating and color designation, standard compliance, materials content as well as mixing and/or reducing and manufacturer's instructions and application requirements.

1. Product Name or Title of Material.
2. Product Description (Generic Classification or Binder Type).
3. Manufacturer's Stock Number and Date of Manufacture.
4. Contents by Volume, for Pigment and Vehicle Constituents.
5. Thinning Instructions.
6. Application Instructions.
7. Color Name and Number.
8. VOC Content.

B. Approved materials without the above information will NOT be allowed on the Project Site.

C. Store all paint materials in original labeled containers in a secure (lockable), dry, heated and well ventilated single designated area meeting the minimum requirements of both paint manufacturer and authorities having jurisdiction and at a minimum ambient temperature of 45 deg F (7 deg C). Only material used on this project to be stored on site.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.
3. Take all necessary precautionary and safety measures to prevent fire hazards and spontaneous combustion and to protect the environment from hazard spills. Materials that constitute a fire hazard (paints, solvents, drop clothes, etc.) shall be stored in suitable closed and rated containers and removed from the site on a daily basis.

D. Where toxic and/or volatile / explosive / flammable materials are being used, provide adequate fireproof storage lockers and take all necessary precautions and post adequate warnings (e.g. no smoking) as required.

E. Comply with requirements of Authorities Having Jurisdiction (AHJ), in regard to the use, handling, storage and disposal of hazardous materials.

1.14 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

C. Conduct all moisture tests using a properly calibrated electronic Moisture Meter.

1.15 WASTE MANAGEMENT AND DISPOSAL

A. Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Obtain information on these controls from applicable State and Local government Authorities Having Jurisdiction (AHJ).

B. All waste materials shall be separated and recycled. Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility. Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

C. Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

D. To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:

1. Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.
2. Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
3. Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
4. Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
5. Empty paint cans are to be dry prior to disposal or recycling (where available).
6. Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

E. Set aside and protect surplus and uncontaminated finish materials not required by the Owner and deliver or arrange collection for verifiable re-use or re-manufacturing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, the available manufacturers' offering products that may be incorporated into the Work, except where noted otherwise, all finishing materials, thinners, etc., shall be the best quality, first line materials as manufactured by one of the following manufacturers:

1. Sherwin-Williams Company (The).
2. Benjamin Moore & Co.
3. Glidden Professional.
4. Miller Paint.
5. Rodda Paint. Co.

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Exterior Painting Schedule for the paint category indicated.

1. Basis-of-Design:

a. Manufacturer: Sherwin-Williams Company (The).
b. Product: Sherwin Williams Exterior Latex Primer at all surfaces to receive paint.
c. Product: Sherwin Williams SuperPaint, Exterior Latex Satin at all exterior locations, except exterior doors.
d. Product: Sherwin Williams Pro Industrial DTM Acrylic, Semi-Gloss paint at all exterior metal door and door frame surfaces.

2. Acceptable manufacturers with an equal or better product from one of the following:

a. Benjamin Moore & Co.
b. Glidden Professional.
c. Miller Paint.
d. Rodda Paint. Co.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. VOC Content: When the Project uses the following materials, those materials shall comply with the field applications, paints and coatings, and shall not exceed the VOC content limits of Authorities Having Jurisdiction (AHJ) and the following maximum VOC content limits:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 100 g/L.
3. Dry-Fog Coatings: 150 g/L.
4. Industrial Maintenance Coatings: 250 g/L.
5. Pretreatment Wash Primers: 420 g/L.
6. Primers, Sealers, and Undercoaters: 100 g/L.
7. Recycled Coatings: 250 g/L.
8. Rust-Preventive Coatings: 250 g/L.

C. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

D. Colors: ~~As indicated on "Exterior Finish Legend" on Drawings~~. (DELETE) **To be Determined.**

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. DO NOT commence the Work of this Section until the exterior paint submittal and mock-ups, specific locations, and colors have been reviewed and approved by the Architect.

B. Prior to commencement of the Work of this Section, thoroughly examine (and test as required) all substrates and conditions scheduled to be painted or receive coatings, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

1. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

C. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Wood: 15 percent.
2. Portland Cement Plaster: 12 percent.
3. Gypsum Board: 12 percent.
4. **Fiber-Cement Board: 12 percent.**

D. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

E. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

G. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations for preparation and workmanship in "*MPI* Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove and securely store all hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, carefully clean and replace all hardware, covers, plates, and similar items, using workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any. Do not use solvent or reactive cleaning agents on items that will mar or remove finishes.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel and Iron Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 3: Power Tool Cleaning.

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

G. Aluminum Substrates: Remove loose surface oxidation.

H. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

I. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Paint entire exposed surface of window frames and sashes.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Do not paint unless substrates are acceptable and/or until all environmental conditions (heating, ventilation, lighting and completion of other sub-trade work) are acceptable for applications of products.

E. Apply paint and coatings within an appropriate time frame after cleaning when environmental conditions encourage flash-rusting, rusting, contamination or the manufacturer's paint specifications require earlier applications.

F. Apply paint only to dry, clean, properly cured and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces.

G. Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.

H. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

I. Apply one (1) coat of specified primer at all exterior wall surfaces to receive paint.

J. Apply two (2) coats of specified top coat paint at all exterior wall surfaces to receive paint.

K. Apply two (2) coats of specified top coat paint at all exterior metal and metal frames.

L. Protect all adjacent surfaces and areas, including rating and instruction labels on doors, frames, equipment, piping, etc., from painting operations and damage with drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by fail to provide protection.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Steel and Iron Substrates:

1. Water-Based Light Industrial Coating System MPI EXT 5.1C:

a. Prime Coat: Shop primer specified in Section where substrate is specified.
b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
c. Topcoat: Light industrial coating, exterior, water based, gloss (MPI Gloss Level 6), MPI #164.

B. Galvanized-Metal Substrates:

1. Alkyd System MPI EXT 5.3B:

    a. Prime Coat: Primer, galvanized, cementitious, MPI #26.
    b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
    c. Topcoat: Alkyd, exterior, gloss (MPI Gloss Level 6), MPI #9.

C. Wood Substrates: (Location(s): Wood siding, trim, architectural woodwork.)

1. Water-Based Light Industrial Coating System MPI EXT 6.3J:
    a. Prime Coat: Primer, alkyd for exterior wood, MPI #5.
    b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
    c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), MPI #163.

D. Cement Board Substrates: (Location: Vertical Surfaces, including horizontal soffits where painted finish is specified)

1. Latex System MPI EXT 3.3A:

a. Prime Coat: Latex, exterior, matching topcoat.
b. Intermediate Coat: Latex, exterior, matching topcoat.
c. Topcoat: Latex, exterior, low sheen (MPI Gloss Level 3-4), MPI #15.

END OF SECTION 099113

SUBSTITUTION REQUEST

(During the Bidding/Negotiating Stage)

Project: BSD International School of Beaverton Roof Project

Substitution Request Number:

From: Cam Jack

To: Beaverton School District #48 - contracts@beaverton.k12.c

Date: March 02, 2021

A/E Project Number:

Re:

Contract For: contracts@beaverton.k12.or.us

Specification Title: TPO MEMBRANE ROOFING

Description: Manufacturer

Section: 075423 Page: 6

Article/Paragraph: 2.2 / Products

Proposed Substitution: Carlisle SynTec: Sure-Weld 60 mil TPO M.F. Roofing System

Manufacturer: Carlisle Syntec Address: Carlisle, PA 17013 Phone: 800-479-6832

Trade Name: Carlisle Syntec Systems Model No.:

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: Cam K. Jack

DocuSigned by:

Signed by: Cam K. Jack

Firm: Harper Winn, Inc.

EBE232FFF993415...

Address: 2327 W Commodore Way, Seattle WA 98199

Telephone: (541)-543-7179 / Email: cam@harperwinn.com

A/E's REVIEW AND ACTION

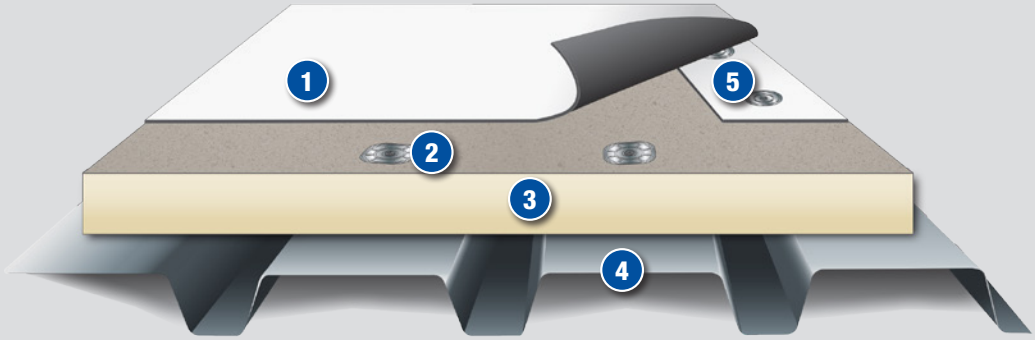
☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☒ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date: 3/5/2021

Supporting Data Attached: ☐ Drawings ☑ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

CARLISLE SYNTEC SYSTEMS

Sure-Weld® TPO
Mechanically Fastened Roofing Systems



1. Sure-Weld TPO Reinforced Membrane
2. Carlisle Insulation Fasteners and Plates
3. Acceptable Insulation
4. Approved Roof Deck
5. Membrane Fasteners and Plates

Sure-Weld Membrane for Mechanically Fastened Systems is available in the following:

Color	White, Gray, and Tan
Thicknesses (mils)	45, 60, and 80
Standard Widths	4', 6', 8', 10', and 12'
Standard Lengths	100'

System Features & Benefits:

- Heat-weldable membranes
- High wind uplift performance
- Resistance to hail and accidental punctures
- Top ply membrane thickness adds improved long-term weatherability and durability
- White and tan membranes are ENERGY STAR® qualified
- OctaGuard XT™ weathering package provides superior long-term performance

	New Construction						Re-roofing		
Existing or New Deck Type	**Steel**	**Plywood or OSB**	**Lt. Wt. Concrete**	**Structural Concrete**	**Wood Planks**	**Gypsum & Fibrous Cement**	**Smooth-Surface BUR**	**Gravel-Surfaced BUR**	**Existing Single-Ply**
Insulation Required	Yes	No	Refer to Specs**	No	Yes	Yes	No	Yes	Refer to Specs**
Recommended Insulations	Approved Carlisle insulation or cover board								
Insulation Attached By	Carlisle fasteners and plates								
Membrane Attached By	HPX Fasteners/ Piranha Plates; HPXTRA Fast/Piranha XTRA Plate	HPX Fasteners/ Piranha Plates; HPXTRA Fast/Piranha XTRA Plate	Gyptec Fasteners/ Plates	CD-10/ Piranha Plates; HD 14–10 Fasteners/ Piranha Plates	HPX Fasteners/ Piranha Plates	Gyptec Fasteners/ Plates			

FOR TEAR-OFF OPTIONS REFER TO NEW CONSTRUCTION ABOVE.

For current code approvals and warranties, visit Carlisle's website or contact a design analyst.

** Refer to Carlisle's Sure-Weld Design Criteria Portion of the Current Specification.

CARLISLE SYNTEC SYSTEMS

Sure-Weld® TPO
Mechanically Fastened Roofing Systems

Sure-Weld TPO Membrane

Carlisle's Sure-Weld TPO is a premium, heat-weldable, single-ply thermoplastic polyolefin membrane, engineered to provide outstanding long-term performance in new roof construction and re-roofing applications. All Sure-Weld TPO membranes utilize the patented OctaGuard XT weathering package technology, which is able to withstand extreme durability testing intended to simulate exposure to several climates.

Sure-Weld TPO Accessories

Carlisle also offers over a dozen prefabricated, in-stock, standard-order accessories, and countless custom-order accessories. All carry a CFA (Certified Fabricated Accessory) stamp of approval, so you know they are manufactured to the highest standards. Every Carlisle CFA-approved accessory saves time and money during installation.

Installation

Carlisle's Sure-Weld TPO Mechanically Fastened Roofing System utilizes white, gray or tan membranes in standard reinforced 45- or 60-mil thicknesses or 80-mil-thick reinforced Sure-Weld EXTRA membranes.

Insulation is mechanically fastened to an acceptable roof deck. Sure-Weld membrane sheets are mechanically fastened to the deck with appropriate Carlisle fasteners and plates. Adjoining sheets are overlapped and joined together with a minimum 1½"-wide hot-air weld.

The above information represents a typical Carlisle Sure-Weld TPO Mechanically Fastened Roofing System. Refer to Carlisle's published specifications and details for more complete information.

Optional APEEL Protective Film

- APEEL Protective Film guards the TPO membrane's surface from scuffs and dirt accumulation during installation, improving the roof system's appearance and long-term performance
- APEEL Protective Film can be left in place for up to 90 days without degrading due to its excellent heat-and UV-resistance

APEEL PROTECTIVE FILM

System Codes

- UL Class A, B, and Universal Slope ratings are available over any deck type
- FM Uplift values of up to 135 psf can be achieved

For code specifics, refer to Carlisle's Sure-Weld Code Approval Guide.

Inspection

Upon installation completion, and prior to the issuance of a membrane system warrranty, an inspection will be conducted by a Carlisle Field Service Representative.

Warranty

Consult your Authorized Applicator or Carlisle Manufacturer's Representative/Distributor for associated warranty charges.

This system, properly installed and inspected on a commercial project, may receive:

- A 10-, 15-, or 20-year Total System Warranty when all materials used for the roofing installation are manufactured or marketed by Carlisle
- A 25- or 30-year Golden Seal Warranty with 80-mil Sure-Weld EXTRA membranes
- 55 mph maximum peak gust wind speed coverage is standard; higher wind speed warranties available upon review by Carlisle
- A 10-year Reflectivity Warranty (based on ENERGY STAR qualifications) with white membranes
- Available Puncture Warranty with Sure-Weld 80-mil EXTRA membranes

For more specifics or for International warranty programs, contact Carlisle.

Certified Fabricated Accessory

CLASSIFIED UL

ENERGY STAR

FM APPROVED

800-479-6832 | P.O. Box 7000 | Carlisle, PA 17013 | Fax: 717-245-7053 | **www.carlislesyntec.com**

CARLISLE SYNTEC SYSTEMS

Sure-Weld® TPO
Roofing Systems

TPO Competitive Test Programs

Summary of Results

Architectural Testing

All testing was conducted by an independent laboratory.

Carlisle chose to utilize an independent laboratory to conduct all testing to add credibility to the study. Membrane was purchased from various sources but was always acquired through the same channel a roofing contractor would use. One roll of each competitor's membrane was selected and various samples were cut from these rolls.

The Tests

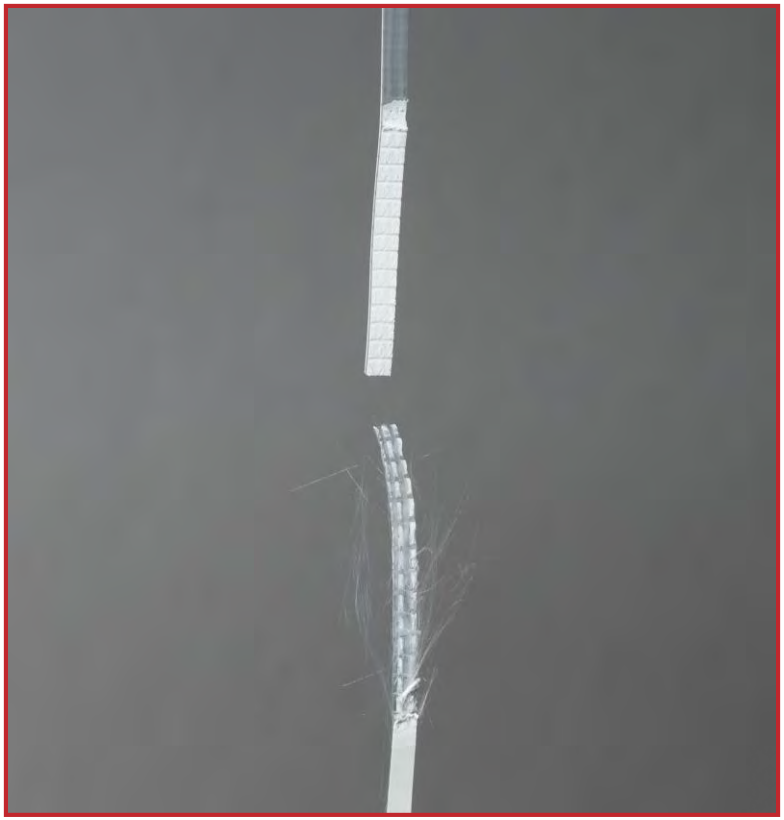
- Seam Strength
- Flexibility
- Weldability
- Breaking Strength
- Tearing Strength
- Thickness Over Scrim
- Puncture Resistance
- Chemical Analysis
- Heat Aging @ 240°F

This list represents the actual physical properties that were evaluated. Each of these physical properties affects the service life of the roofing system in some way.

Seam Strength

Seam Peel Strength Test

Seam Strength



Desired Mode of Failure
During Seam Peel Strength
Test – Ply-to-Ply Separation

Seam Strength

Simulated Wind Uplift Test - The stronger the seam, the greater the uplift resistance.

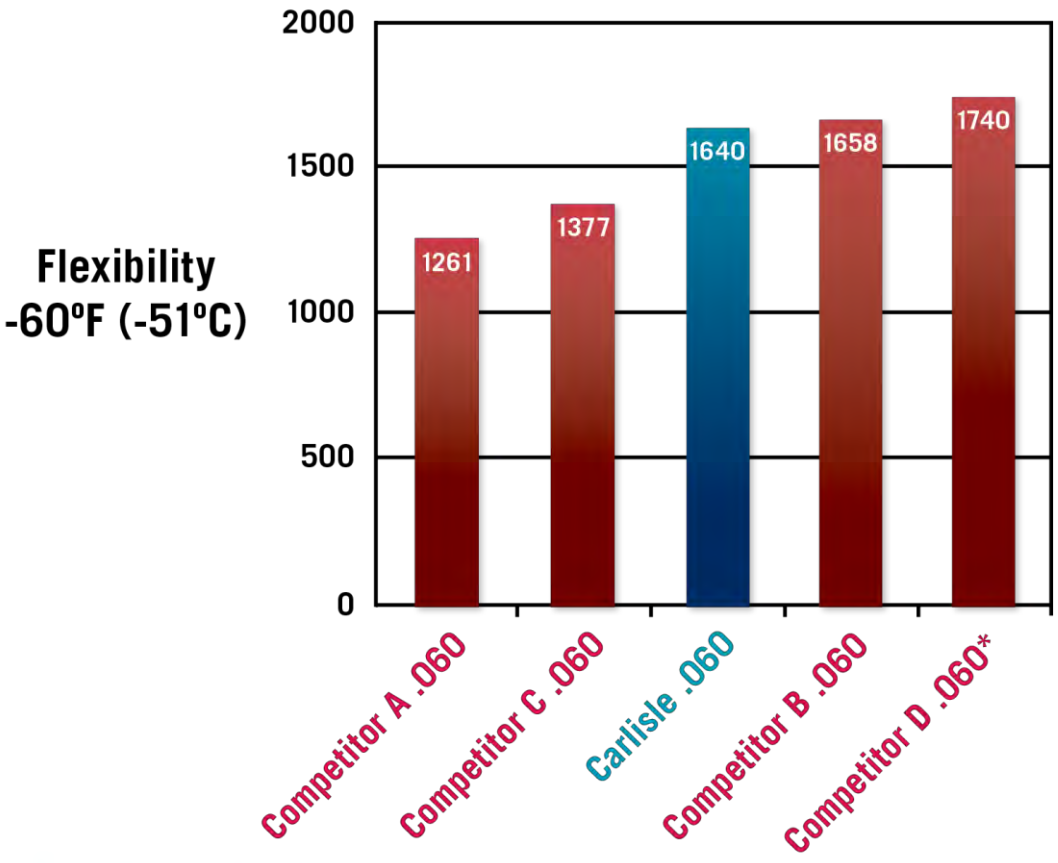
Seam Strength

SEAM STRENGTH MEASURED IN LBF/IN

	Carlisle				Competitor A				Competitor B			
Speed Ft/M	7.9	10.5	13.5	16.1	7.9	10.5	13.5	16.1	7.9	10.5	13.5	16.1
806°F	61	65	64	65	35	40	38	43	57	60	57	58
1004°F	62	64	68	62	39	44	39	38	60	60	58	58
1148°F	65	64	68	66	41	39	38	43	65	61	56	57

A chain is only as strong as its weakest link. It is extremely important that the seam of a TPO roofing system does not become that weak link. If welded properly the seam areas should be stronger than the sheet itself. A wide range of weldability will help ensure a solid seam at various temperatures and conditions without adjusting speeds and temperatures of the welder.

Flexibility



In a recent survey contractors listed ease of installation as the physical characteristic that they use most often to determine which membrane they prefer to install. Ease of installation is defined in part by flexibility. The more flexible the membrane, the easier it is to complete details and install the membrane.

*Competitor D is a premium-priced product compared to the other 4 samples.

Window of Weldability

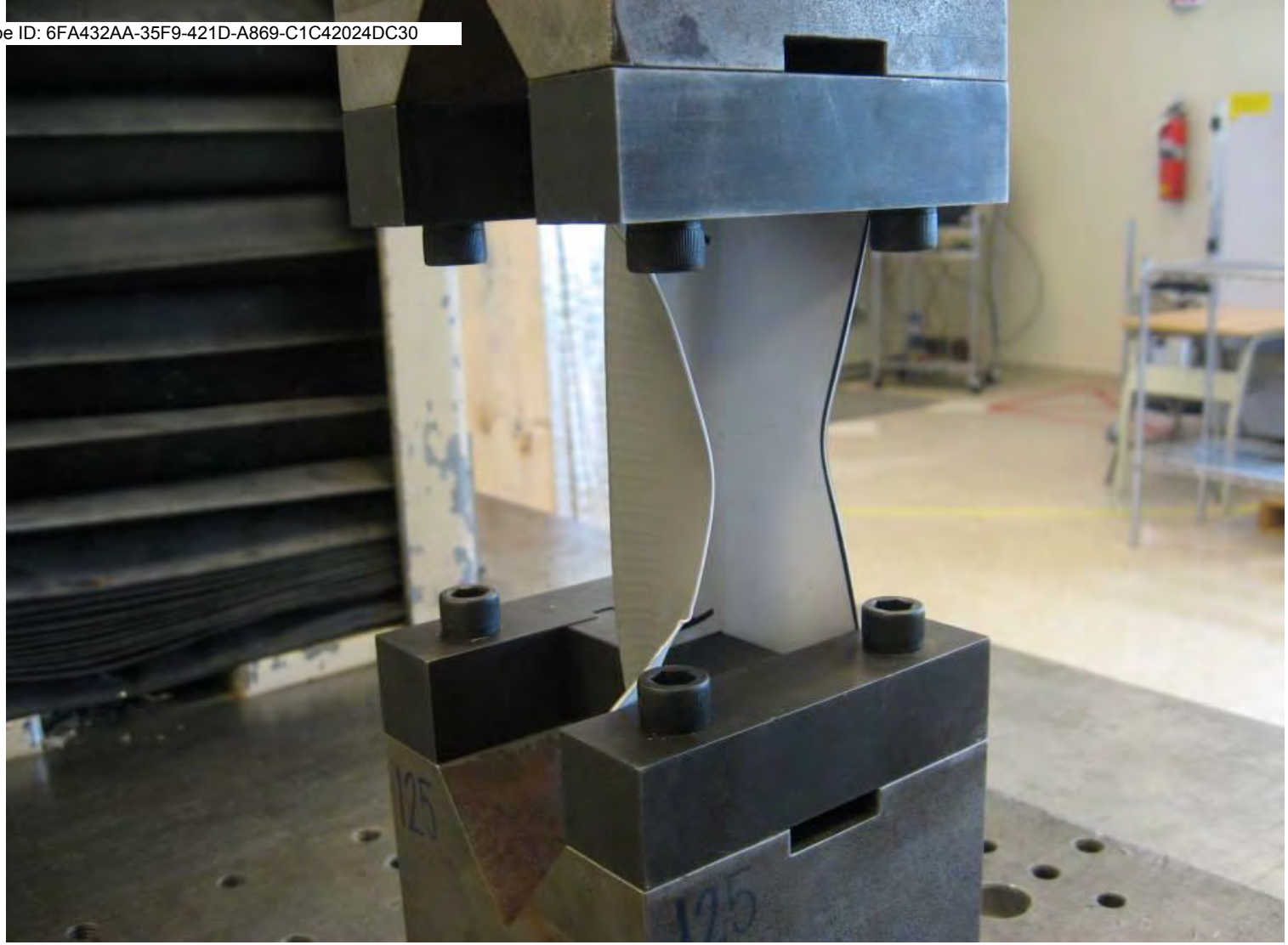
SEAM STRENGTH MEASURED IN LBF/IN

	Carlisle				Competitor A				Competitor B			
Speed Ft/M	7.9	10.5	13.5	16.1	7.9	10.5	13.5	16.1	7.9	10.5	13.5	16.1
806°F	61	65	64	65	35	40	38	43	57	60	57	58
1004°F	62	64	68	62	39	44	39	38	60	60	58	58
1148°F	65	64	68	66	41	39	38	43	65	61	56	57

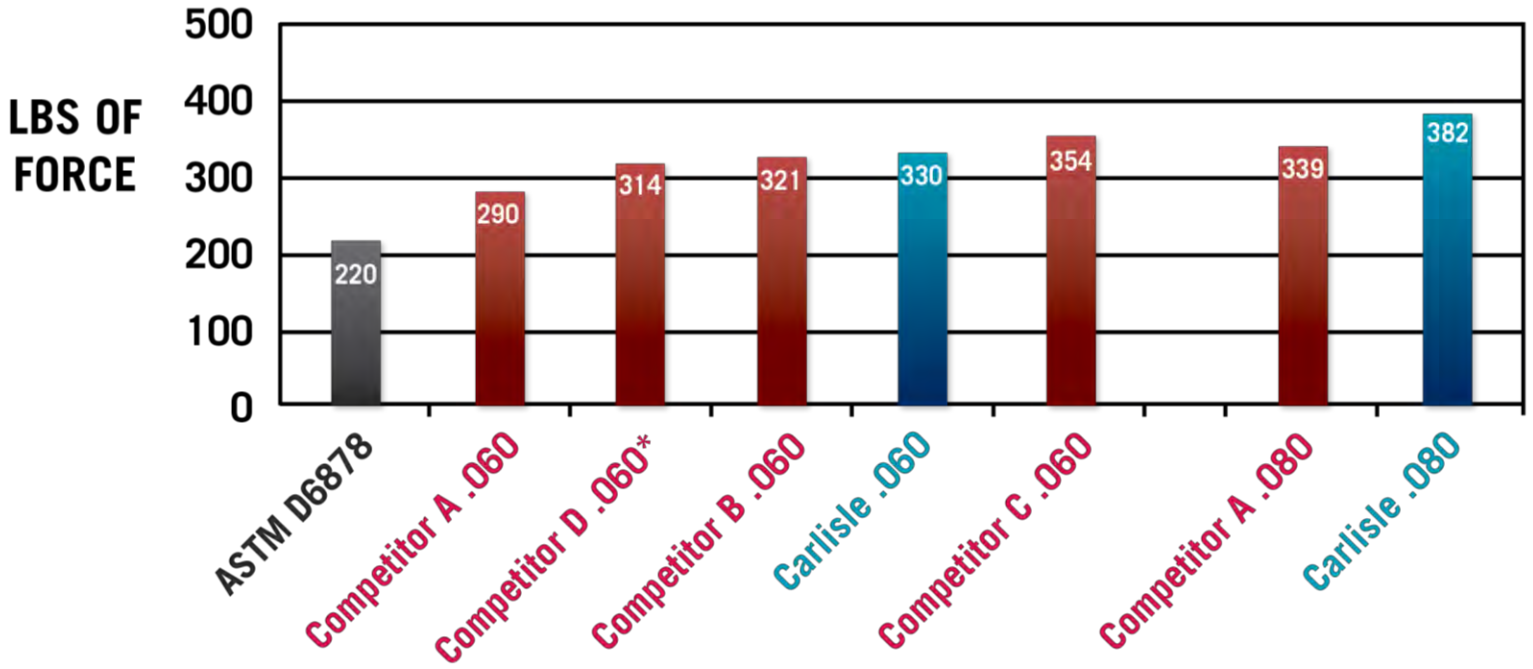
A wide window of weldability will help ensure a solid seam is created at various ambient temperatures and weather conditions without adjusting speeds and temperatures of the welder. In addition to more consistent seaming, a wide window of weldability provides labor savings and an easier to install roofing system

Breaking Strength

Breaking Strength Test



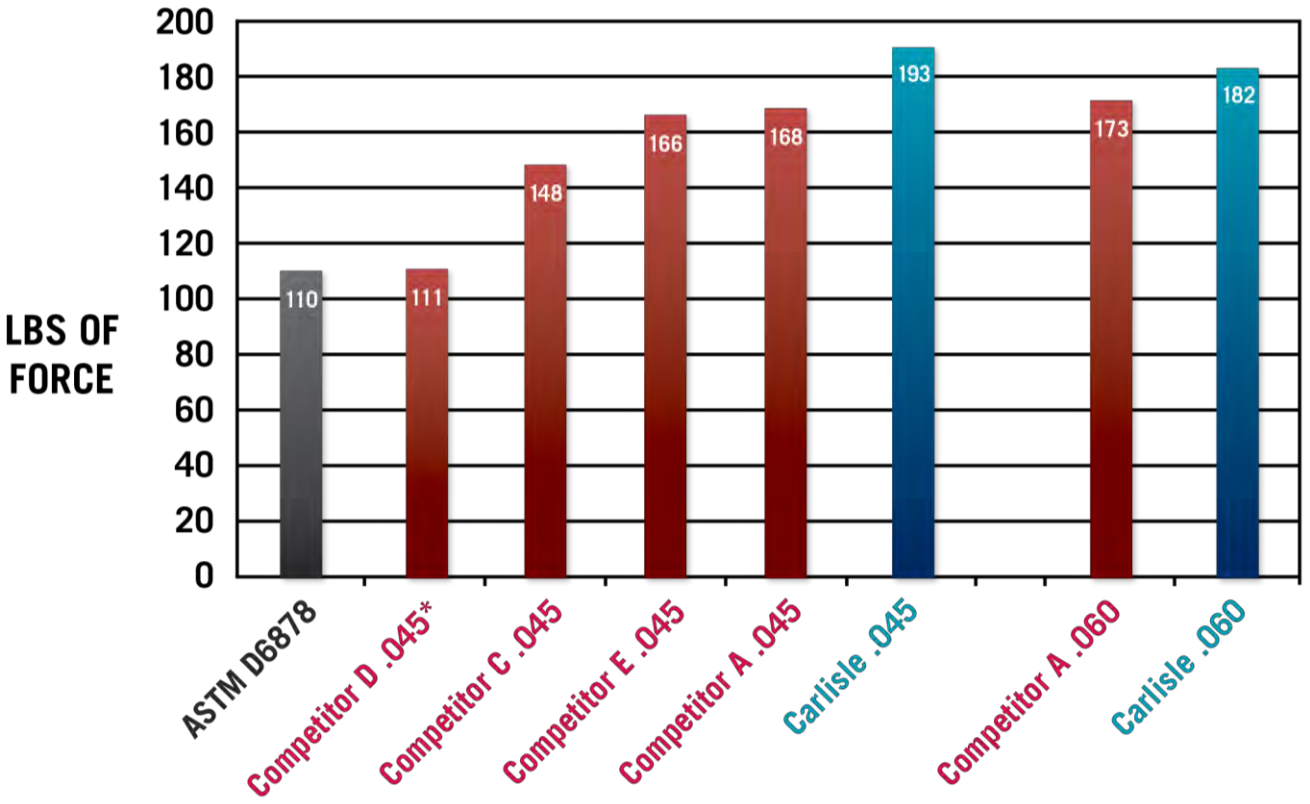
Average Breaking Strength



A majority of TPO roofing systems that are installed are mechanically fastened to the roof deck. Breaking strength is a critical measurement of a sheet's strength if the membrane is ever subjected to extreme forces, such as excessive wind, against the fasteners that hold it in place. The ASTM breaking strength test consists of a machine pulling the membrane in opposite directions and recording the amount of force necessary to create membrane failure. This test is performed both across the sheet (cross direction) and lengthwise (machine direction). The numbers above represent the average of the machine and cross direction results.

*Competitor D is a premium-priced product compared to the other 4 samples.

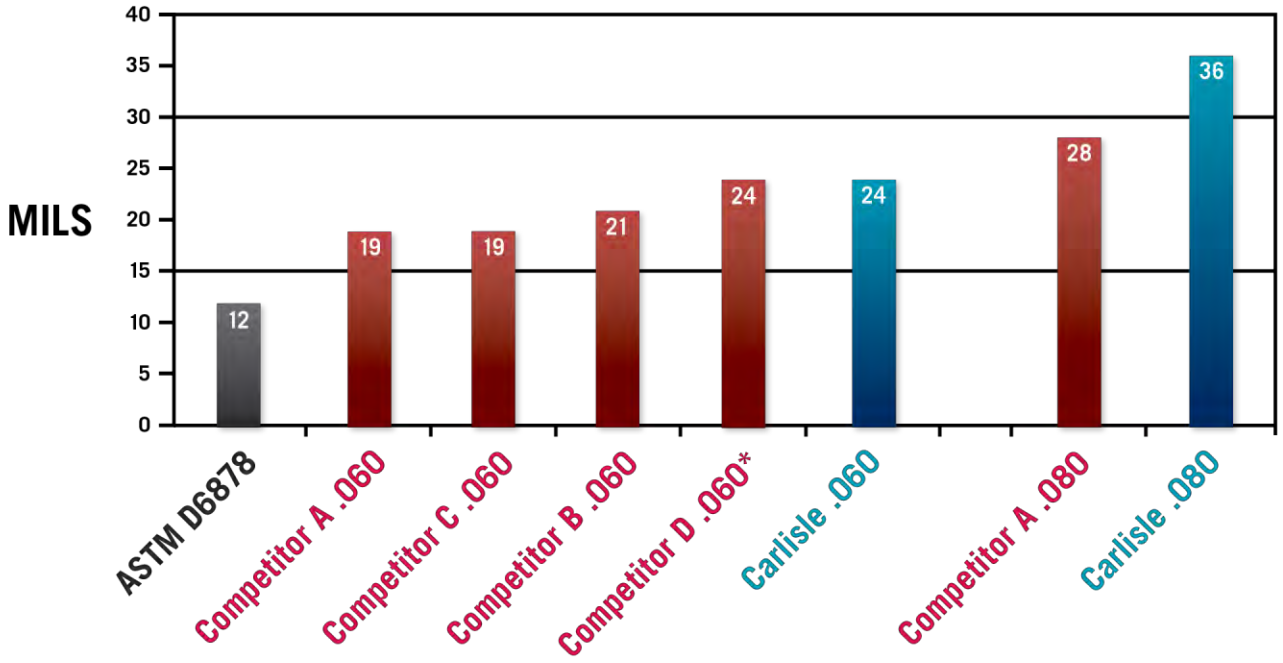
Tearing Strength



Tearing strength is very similar to breaking strength and its importance is just as critical. Tearing strength is a measurement of how much force is required to rip the membrane from the edge, as opposed to breaking strength which involves pulling opposite ends of the sheet in different directions. Tearing strength results are also measured by adding the results of the force required to tear the sheet both across and down the sheet. The main benefit to a high tearing strength value is experienced when a small cut in the membrane occurs. By having high tearing strength a small cut is less likely to become a large tear, which can lead to excessive damage.

*Competitor D is a premium-priced product compared to the other 4 samples.

Thickness Over Scrim

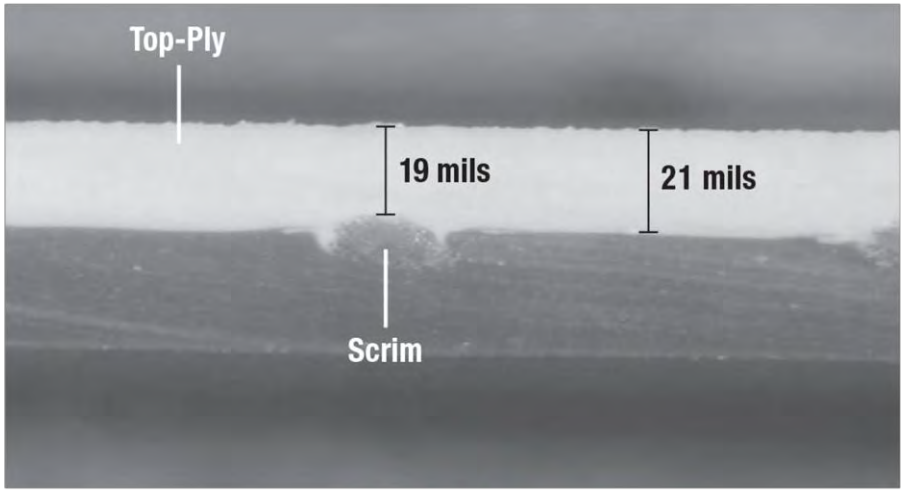


While it's important to have a thick sheet, which is measured in the "Thickness Overall" test, "Thickness Over Scrim" measures the top-ply of the TPO membrane. TPO consists of a top-ply, scrim in the middle and a bottom ply. The top-ply is the front line of defense against the elements and the usable life of the membrane is compromised when the scrim is exposed. Thickness over scrim is a critical measurement when evaluating the potential longevity of a TPO roofing system.

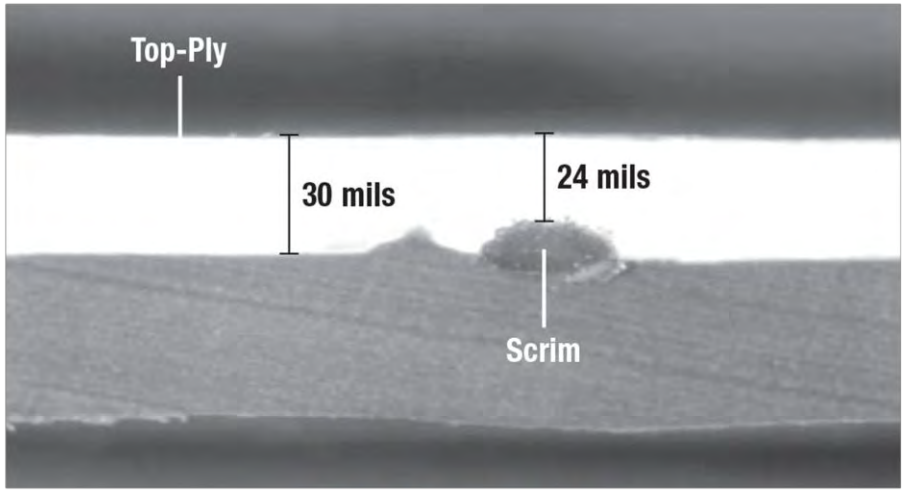
*Competitor D is a premium-priced product compared to the other 4 samples.

Thickness Over Scrim

CROSS-SECTION OF TPO MEMBRANE



Competitor B



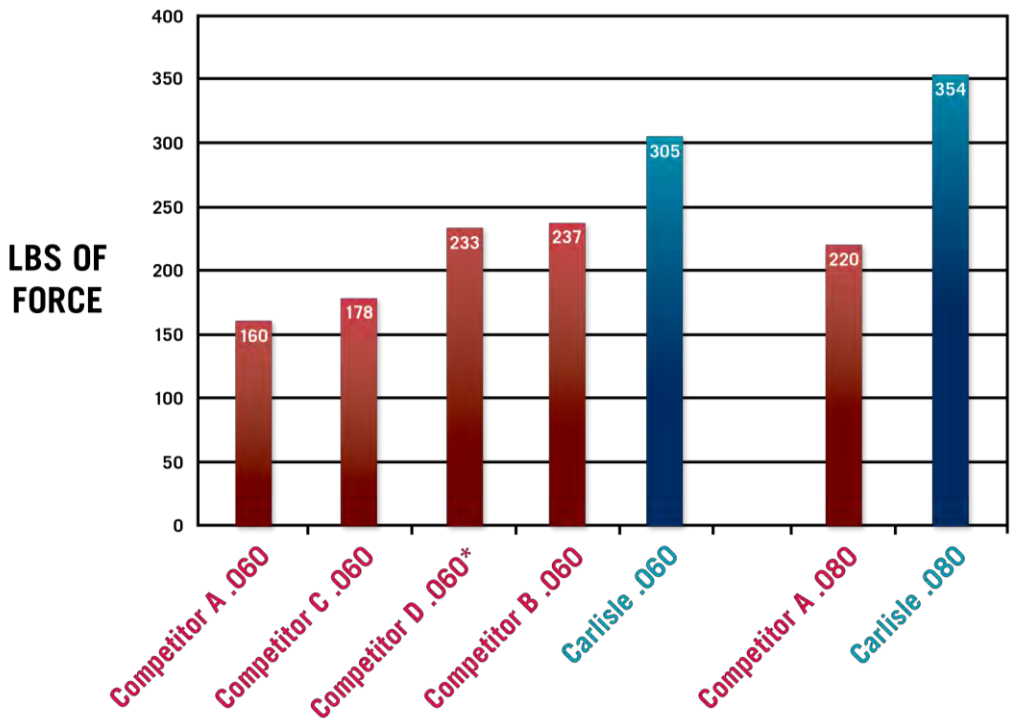
Carlisle Sure-Weld TPO

The top-ply of your TPO membrane is the first line of defense your building has against harmful weather. Thickness over scrim measurements can be misleading if the scrim is not properly embedded in the top and bottom ply.

Puncture Resistance

There are many reasons to have a membrane with high puncture resistance.

Puncture Resistance



On a properly installed TPO roofing system a common way for leaks to occur is through punctures in the membrane. By ensuring that the membrane installed has high puncture resistance and the manufacturer has the ability to provide an accidental puncture warranty, leaks due to punctures in the membrane can be mitigated and handled in a timely manner.

*Competitor D is a premium-priced product compared to the other 4 samples.

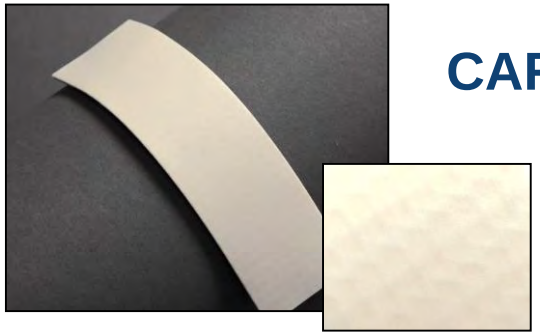
Carlisle Offers a Superior Weathering Package in Every TPO Membrane it Offers

OCTAGUARD XT™
WEATHERING PACKAGE

OctaGuard XT is comprised of 8 Heat and UV stabilizers as well as antioxidents.

ASTM Has Increased The Requirement For Heat Aging

- ASTM 2009 minimum 4 weeks @ 240°F
- ASTM 2012 minimum 32 weeks @ 240°F

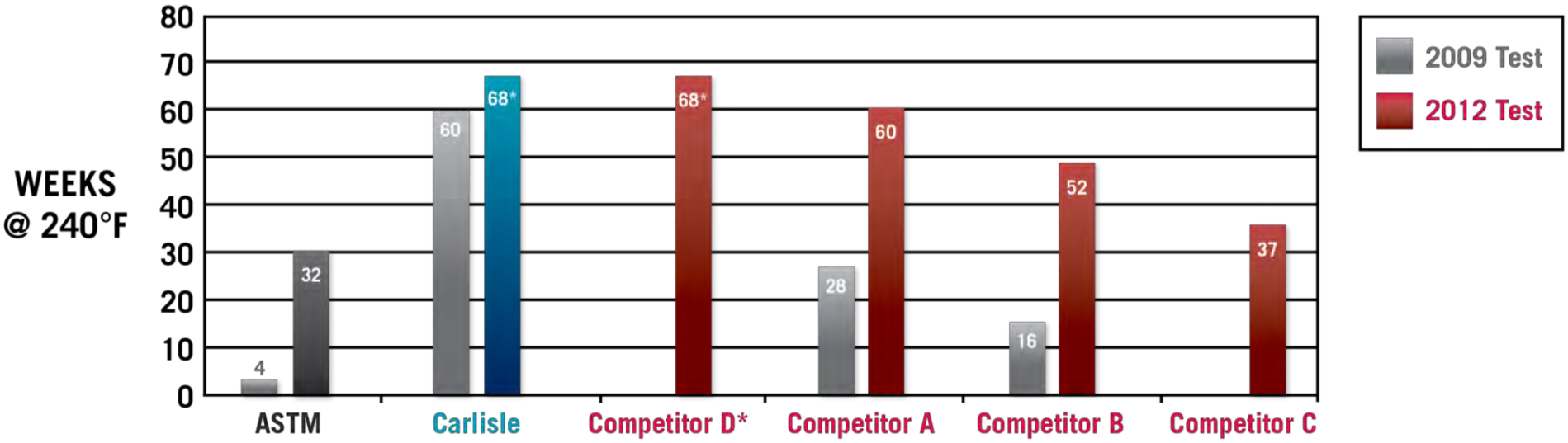


CARLISLE - 68 WEEKS No Failure

OCTAGUARD XT™
WEATHERING PACKAGE

*32 weeks @ 240° F = 20 years @ 185° F for 6 hours per day

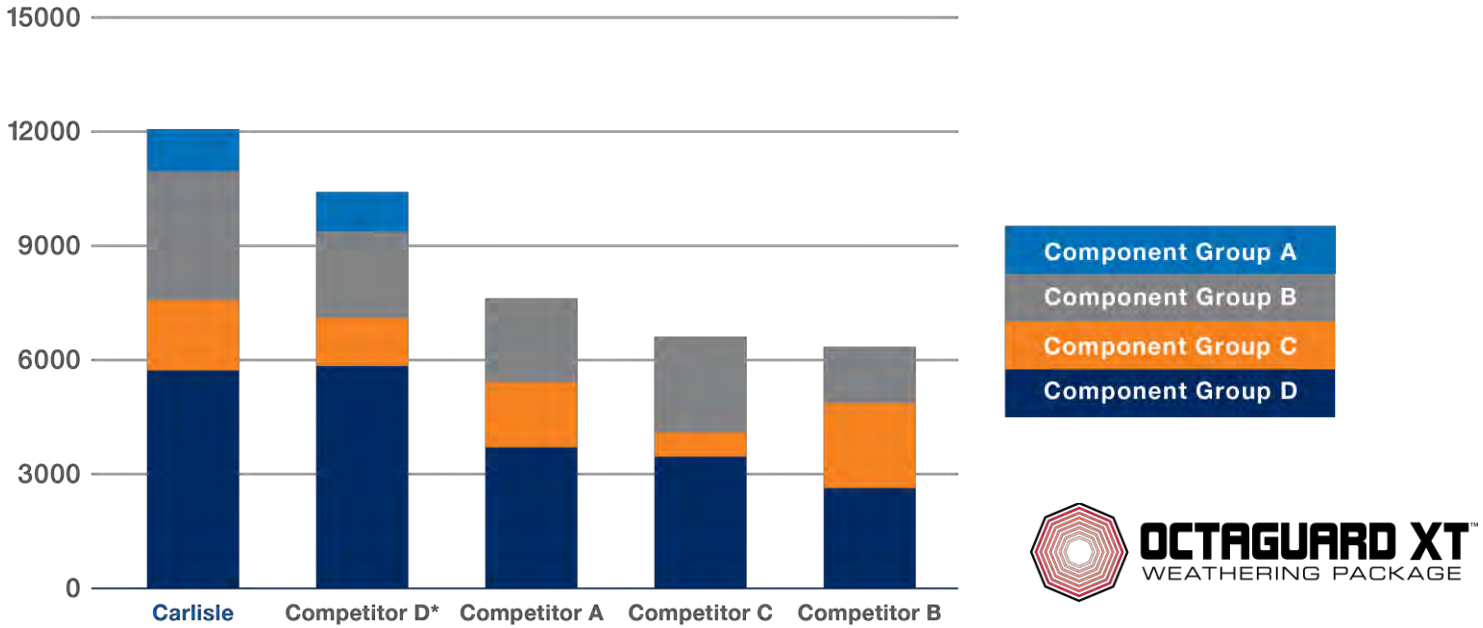
Heat Aging 240°F



Heat aging has been directly tied to the long-term performance of TPO. In 2011 ASTM increased the heat aging requirement for D6788 (Standard Specification for Thermplastic Polyolefin Based Sheet Roofing) from 4 weeks at 240°F to 32 weeks at 240°F, an 800% increase. Carlisle has been at the forefront of the movement to increase heat aging requirements for TPO. Carlisle's Sure-Weld was able to nearly double the heat aging requirement of the improved standard long before it went into effect.

*Competitor D is a premium-priced product compared to the other 4 samples.

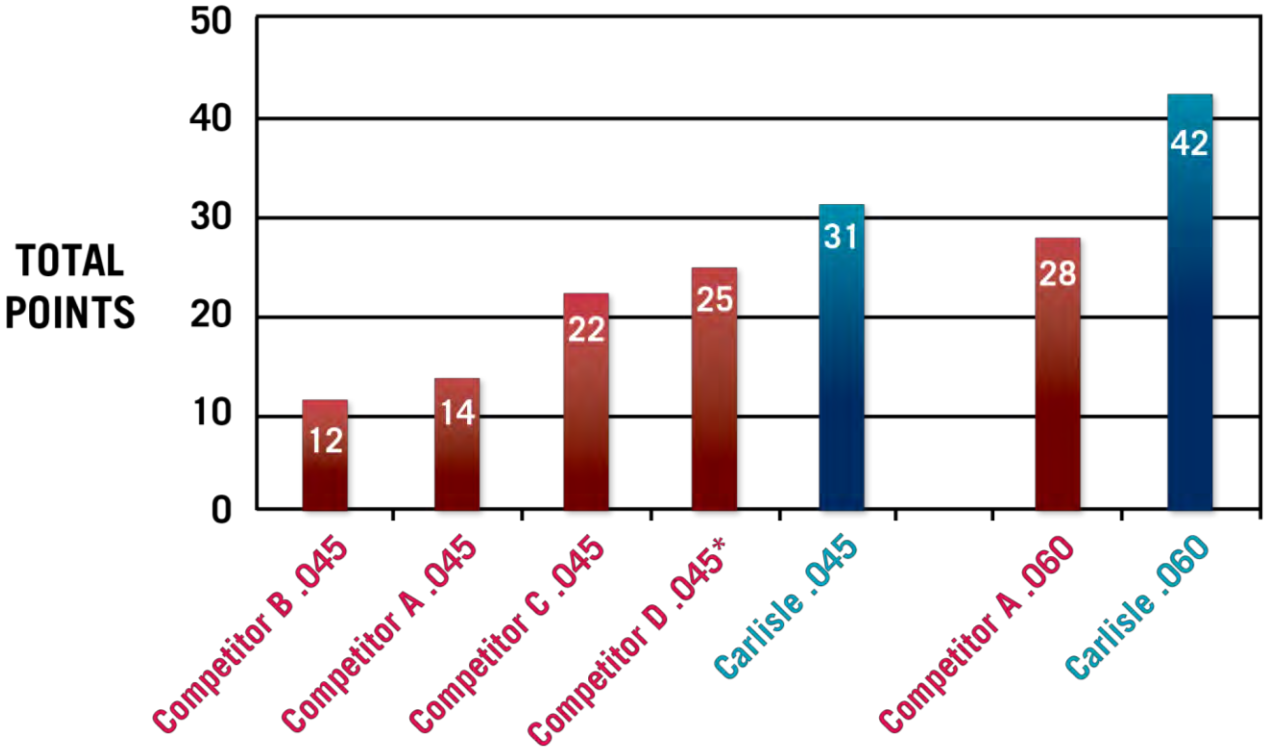
Weathering Package



Carlisle has been at the forefront of TPO development for nearly 20 years and continues to lead the industry with its high-performance OctaGuard XT weathering package that is incorporated into all Sure-Weld membrane and accessories. OctaGuard XT weathering package technology is comprised of eight performance-enhancing ingredients, including three heat-stabilizing antioxidants and three UV light stabilizers as well as organic and inorganic UV absorbers. When combined, these eight ingredients provide a weathering package second to none in the TPO industry.

*Competitor D is a premium-priced product compared to the other 4 samples.

Rank by Properties



After compiling all of the test data, a ranking system was applied to each of the TPO membranes. Each test was given the same weight in terms of importance. For each of the tests, the sample that performed the worst was given a score of 1, and the sample that performed the best was given a score of 7. Therefore this table reflects the cumulative score of all the tests.

*Competitor D is a premium-priced product compared to the other 4 samples.

ENVIRONMENTAL PRODUCT DECLARATION

TPO MEMBRANE

SINGLE PLY ROOFING MEMBRANE
INSTALLATION: MECHANICALLY FASTENED

Singly ply, TPO membrane mechanically fastened and representative of 45, 60, and 80 mil thicknesses

CARLISLE SYNTEC SYSTEMS

In the 1960s, Carlisle SynTec Systems revolutionized the commercial roofing industry when it introduced its EPDM single-ply roofing membrane. Since that time, the name Carlisle has become synonymous with innovative, high-quality, sustainable building products, including single-ply roofing membranes, insulation, and waterproofing materials.

Today, Carlisle's diverse product offering includes EPDM, TPO, PVC, and FleeceBACK® roofing membranes, as well as a full line of labor-saving flashing accessories. Backed by industry-leading warranties, Carlisle's products have been installed on a wide range of buildings around the world, including schools, hospitals, warehouses, and cold storage facilities.

To date, Carlisle has manufactured and sold more than 20 billion square feet of roofing membranes, and remains committed to developing and manufacturing the highest-quality, most sustainable commercial roofing materials on the market.

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

TPO MEMBRANE
SINGLE PLY ROOFING MEMBRANE
INSTALLATION: MECHANICALLY FASTENED

According to ISO 14025

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Carlisle SynTec Systems
DECLARATION NUMBER	4787408569.102.1
DECLARED PRODUCT	TPO Single Ply Roofing Membrane (Mechanically Fastened)
REFERENCE PCR	PCR for Single Ply Roofing Membranes. ASTM International.
DATE OF ISSUE	September 29, 2016
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications

The PCR review was conducted by:	PCR Review Panel
	Peer review report available upon request
	cert@astm.org
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	Wade Stout, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas P. Gloria, Industrial Ecology Consultants

TPO MEMBRANE
SINGLE PLY ROOFING MEMBRANE
INSTALLATION: MECHANICALLY FASTENED

According to ISO 14025

Product Definition

Description of Product

The product system evaluated in this report is an installed single ply thermoplastic polyolefin (TPO) roofing membrane at the finished nominal thicknesses produced by Carlisle and listed in Table 1.

Table 1: Membrane specification and standard

Roof System	Roof System Component	Declared Thicknesses and Weights	Standard
Thermoplastic polyolefin (TPO)	Membrane	45 mils: 1.12 kg/m^2 60 mils: 1.42 kg/m^2 80 mils: 1.95 kg/m^2	ASTM D6878

Application and Uses

Carlisle's TPO reinforced membrane is a premium, heat-weldable, single-ply thermoplastic polyolefin (TPO) sheet designed for new and retrofit low-slope roofing applications. TPO membranes can be mechanically fastened or fully adhered as part of a complete roofing assembly. Carlisle TPO membranes use advanced polymerization technology that combines the flexibility of ethylenepropylene (EP) rubber with the heat weldability of polypropylene. All Carlisle TPO membranes include OctaGuard XT™, an industry-leading, state-of-the-art weathering package. OctaGuard XT technology enables Carlisle TPO to withstand the extreme weatherability testing intended to simulate exposure to severe climates. Physical properties of the membrane are enhanced by a strong polyester fabric that is encapsulated between the TPO-based top and bottom plies. The combination of the fabric and TPO plies provides high breaking and tearing strength, as well as excellent puncture resistance. The relatively smooth surface of the membrane produces a total surface fusion weld that results in consistent, watertight, monolithic roof assembly.

Carlisle TPO membranes are available in highly reflective white, tan and gray, in 45-mil and 60-mil, and 80-mil thicknesses. Carlisle TPO is also offered in white, gray and tan colors. Carlisle's TPO is offered in 4- and 6-ft perimeter sheets and 8-, 10- and 12-ft field sheets.

Health Safety & Environmental Aspects During Installation

Exercise caution when walking on a wet membrane. Membranes are slippery when wet.

For white membranes the following precautions apply:

- Sunglasses that filter out ultraviolet light are strongly recommended as the white surface intensifies sunlight through reflection.
- White surfaces reflect heat and may become slippery due to frost and ice build-up. Exercise extreme caution during cold conditions to prevent falls.
- Use caution when working close to a roof edge when surrounding area is snow covered as roof edge may not be clearly visible.

Product Life Cycle Description

Material Content

Table 2 shows the input material for TPO roofing membranes and their material percentages for the three membrane thicknesses.

Table 2: Average composition of TPO roofing membrane

Material	[%]
Base resin [polypropylene (PP)/ ethylene propylene diene monomer (EPDM)]	71
Fire retardants	14
Polyester scrim	7
Weathering agents	6
Pigments	1

Manufacturing Process

The main material input into the TPO manufacturing process is polyolefin polymer in the form of pellets. Other ingredients essential to the TPO membrane performance, such as fire retardants and anti-oxidant, are also added. Optional ingredients, such as colorants and slip agents, can be added to increase the aesthetic appeal and improve the processability, respectively. The mixture is blended together, heated, and extruded onto the top and bottom of polyester reinforcing scrim to form laminated layers. The process is run to have the reinforcing scrim sandwiched in the middle of the top and bottom ply, each with a precisely controlled thickness. The TPO membrane is cooled by passing it through a series of rollers with temperatures controlled by closed loop chillers. The membrane is then cut to the desired length, wound onto a cardboard core, and wrapped in plastic film. Membrane rolls are packaged and labelled before they are shipped to construction sites for installation.

Figure 1 shows the manufacturing process for TPO membrane.

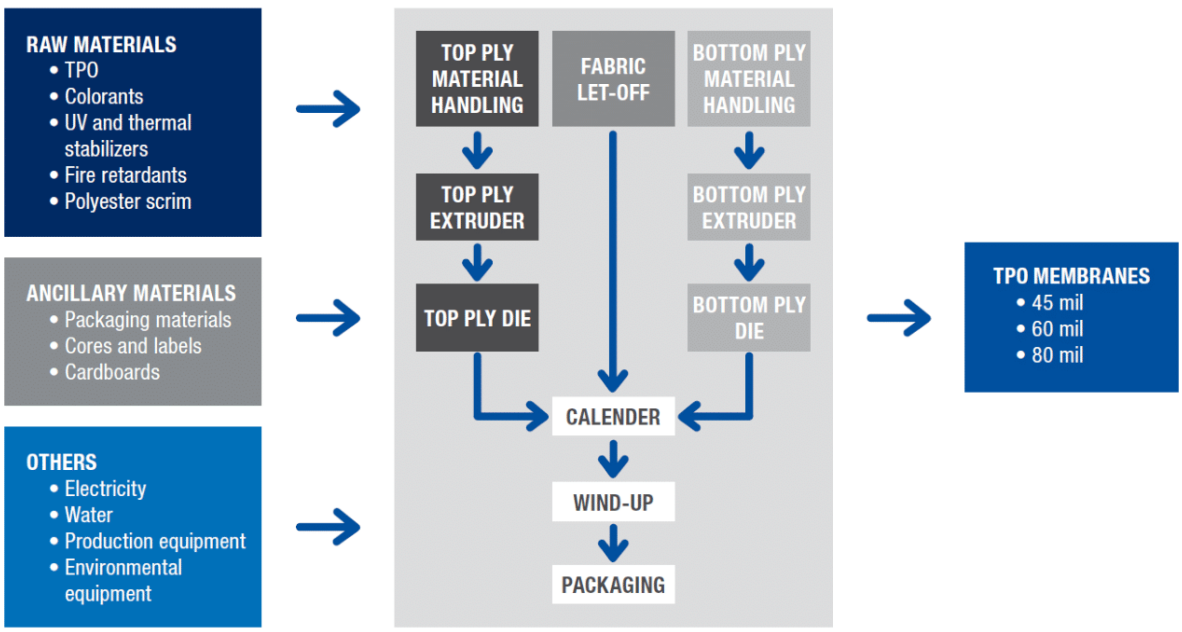


Figure 1: TPO production process map

Installation

The installation process was modeled following common practice in which TPO membrane is mechanically fastened.

Table 3 shows the material inputs, material outputs, and emissions associated with the installation of 1 m^2 of TPO membrane. This scenario is identical to the one used for the industry-average reinforced EPDM membrane EPD produced by SPRI, with only the weight of the membrane adjusted according to membrane thickness. It is assumed to be representative for all thicknesses. Packaging materials are disposed of after the membrane is installed at the building site.

Table 3: Installation of TPO membrane, unit process (per declared unit)

I/O	Material	Value	Unit
Inputs	TPO roofing membrane (packaged), incl. 2.5% overlap	1.025	m^2
	Steel fasteners	0.0242	kg
	Electricity for power tools	0.00360	MJ
Outputs	1 m^2 of installed TPO roofing membrane	1	m^2
	Packaging waste (from membrane)	*	kg

* varies with membrane thickness

End-of-Life

At the end of the roofing membrane's useful life, it was assumed that the membrane material, as well as any fasteners or adhesive substances, are manually removed from the building and then landfilled. This aligns with the disposal method used in the industry average EPD produced by SPRI. Transport to landfill was approximated with 20 miles via large dump truck.

Life Cycle Assessment – Product Systems and Modeling

Declared Unit

The declared unit evaluated is 1 m^2 of single ply roofing membrane for a stated product thickness. As the use stage is excluded from this study, no reference service life is defined.

Life Cycle Stages Assessed

The life cycle assessment (LCA) conducted includes the production, transport to installation site, installation, and end-of-life (EoL) stages.

System Boundaries

System boundaries are summarized in Figure 2 for the analysis scope of "cradle-to-building with EoL stage" (i.e., production with installation and EoL stages). Excluded modules are indicated by "MND" or "module not declared". As is typical of works of life cycle assessment, the construction and maintenance of capital equipment, such as production equipment in the manufacturing stage, are not included in the system, nor are human labor and employee commute. The use stage is also outside the scope of this study.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END-OF-LIFE STAGE			
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X

Figure 2: Life cycle stages included in system boundary

Assumptions

In cases where no matching life cycle inventories were available to represent a flow, proxy data were applied based on conservative assumptions regarding environmental impacts.

Transportation

Transportation distances and the associated modes of transport are included for the transport of the raw materials, operating materials, and auxiliary materials to production facilities.

Period under Consideration

All primary data were collected for the year 2014. All secondary data come from the GaBi Professional databases and are representative of the years 2010-2013.

Manufacturing Locations

Carlisle manufactures its membranes in the United States. Specifically, TPO membranes are manufactured in Senatobia, MS and Tooele, UT. As such, the geographical coverage for this study is based on US system boundaries for all processes and products. Whenever US background data were not readily available, European data or global data were used as proxies.

Background Data

The LCA model was created using the GaBi ts software system for life cycle engineering, developed by thinkstep AG. The GaBi Professional LCI database provides the life cycle inventory data for several of the raw and process materials obtained from the background system.

Cut- Off Criteria

Per the PCR, the cut-off criteria for flows to be considered within each system boundary are as follows:

- Mass: If a flow is less than 1% of the cumulative mass of the model flows, it may be excluded, provided its environmental relevance is minor, based on a sensitivity analysis.
- Energy: If a flow is less than 1% of the cumulative energy of the system model, it may be excluded, provided its environmental relevance is minor, based on a sensitivity analysis.
- Environmental relevance: If a flow meets the above two criteria, but is determined to contribute 2% or more to the selected impact categories of the products underlying the EPD, based on a sensitivity analysis, it is included within the system boundary.

At least 95% of the mass flows shall be included and the life-cycle impact data shall contain at least 95% of all elementary flows that contribute to each of the declared category indicators. A list of hazardous and toxic materials and substances shall be included in the inventory and the cut-off rules do not apply to such substances.

No cut-off criteria were applied for this study. All available energy and material flow data were included in the model.

Data Quality Requirements

As the majority of the relevant foreground data are measured data or calculated based on primary information sources of the owner of the technology, precision is considered to be high. Seasonal variations were balanced out by using yearly averages. All background data are sourced from GaBi databases with the documented precision. Each foreground process was checked for mass balance and completeness of the emission inventory. No data were knowingly omitted. Completeness of foreground unit process data is considered to be high. All background data are sourced from GaBi databases with the documented completeness.

Allocation

As several products are often manufactured at the same plant, Carlisle used mass allocation to report data. Mass allocation was selected since the environmental burden in the industrial process (energy consumption, emissions, etc.) is primarily governed by the mass throughput of each sub-process.

Life Cycle Assessment – Results and Analysis

Use of Material Resources

The material resource consumption associated with the TPO roofing membranes is presented below in Table 4 for the production (A1-A3), transport to installation site (A4), installation (A5), and EoL (C1-C4) stages. The fresh water indicator accounts for net water consumption.

Table 4: Use of material resources for TPO membrane, per declared unit

Indicator	Production A1-A3	Transport to Site A4	Installation A5	EoL C1-C4	Total
Non-renewable materials [kg]					
TPO 45 mils	4.01	0.00162	0.0879	0.280	**4.38**
TPO 60 mils	5.11	0.00206	0.0957	0.351	**5.56**
TPO 80 mils	7.33	0.00298	0.111	0.482	**7.93**
Renewable materials [kg]					
TPO 45 mils	1,770	1.18	24.9	24.0	**1,820**
TPO 60 mils	2,140	1.50	24.9	30.1	**2,200**
TPO 80 mils	2,540	2.17	24.5	41.3	**2,610**
Fresh water [L]					
TPO 45 mils	166	0.0697	-0.0352*	-0.766*	**165**
TPO 60 mils	211	0.0889	-0.0688*	-0.962*	**210**
TPO 80 mils	297	0.128	-0.141*	-1.32*	**296**

* Water consumption values are negative due to waste sent to landfill during construction and at EoL. A landfill introduces blue water to the watershed because it collects rainwater during its lifetime that is eventually released as ground water, therefore more water is coming out of the process than going in. Rainwater is not blue water and is therefore not included in the water consumption metric.

Primary Energy by Life Cycle Stage

The primary energy demand associated with the TPO roofing membranes is presented below in Table 5 for the production (A1-A3), transport to installation site (A4), installation (A5), and EoL (C1-C4) stages.

Table 5: Primary energy consumption results for TPO membrane, per declared unit

Indicator	Production A1-A3	Transport to Site A4	Installation A5	EoL C1-C4	Total
Non-renewable fossil [MJ, LHV]					
TPO 45 mils	88.8	0.348	0.234	0.852	**90.2**
TPO 60 mils	113	0.444	0.244	1.07	**115**
TPO 80 mils	160	0.640	0.258	1.47	**162**
Non-renewable nuclear [MJ, LHV]					
TPO 45 mils	3.60	0.00185	0.0279	0.0237	**3.65**
TPO 60 mils	4.66	0.00236	0.0249	0.0298	**4.72**
TPO 80 mils	6.99	0.00341	0.0176	0.0409	**7.05**
Renewable (solar, wind, hydroelectric, geothermal) [MJ, LHV]					
TPO 45 mils	4.42	0.00548	-0.00440*	0.0460	**4.47**
TPO 60 mils	5.47	0.00700	-0.0226*	0.0578	**5.51**
TPO 80 mils	7.05	0.0101	-0.0771*	0.0794	**7.07**
Renewable (biomass) [MJ, LHV]					
TPO 45 mils	6.31×10^{-11}	4.52×10^{-15}	2.13×10^{-12}	9.99×10^{-13}	6.62×10^{-11}
TPO 60 mils	7.97×10^{-11}	5.77×10^{-15}	2.14×10^{-12}	1.25×10^{-12}	8.31×10^{-11}
TPO 80 mils	1.11×10^{-10}	8.32×10^{-15}	2.15×10^{-12}	1.72×10^{-12}	1.15×10^{-10}

* Net negative renewable energy values have occurred due to the material credit associated with recovering a fraction of wooden pallets and should not be interpreted in a way that an increase in consumption of the products under study will lead to any 'reversal' of environmental burden elsewhere.

Life Cycle Impact Assessment

The environmental impacts associated with the TPO roofing membrane are presented below in Table 6 for the production (A1-A3), transport to installation site (A4), installation (A5), and EoL (C1-C4) stages.

Table 6: Life cycle impact category results for TPO membrane, per declared unit

Indicator	Production A1-A3	Transport to Site A4	Installation A5	EoL C1-C4	Total
GWP [kg CO_2-eq]					
TPO 45 mils	3.48	0.0252	0.0900	0.0551	**3.65**
TPO 60 mils	4.42	0.0321	0.113	0.0692	**4.64**
TPO 80 mils	6.27	0.0463	0.166	0.0951	**6.58**

Indicator	Production A1-A3	Transport to Site A4	Installation A5	EoL C1-C4	Total
AP [kg SO_2-eq]					
TPO 45 mils	0.00818	1.20×10^{-4}	3.12×10^{-4}	8.27×10^{-4}	**0.00944**
TPO 60 mils	0.0105	1.54×10^{-4}	3.93×10^{-4}	0.00104	**0.0120**
TPO 80 mils	0.0151	2.22×10^{-4}	5.71×10^{-4}	0.00144	**0.0173**
EP [kg N-eq]					
TPO 45 mils	8.12×10^{-4}	1.09×10^{-5}	6.79×10^{-5}	3.07×10^{-4}	**0.00120**
TPO 60 mils	0.00103	1.40×10^{-5}	8.68×10^{-5}	3.88×10^{-4}	**0.00152**
TPO 80 mils	0.00147	2.01×10^{-5}	1.28×10^{-4}	5.35×10^{-4}	**0.00214**
ODP [kg CFC 11-eq]					
TPO 45 mils	3.51×10^{-10}	2.12×10^{-13}	6.11×10^{-14}	1.30×10^{-12}	**3.53×10^{-10}**
TPO 60 mils	4.57×10^{-10}	2.71×10^{-13}	$-3.27 \times 10^{-13*}$	1.63×10^{-12}	**4.59×10^{-10}**
TPO 80 mils	6.94×10^{-10}	3.90×10^{-13}	$-1.23 \times 10^{-12*}$	2.24×10^{-12}	**6.96×10^{-10}**
SFP [kg O_3-eq]					
TPO 45 mils	0.139	0.00380	0.00178	0.00734	**0.152**
TPO 60 mils	0.177	0.00485	0.00214	0.00923	**0.193**
TPO 80 mils	0.250	0.00700	0.00290	0.0127	**0.272**

*ODP values are negative during installation due to the credit given for energy recovered from the landfill of packaging waste and should not be interpreted in a way that an increase in consumption of the products under study will lead to any 'reversal' of environmental burden elsewhere.

Waste Generation

The waste generation associated with the TPO roofing membrane is presented below in Table 7 for the production (A1-A3), transport to installation site (A4), installation (A5), and EoL (C1-C4) stages.

Table 7: Waste generation results for TPO membrane, per declared unit

Indicator	Production A1-A3	Transport to Site A4	Installation A5	EoL C1-C4	Total
Waste generated [kg]					
TPO 45 mils	0.199	1.13×10^{-5}	0.125	1.16	**1.48**
TPO 60 mils	0.246	1.49×10^{-5}	0.164	1.49	**1.90**
TPO 80 mils	0.373	1.95×10^{-5}	0.210	2.01	**2.60**

Additional Environmental Information

Product Performance

UV Resistance – TPO has excellent UV resistance as evidenced in the ASTM G155 Accelerated Xenon Arc Weathering test. TPO white reinforced membrane has UV resistance that has tested in excess of 20,000 kJ/m^2 which is more than double the ASTM requirements.

Resistance to unwanted biological growth – Carlisle TPO roofing membrane has been tested in accordance with ASTM1 G21 (Practice for determining resistance of synthetic polymeric materials to fungi) by an independent laboratory. Fungi includes mold and mildew. The results indicate that Carlisle TPO is resistant to fungal growth. Carlisle TPO does not contain any ingredients that are metabolized by microbials and some ingredients act to inhibit the growth of fungi, bacteria and algae. Carlisle TPO is not susceptable to degradation from microbials.

Resistance to hail damage – Carlisle TPO has UL 2218 Class 4 hail resistance rating.This test is designed to test the roof systems resistance to damage from the most severe hail strikes.

Roof Surface Solar Reflectance

Carlisle TPO membranes have radiative properties that qualify the material for the Department of Energy's - ENERGY STAR rating, Cool Roof Rating Council (CRRC), and LEED requirements. White and tan membranes are also ENERGY STAR certified and California Title 24 compliant.

Carlisle white TPO has a initial solor reflectance of 0.79 and initial emissivity of 0.90. Both of these values are critical when evaluating solar reflectance index (SRI) values which represent the potential energy savings impact of reflective roofing.such as TPO. Materials with the highest SRI values are the coolest choices for roofing. Reflective roofing membranes are generally recommended in climates where energy usage for cooling exceeds that of heating.

Carlisle TPO comes with an optional APEEL protective film on the surface of the TPO to protect the reflectivity of the membrane during installation.

Recycling

All post-industrial scrap is recycled back into the product through an in-house process. Additionally, Carlisle offers recycling options for TPO membrane after use.through a partnership with Nationwide Foam.

To reduce waste during the construction of the roofing system, Carlisle also offers pre-fabricated flashings and accessories for details and penetrations.

Environmental Stewardship

Carlise TPO membranes conform to requirements of the US E.P.A. Toxic Leachate Test (40 CFR part 136) performed by an independent analytical laboratory.

Carlisle TPO membrane is chlorine-free with no halogenated flame retardants.

References

- ASTM. (2013). Product Category Rule for Preparing an Environmental Product Declaration for Single Ply Roofing Membranes. West Conshohocken, PA: ASTM International.
- thinkstep. (2014). GaBi LCA Database Documentation. Retrieved from thinkstep AG: http://database-documentation.gabi-software.com

LCA Development

The EPD and background LCA were prepared by thinkstep, Inc.

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EXPERIENCE THE CARLISLE DIFFERENCE

CARLISLE SYNTEC SYSTEMS

Sure-Weld® TPO Roofing Systems

CASE STUDY

West Park Elementary School
Elevating Expectations with Sure-Weld TPO

The Lake County School District's motto is "Elevating Expectations," and when choosing the right roofing membrane and material supplier for their new roof in the late 1990's, they made no exceptions.

Lake County School District, located in Leadville, Colorado, sought the services of B&M Roofing, Inc. in 1997 when it became clear that West Park Elementary School needed a new roof. B&M Roofing decided to use Carlisle SynTec Systems' Sure-Weld 60-mil white TPO membrane for the project, even though TPO was relatively new to the roofing industry.

"At the time, there were a number of 'expert' opinions, both pro and con, regarding the long-term performance of TPO," commented John Hesslink, the roofing consultant who worked with West Park Elementary School on this project.

Hesslink also notes, however, that after 17 years, Carlisle's Sure-Weld TPO continues to perform "far beyond any expectation."

West Park Elementary School is situated in a climate and elevation where severe environmental stress presents an extraordinary challenge to the school's exterior building materials. At 10,200 feet above sea level, the damaging solar radiation of UV rays poses a particular threat to the roofing membrane's performance because exposure to UV radiation increases at higher elevations.

"UV rays are one of the most damaging types of solar radiation," Hesslink observes. "The greatest performance concern for any roofing membrane is its ability to endure UV light, since the damaging effects are both immediate and cumulative."

JOB PROFILE

SQUARE FOOTAGE:
42,000 sq ft.

ROOFING CONTRACTOR:
B&M Roofing of Colorado, Inc.

ROOFING SYSTEM:
Carlisle SynTec Systems
60-mil Sure-Weld® TPO

CONSULTANT:
Division 7 Design, Inc.

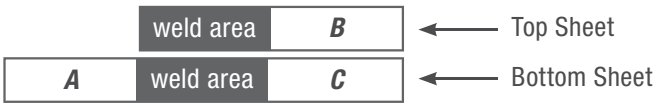
COMPLETION DATE:
1997

CASE STUDY

Despite these challenges, test results from Carlisle's TPO have proven it is highly resilient. Nearly 20 years after the school's roof was installed, samples extracted from the site demonstrate the material's longevity. Three sections of TPO membrane were removed from the roof and sent to an independent lab for analysis. Careful review of these samples revealed that Carlisle's Sure-Weld TPO was able to withstand Colorado's severe weather and harsh environmental conditions with minimal signs of aging to the membrane.

Analyzing the Findings

Three 12" x 12" samples of TPO membrane were removed from the roof for analysis. Each sample included the field seam area where two sheets were welded together with one sheet underlying the other by approximately 6", thus remaining unexposed to the elements.



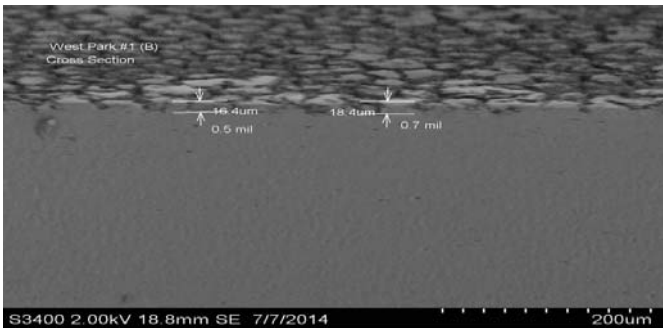
Each sample was examined for surface crazing, depth of surface crazing, thickness of TPO over scrim, and total thickness of the TPO sheet.

Table 1 shows the thickness over scrim and total sheet thickness of the 17-year-old samples, as well as the current ASTM standard for new TPO membranes.

Table 1

Compare	Average Thickness Over Scrim (mils)		Average Total Sheet Thickness (mils)	
	Exposed Membrane	Unexposed Membrane	Exposed Membrane	Unexposed Membrane
West Park Samples	25.6	25.6	57.8	57.0
ASTM Requirement for New TPO Membranes	15.0	15.0	60±10%	60±10%

In addition to overall thickness, a measurement of the depth of any crazing on the surface of the membrane was taken. As demonstrated in Figure 1, the surface of the TPO held up extremely well to the intense and prolonged UV exposure.



Carlisle's TPO Marketing Manager, David French, was pleased with these results.

"While we are extremely satisfied with the results of the long-term performance study conducted on the membrane installed on the West Park Elementary project 17 years ago, we are not at all surprised by the report," French remarked. "As an innovator of TPO membrane, Carlisle has always prided itself on producing TPO with exceptional long-term performance," he continued.

Advantages of TPO

TPO is the fastest-growing segment of the commercial roofing industry, but not all TPO membranes are created equally. Carlisle's Sure-Weld TPO offers the performance that building owners have come to expect from the leading manufacturer of this highly reflective roofing material. Sure-Weld TPO membranes are ENERGY STAR®-qualified and Cool Roof Rating Council (CRRC)-certified and have been directly attributed to a reduction in a building's energy consumption by decreasing the amount of air conditioning needed.

Xenon-Arc testing and long-term heat aging show that Carlisle's TPO membrane meets and exceeds the highest standards in the industry. That's because every TPO membrane is enhanced with the OctaGuard XT Weathering Package, a unique eight-component blend of antioxidants, UV absorbers, as well as light and heat stabilizers, providing highly dependable long-term performance.

Conclusion

Only the strongest roofing membranes can provide long-term performance at 10,000 feet above sea level with constant exposure to UV rays. The samples extracted from the West Park Elementary School roof showed only minor crazing and revealed that the TPO maintained impressive thickness after 17 years of exposure to some of the country's harshest weather conditions. For these reasons, it is clear Carlisle's TPO was the right choice for West Park Elementary School.

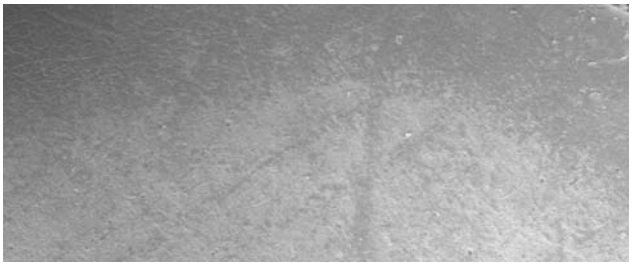
CARLISLE SYNTEC SYSTEMS

Carlisle Sure-Weld® TPO with OctaGuard XT™ Weathering Package

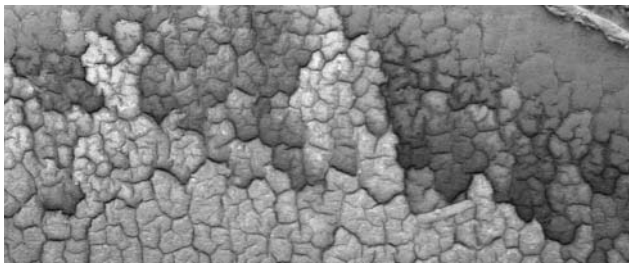
Carlisle has been at the forefront of TPO development for nearly 20 years and continues to lead the industry with its high-performance OctaGuard XT weathering package that is incorporated into all Sure-Weld membrane and accessories. OctaGuard XT weathering package technology is comprised of eight performance-enhancing ingredients, including three heat-stabilizing antioxidants and three UV light stabilizers as well as organic and inorganic UV absorbers. When combined, these eight ingredients provide a weathering package second to none in the TPO industry.

THE TESTS

TPO membrane samples from four manufacturers, including Carlisle, were recently subjected to accelerated heat aging in a controlled, 275°F environment. Heat aging accelerates the impact that heat plays on TPO and evaluates its performance on the roof. Samples were removed when they showed signs of cracking, or were deemed not suitable to perform as a waterproofing membrane. Extreme Xenon Arc Weatherometer testing also reveals that Sure-Weld TPO can withstand twice the ASTM D6878 requirement of 10,080 kJ/m^2 without losing its desired physical properties.



Carlisle Sure-Weld TPO with OctaGuard XT



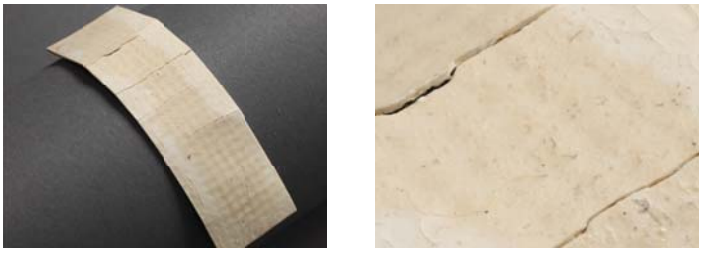
The Other Guys

45-mil TPO membrane at 50x magnification after extreme simulated UV exposure.

OCTAGUARD XT WEATHERING PACKAGE

HEAT AGING FOLLOWING ASTM D6878 PROTOCOL

Carlisle Sure-Weld TPO – 60 Weeks (No Failure)



"Competitor C" TPO – 37 Weeks

THE RESULTS

Independent test results and a chemical analysis show that Sure-Weld TPO with OctaGuard XT contains more weather-protecting ingredients than any other TPO membrane tested, which means Carlisle's TPO provides superior long-term protection against the dangers of heat and UV exposure.

With Carlisle's Sure-Weld TPO, featuring the OctaGuard XT weathering package, you get a whiter, cleaner, more energy-efficient, longer-lasting, and weather-resistant TPO roofing system. Carlisle's Sure-Weld TPO with OctaGuard XT weathering package technology has set a new standard in the thermoplastic single-ply industry.

CARLISLE SYNTEC SYSTEMS

WHITER, LONGER

As a white membrane collects dirt, the cost savings associated with having a reflective roof is severely reduced and the higher associated temperatures can accelerate aging. The time-tested Sure-Weld TPO compound, which includes OctaGuard XT along with Carlisle's state-of-the-art manufacturing process, produces one of the smoothest TPO sheets on the market. The extremely smooth top ply of Sure-Weld TPO reduces the ability of dirt, mold, bacteria and other contaminants to collect on the membrane, keeping it whiter longer and increasing the efficiency and potential lifespan of your TPO roof.

Cool Roof Rating Council (CRRC) Solar Reflectance Rating

	% of Sunlight Reflected	
	Initial	3-year Aged
Carlisle Sure-Weld TPO	.79	.70
Competitor A	.79	.68
Competitor B	.76	.68
Competitor C	.79	.68

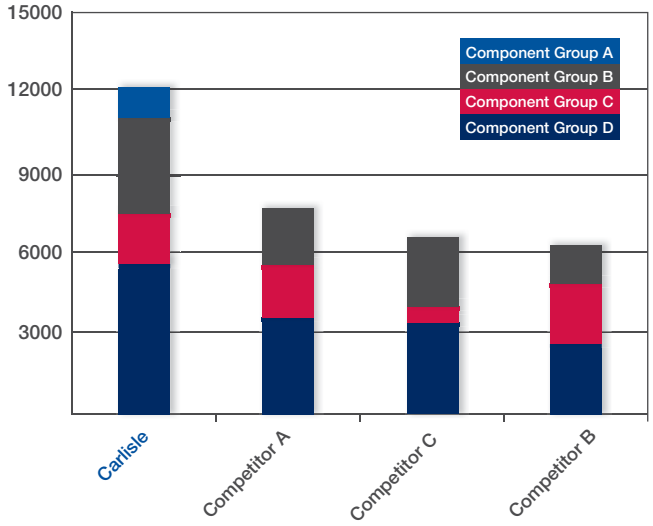
REFLECTIVITY WARRANTY

Carlisle backs their commitment to long-term performance and energy-efficiency with an industry-leading Reflectivity Warranty on all white TPO membranes. A warranty backed by a company with over 50 years of single-ply manufacturing experience.

Benefits of a Carlisle Sure-Weld TPO roof system featuring the OctaGuard XT weathering package include:

- Cleaner surface
- Long-term energy efficiency in warm, southern climates
- Greater weather resistance
- Improved long-term performance
- Heat and UV resistance

WEATHERING PACKAGE
CHEMICAL ANALYSIS



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GOLDEN SEAL TOTAL ROOFING SYSTEM WARRANTY

CARLISLE SYNTEC SYSTEMS

WARRANTY NO.:
BUILDING OWNER:
NAME OF BUILDING:
BUILDING ADDRESS:
DATE OF COMPLETION OF THE CARLISLE TOTAL ROOFING SYSTEM:
DATE OF ISSUE:

Carlisle Roofing Systems, Inc., (Carlisle) warrants to the Building Owner (Owner) of the above described building, that; subject to the terms, conditions, and limitations stated in this warranty, Carlisle will repair any leak in the Carlisle Roofing System (Carlisle Total Roofing System) installed by a Carlisle Authorized Roofing Applicator for a period of -- years, commencing with the date of Carlisle's acceptance of the Carlisle Total Roofing System installation. However, in no event shall Carlisle's obligations extend beyond -- years, subsequent to the date of substantial completion of the Carlisle Total Roofing System. See below for exact date of warranty expiration.

The Carlisle Total Roofing System is defined as the following Carlisle brand materials: Membrane, Flashings, Adhesives and Sealants, Insulation, Cover Boards, Fasteners, Fastener Plates, Fastening Bars, Insulation Adhesives and any other Carlisle brand products utilized in this installation.

TERMS, CONDITIONS, LIMITATIONS

1. Owner shall provide Carlisle with written notice via letter, fax or email within thirty (30) days of any leak in the Carlisle Total Roofing System. Owner should send written notice of a leak to Carlisle's Warranty Services Department at the address set forth at the bottom of this warranty. By so notifying Carlisle, the Owner authorizes Carlisle or its designee to investigate the cause of the leak. Should the investigation reveal the cause of the leak to be outside the scope of this Warranty, investigation and repair costs for this service shall be paid by the Owner.

2. If, upon inspection, Carlisle determines that the leak is caused by a defect in the Carlisle Total Roofing System's materials, or workmanship of the Carlisle Authorized Roofing Applicator in installing the same, Owner's remedies and Carlisle's liability shall be limited to Carlisle's repair of the leak. Carlisle shall have sole responsibility in determining the method of repair of the area.

3. This warranty shall not be applicable if, upon Carlisle's inspection, Carlisle determines that any of the following has occurred:
(a) The Carlisle Total Roofing System is damaged by: natural disasters, lightning, fire, insects, animals, windblown debris or objects, earthquakes, tornados, hail, hurricanes, and winds of (3 second) peak gust speeds of -- mph or higher measured at 10 meters above ground; or
(b) Loss of integrity of the building envelope and/or structure, including, but not limited to, partial or complete loss of roof decking, wall siding, windows, roof top units, doors or other envelope components; or
(c) All associated building components, including but not limited to the deck substrate, joists, columns and foundation, must also meet wind speed design requirements.
(d) The Carlisle Total Roofing System is damaged by any acts, accidents, misuse, abuse, vandalism, civil disobedience or the like; or
(e) Deterioration or failure of building components, including, but not limited to, the roof substrate, walls, mortar, HVAC units, non Carlisle brand metal work, etc., occurs and causes a leak, or otherwise damages the Carlisle Total Roofing System; or
(f) Deterioration of metal materials and accessories caused by marine salt water, atmosphere, or by regular spray of either salt or fresh water; or

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(g) Acids, oils, harmful chemicals and the like come in contact with the Carlisle Total Roofing System and cause a leak, or otherwise damage the Carlisle Total Roofing System; or
(h) The Carlisle Total Roofing System encounters leaks or is otherwise damaged by condensation resulting from any condition within the building that may generate moisture; or
(i) The Carlisle Authorized Applicator or any additional contractor or subcontractor failed to follow Carlisle's published specifications and details for the approved system assembly or failure to correct all installation deficiencies listed in any Carlisle inspection report.

4. This Warranty shall be null and void if any of the following shall occur:
(a) If, after installation of the Carlisle Total Roofing System by a Carlisle Authorized Roofing Applicator, there are any alterations or repairs made on or through the roof or objects such as, but not limited to, structures, fixtures, solar arrays, wind turbines, roof gardens or utilities are placed upon or attached to the roof without first obtaining written authorization from Carlisle; or
(b) Failure by the Owner to use reasonable care in maintaining the roof, said maintenance to include, but not be limited to, those items listed on Carlisle's Care & Maintenance Guide which accompanies this Warranty.

5. In addition, it shall be Owner's sole responsibility to remove and re-install at Owner's expense, all obstructions, including, but not limited to, structures, fixtures, solar arrays, wind turbines, roof gardens, utilities or other overburden from the affected area as determined by Carlisle that would hinder or impede repairs being made in the most expedient and least expensive manner possible. Owner shall be responsible for all costs associated with any loss of power generation in the event that removal of a solar array is required to repair the roofing system.

6. During the term of this Warranty, Carlisle shall have free access to the roof during regular business hours.

7. Carlisle shall have no obligation under this Warranty while any bills for installation, supplies, service, and/or warranty charges have not been paid in full to the Carlisle Authorized Roofing Applicator, Carlisle, or material suppliers.

8. Carlisle's failure at any time to enforce any of the terms or conditions stated herein shall not be construed to be a waiver of such provision.

9. Carlisle shall not be responsible for the cleanliness or discoloration of the Carlisle Total Roofing System caused by environmental conditions including, but not limited to, dirt, pollutants or biological agents.

10. Carlisle shall have no liability under any theory of law for any claims, repairs, restoration, or other damages including, but not limited to, consequential or incidental damages relating, directly or indirectly, to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in the building or in the air, land, or water serving the building.

11. This warranty shall be transferable upon a change in ownership of the building when the Owner has completed certain procedures, including a transfer fee and an inspection of the Roofing System by a Carlisle representative.

12. Any dispute, controversy or claim between the Owner and Carlisle concerning this Limited Warranty shall be settled by mediation. In the event that the Owner and Carlisle do not resolve the dispute, controversy or claim in mediation, the Owner and Carlisle agree that any and all suits, proceedings, or claims shall be filed in either the state courts of Cumberland County, Pennsylvania or in the United States District Court for the Middle District of Pennsylvania. Each party irrevocably consents to the jurisdiction and venue of the above-identified courts.

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13. Roof System Design Assembly: Carlisle, as manufacturer of commercial roofing products with the sole purpose of offering products for an Owner, design professional, architect, consultant, or engineer when designing/choosing a roof system assembly, assumes no liability nor implies to the suitability of the products for any particular assembly or specific building operation or structure. The Owner, design professional, architect, consultant, or engineer is solely responsible for the assembly chosen for a particular building structure to include the responsibility to properly calculate wind uplift values, design dead loads and live loads, and suitability and condition of building envelope substrate, decking, parapets, drainage, slope, and other attributes pertaining to the performance of the roof system assembly.

14. The Carlisle Authorized Applicator or any additional contractor or subcontractor are not agents of Carlisle.

CARLISLE DOES NOT WARRANT PRODUCTS UTILIZED IN THIS INSTALLATION WHICH IT HAS NOT FURNISHED AND SPECIFICALLY DISCLAIMS LIABILITY, UNDER ANY THEORY OF LAW, ARISING OUT OF THE INSTALLATION AND PERFORMANCE OF, OR DAMAGES SUSTAINED BY OR CAUSED BY, PRODUCTS NOT FURNISHED BY CARLISLE OR THE PRIOR EXISTING ROOFING MATERIAL OVER WHICH THE CARLISLE ROOFING SYSTEM HAS BEEN INSTALLED.

THE REMEDIES STATED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES FOR FAILURE OF THE CARLISLE TOTAL ROOFING SYSTEM OR ITS COMPONENTS. THERE ARE NO WARRANTIES EITHER EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, WHICH EXTEND BEYOND THE FACE HEREOF. CARLISLE SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR DAMAGE TO THE BUILDING OR ITS CONTENTS UNDER ANY THEORY OF LAW.

BY: Mark J. Long

AUTHORIZED SIGNATURE
TITLE: Director, Technical and Warranty Services
This Warranty Expires:

800-233-0551 | P.O. Box 7000 | Carlisle, PA 17013 | Fax: 717-245-7121 | www.carlislesyntec.com

Carlisle Care and Maintenance Guide

In order to ensure the long-term performance of your Roofing System and continued warranty service and coverage, regular rooftop maintenance inspections are necessary. While normal aging will occur on all roofs, if not detected early, problems stemming from abuse, contamination, accidents and severe weather can result in extensive and costly repairs or premature failure of the roofing system. Single-ply Roofing Systems are typically low-slope and easy to inspect, but caution must be taken to ensure safety. Carlisle disclaims and assumes no liability for any rooftop activity.

- Owner must retain records related to the Roofing System. Such records include, but are not limited to: the warranty document and serial number, maintenance inspection logs, rooftop traffic logs, service logs, and invoices for work performed on the roofing system.
- Inspect the roof at least every six months (preferably spring and fall) and immediately following any weather event that includes excessive rainfall, high winds and/or hail warnings. Increased number of rooftop maintenance inspections may be required on some roofs as the location may dictate, such as higher trees near the building which will accumulate leaves and debris on the roof and have adverse effects on drainage. In addition, rooftop maintenance inspections should occur after regular maintenance of any rooftop unit.

When inspecting the Roofing System, pay special attention to the following:
- Walls/Parapets/Roof Edge – Wind damage often begins at the perimeter of the roof. Ensure all membrane terminations and edge metal and copings are secure.
- Roof Deck Membrane – Inspect the field of the roof, scanning for damage caused by wind-blown debris or traffic.
- Penetrations/Rooftop Units – Inspect the membrane, flashings and terminations around penetrations and roof top units for possible damage from service work. Ensure the units and terminations are secure.
- Remove debris (leaves, dirt, trash, etc.) – Good roofing practice dictates that water should drain from the roof and that ponded water should evaporate within 48 to 72 hours after a rainfall. Debris can inhibit drainage.

Additional Maintenance Items:
- Foot Traffic – Walkways must be provided if regular traffic is required or if rooftop equipment has a regular thirty (30) day or less maintenance schedule.
- Petroleum Products & Chemicals - Keep all liquids containing petroleum products or chemicals off the membrane to avoid product degradation.
- Animal Fats/Vegetable Oils: EPDM Membranes - Do not exhaust animal fats/vegetable oils directly onto EPDM roof surfaces. TPO & PVC Membranes – Animal fats/vegetable oils must be regularly removed and the rooftop surface cleaned with a mixture of soap and water.

What to do if a leak occurs:
- After verifying the leak is through the roofing system, contact Carlisle at 1-800-233-0551 or at www.carlislesyntec.com.
- If minor, emergency temporary repairs are made to a suspected leak area, use Carlisle's Lap Sealant or a good-grade rubber caulk to address the repair area (do not use asphaltic roof cement). Please note, Carlisle is not responsible for the cost associated with any emergency temporary repairs.

Alterations to the Roofing System:
- Alterations to the Roofing System must be completed by a Carlisle Authorized Applicator. The Carlisle Authorized Applicator must notify Carlisle when the revision work is complete. The necessary form can be found on the Carlisle website via the Authorized Applicators login.

Warranty Transfer:
- Warranties shall be transferable upon a change in ownership of the building when the Owner has completed certain procedures. This form can be found on the Carlisle website for additional guidelines.

800-233-0551 | P.O. Box 7000 | Carlisle, PA 17013 | Fax: 717-245-7121 | www.carlislesyntec.com

Advancement of Construction Technology

SUBSTITUTION REQUEST
(During the Bidding Phase)

Project: BSD International School of Beaverton Re-Roof

Substitution Request Number: _____

From: _____

To: CIDA Architects

Date: _____

A/E Project Number: _____

Re: _____

Contract For: _____

Specification Title: Thermoplastic Polyolefin (TPO) Membrane Roofing

Description: TPO complying with ASTM D6878/D6878M

Section: 07 54 23 Page: 6

Article/Paragraph: 2.2 Thermoplastic Polyolefin (TPO) Roofing Membrane

Proposed Substitution: Everguard® TPO Single-Ply Roofing Systems

Manufacturer: GAF Address: 1 Campus Drive Parsippany, NJ 07054 Phone: 1-973-628-3000

Trade Name: Everguard® TPO 60 mil Membrane (Smooth), White Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: Kathleen Espartero

Signed by: [signature]

Firm: JR Swigart Co., Inc.

Address: P.O. Box 2753 Pasco, WA 99302

Telephone: 509-547-4851

Should the awarded Bidder elect to proceed with any approved acceptable alternates that differ from the basis-of-design indicated in the Bid Documents, the awarded Bidder will be responsible for all changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☒ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Owner has accepted the proposed substitution request as an acceptable alternate to the specified basis-of-design product.

Signed by: [signature] [Erik Winter, Architect on behalf of CIDA, Inc.]

Date: 3/5/2021

Supporting Data Attached: ☐ Drawings X☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

EverGuard® TPO 60 mil Membrane

Applicable Standards

UL Listed, FM Approved, Miami-Dade County Product Control Approved, State of Florida Approved, CRRC Rated, Title 24 Compliant*, ENERGY STAR® Certified**, ASTM D6878.

Physical Properties	ASTM Test Method	ASTM D6878 Minimum	EverGuard® Typical Test Data
1. Certain data is provided in MD (machine direction) x CMD (cross machine direction) format. 2. Data is based upon typical product performance, and is subject to normal manufacturing tolerance and variance.			
Nominal Thickness	ASTM D751	0.039" (min.) (0.99 mm)	0.060" (1.52 mm)
Breaking Strength	ASTM D751 Grab Method	220 lbf/in. (38.5 kn/m)	305 lbf x 290 lbf (454 x 432 kg/m)
Factory Seam Strength	ASTM D751	66 lbf (98.34 kg/m)	135 lbf (membrane failure) (201.1 kg/m)
Elongation at Break	ASTM D751	15%	30%
Heat Aging	ASTM D573	90% Retention of Breaking Strength and Elongation at Break	100%
Tear Strength	ASTM D751 8" x 8" (203 x 203 mm) Sample	55 lbf (81.95 kg/m)	75 lbf x 130 lbf (111.8 x 193.7 kg/m)
Puncture Resistance	FTM 101C Method 2031	Not Established	380 lb. (172 kg)
Cold Brittleness	ASTM D2137	-40°C	-40°C
Permeance	ASTM E96	Not Established	0.08 Perms
Dimensional Change	ASTM D1204 @158°F (70°C), 6 hrs.	+/-1%	0.4%
Water Absorption	ASTM D471 @158°F (70°C), 1 week	+/-3.0% (top coating only)	0.7%
Hydrostatic Resistance	ASTM D751 Method D	Not Established	430 psi
Ozone Resistance	ASTM D1149	No visible deterioration @ 7 x magnification	No visible deterioration @ 7 x magnification
SRI (Solar Reflectance Index) Initial/Aged	N/A	N/A	94/81 83 Aged Title 24
Reflectivity (white) Initial/Aged	ASTM C1549 ASTM E903	N/A N/A	0.76/0.68 81.9% Reflectance
Emissivity (white) Initial/Aged	ASTM C1371 ASTM E403	N/A N/A	0.90/0.83 0.94
Weather Resistance	ASTM G155/D6878	10,080 KJ/(m^2 · nm) at 340 nm	>25,000 KJ/(m^2 · nm) at 340 nm
Heat Aging	ASTM D573	240°F (115°C) for 32 weeks	60 weeks
Thickness Above Scrim	ASTM D7635	Min 30% of Total Thickness	22.1 mil (Nominal)
Guarantee			
Up to 25 years			

*White, Energy Gray, and Energy Tan Membranes Only

**ENERGY STAR® only valid in the U.S.

Product Data

	5′x 100′	6′ x100′	8′x100′	10′x100′	12′x100′
Roll Size	(1.52 x 30.5 m) (500 sq. ft. [46.5 sq.m])	(1.83 x 30.5 m) (600 sq. ft. [55.74 sq.m])	(2.44 x 30.5 m) (800 sq. ft. [74.3 sq.m])	(3.05 x 30.5 m) (1,000 sq. ft. [92.9 sq.m])	(3.65 x 30.5 m) (1,200 sq. ft. [111.484 sq.m])
Roll Weight	162 lb. (73.5 kg)	194.4 lb. (88.2 kg)	257 lb. (117 kg)	322 lb. (146.1 kg)	386.4 lb. (175.3 kg)
Colors	White, Tan, Gray				
Storage	Store rolls on their sides on pallets or shelving in a dry area.				
Safety Warning	Membrane rolls are heavy. Position and install by at least two people.				
Note: Membrane rolls shipped horizontally on pallets, stacked pyramid-style and banded. Product sizes, dimensions, and widths are nominal values and are subject to normal manufacturing/packaging tolerance and variation.					

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INDUCTION-WELDED Membrane Application

Drill-Tec™ RhinoBond® Attachment System

"Your Fast-And-Easy Option For Fastening Single-Ply Membranes"

Increased Productivity… installs in half the time as traditional adhesives. Faster dry-in.
Saves on Materials… no half sheets needed, fewer fasteners
Helps Reduce Risk… non-penetrating fastening system which can help reduce installation errors
Consistent Installation… machine beeps, alerting the user the sheet is welded
Excellent Wind Uplift Performance… spreads the wind load evenly across the roof

The RhinoBond® welded membrane spreads the wind load evenly across the roof (left, above) as opposed to the traditional in-seam fastening method (right, above), leading to less flutter – especially with wide sheets.

The Drill-Tec™ RhinoBond® Attachment System allows roofers to achieve the look and performance of a fully adhered roof at nearly the cost of a mechanically attached system. This system is designed for use over many insulation systems: EnergyGuard™ Polyiso, EnergyGuard™ HD/HD PLUS Polyiso, DensDeck® Prime, Securock,® high-density wood fiber board, and plywood.

A

B

A. RhinoBond® Induction Welding System
Non-penetrating fastening system for TPO and PVC single-ply roofing.

B. RhinoTrac® Automated Installation Tool
For use with Drill-Tec™ RhinoBond® TPO & PVC XHD® Plates

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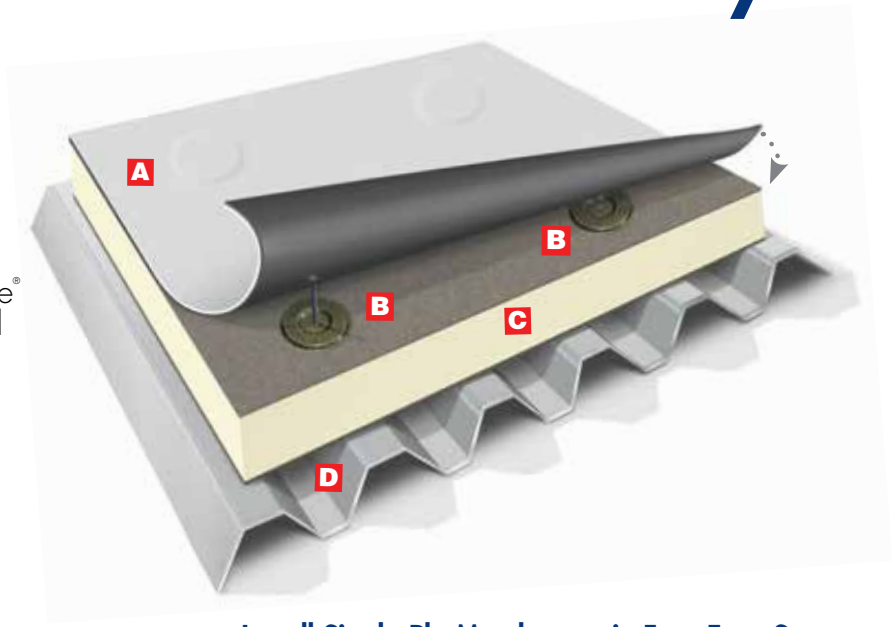
GAF EVERGUARD

Drill-Tec™ RhinoBond® Attachment System

GAF EverGuard

Single-Ply Membrane Application ►



A. EverGuard® TPO, EverGuard Extreme® TPO, or EverGuard® PVC **Reinforced Membrane**

B. GAF Drill-Tec™ RhinoBond® **Plates** and **Fasteners**

C. Insulation or cover board

D. Approved **roof deck**

Professional's Best Choice

- **No Fastener Penetrations…** in field or seams of the membrane
- **No Adhesives…** no waiting for cure, no fumes, no mess, no empty pails
- **No VOCs…** safer for the environment, non-polluting LEED® credit eligible
- **Less Flutter…** optimized attachment across entire sheet
- **No Flammable Storage Issues…** at shop, transport, or on roof
- **Faster Install…** quick dry-in; staged installation option
- **Fewer Hassles…** no half sheets in perimeter — and fewer seams too
- **High Wind Uplift Capability…** FM-approved system details available
- **Backed by GAF,** North America's largest roofing manufacturer

Install Single-Ply Membranes in Four Easy Steps

Step 1

Attach insulation or cover boards to deck using Drill-Tec™ RhinoBond® Plates and Fasteners.

Step 2

Roll out EverGuard® TPO 45, 60, or 80 mil membrane or EverGuard Extreme® TPO 50, 60, 70, or 80 mil membrane.

Step 3

Place RhinoBond® tool over coated plate… and push the button. Wait about 5 seconds for the beep.

Step 4

Clamp with special magnetic clamp…repeat.

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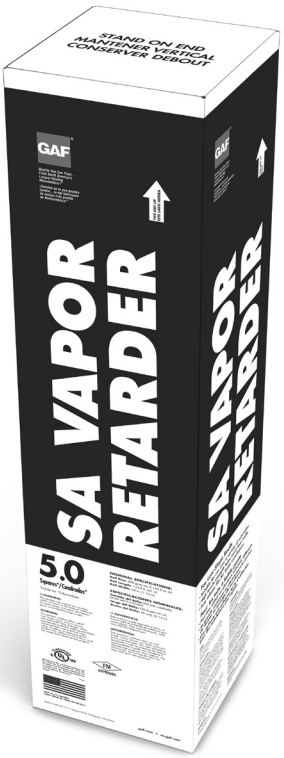
COMDT225

SA VAPOR RETARDER



Description
GAF SA Vapor Retarder is an SBS modified bitumen vapor retarder for use in approved GAF roof assemblies. GAF SA Vapor Retarder is composed of a proprietary formulation of elastomeric styrene-butadiene-styrene (SBS) polymer modified bitumen in combination with a high tack self-adhesive. The topside is surfaced with high-strength tri-laminate polyethylene film and the underside is surfaced with protective polyolefin release film that is removed during application.

Uses
GAF SA Vapor Retarder may be applied to:

- Steel
- Plywood
- Gypsum
- Concrete

Advantages
- 45" (1.1 m) roll provides increased coverage across roof deck
- Easy-to-peel release film for faster installation
- Durable top surface protects roof from inclement weather
- High tensile strength provides resistance to foot traffic

Application:
GAF SA Vapor Retarder can be applied at temperatures between 50°F (10°C) and 100°F (38°C). All substrates except metal decks must be primed. Vapor retarder should be installed with minimum 3" (76.2 mm) side laps and 6" (152.4 mm) end laps.

Applicable Standards
- FM Approved
- UL Listed
- State of Florida approved

Product Specifications (nominal)	
Roll size	5 squares (502.5 gross sq. ft.) (46.68 m^2)
Roll Length	134' (40.8 m)
Roll Width	45" (1.1 m)
Approx. Roll Weight	80 lb. (36.4 kg)

Typical Physical Properties			
Property	**MD Value**	**XMD Value**	**Test Method**
Thickness, mils (mm)	31 (0.8)	31 (0.8)	ASTM D5147
Tensile strength, lbf/in (kN/m)	54 (9.5)	74 (13)	ASTM D5147
Ultimate elongation @ 73.4°F (23°C), %	33	25	ASTM D5147
Tear resistance, lbf (N)	95 (423)	103 (458)	ASTM D1970
Static puncture, lbf (N)	90 (400)	90 (400)	ASTM D5602
Lap adhesion, lbf/ft (N/m)	68 (1000)	68 (1000)	ASTM D1876
Water absorption, %	0.1	0.1	ASTM D5147
Peel resistance, lbf/in (N/m)	5.4 (950)	5.4 (950)	ASTM D903
Cold bending, °F (°C)	-58 (-50)	-58 (-50)	ASTM D5147
Water vapor permeance, perm (ng/Pa.s.m^2)	0.03 (1.7)		ASTM E96
Air permeability, L/s•m^2	< 0.001		ASTM E283

DensDeck®
Prime Roof Board

Updated: 7/17

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North America's Largest Roofing Manufacturer!™

Distributed by:

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DENSDECK®
PRIME ROOF BOARD (1 of 2)

Manufactured by:

Georgia-Pacific Gypsum

133 Peachtree Street, N.E.
Atlanta, GA 30303
Technical: 1-800-225-6119

Description

DensDeck® Prime Roof Board combines exceptional fire resistance, a thermal barrier, and recovery board for use in various commercial roofing systems with a pre-primed surface to make the bond even stronger. The patented DensDeck® Prime Roof Board design employs glass mat facings front and back that are embedded into a water-resistant and moisture-resistant treated gypsum core, providing excellent fire resistance, moisture resistance, and wind uplift properties. The unique construction of DensDeck® Prime Roof Board provides superior flute spanning and will help stiffen and stabilize the roof deck. Additionally, DensDeck® Prime Roof Board has been shown to withstand delamination, deterioration, warping, and job site damage more effectively than roofing membrane substrates such as paper-faced gypsum board, fiber board, and perlite insulation.

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, and re-cover board, as well as an overlayment for polyisocyanurate and polystyrene insulation. DensDeck® can also be used as a foam board for poured gypsum concrete deck in roof applications as well as a substrate for spray form roofing systems. ½" (12.7 mm) and ⅝" (15.9 mm) DensDeck® Prime Roof Board may also be used in vertical applications as a backer board or liner for the roof side of parapet walls. Georgia-Pacific Gypsum offers a limited warranty for up to 90 days of exposure to normal weather conditions when applied vertically on parapet walls. For complete warranty details, visit DensDeck.com.

DensDeck® Prime Roof Board allows the bonding of cold mastic modified bitumen and torching directly to the surface. **Refer to specific membrane system application instructions.** System manufacturers and designers have found DensDeck® Prime Roof Board to be compatible with bonding adhesives for fully adhered single-ply membrane applications and has been shown to extend the adhesive usage.

DensDeck® Prime Roof Board's exceptional moisture resistance and low R-value make it the preferred substrate for vapor retarders. Having excellent fire resistance, DensDeck® Prime Roof Boards feature a noncombustible core and inorganic surface that offers greater fire protection than other conventional commercial roofing products when applied over combustible roof decks and steel decks. DensDeck® Prime Roof Board is FM tested and approved as the only ½" (12.7 mm) gypsum product to meet the calorimeter requirements for conventionally insulated decks. Tested in accordance with ASTM E84, its surface burning characteristics are Flame Spread-0 and Smoke Developed-0. ⅝" (15.9 mm) Dens Deck® Prime Roof Board can replace any generic type X gypsum board in any roof assembly in the UL Fire Resistance Directory under the prefix "P."

Limitations

DensDeck® Prime Roof Boards are designed to act with a properly designed roof system. The actual use of DensDeck® Prime Roof Board as a roofing component is the responsibility of the roofing system's designing authority.

Conditions beyond the control of Georgia-Pacific Gypsum such as weather conditions, dew, application temperatures, and techniques may cause adverse effects with adhered roofing systems. Always consult the roofing system specific manufacturer's instructions for applying the various roofing types to DensDeck® Prime Roof Board.

Panels must be kept dry before, during, and after installation. Apply only as much DensDeck® Prime Roof Board as can be covered by a roof membrane system in the same day.

Accumulation of water due to leaks or condensation in or on DensDeck® Prime Roof Board must be avoided during construction and after construction. Avoid over-use of non-vented direct-fired heaters during winter months. Avoid application of DensDeck® Prime Roof Board during rains, heavy fogs, and other conditions that may deposit moisture on the surface.

When applying solvent-based adhesives or primers, allow sufficient time for the solvent to flash off to avoid damage to roofing components.

Maximum flute span is 2-⅝" (66.7 mm) for ¼" (6.35 mm) DensDeck® Prime; 5" (127 mm) for ½" (12.7 mm) DensDeck® Prime; and 8" (203 mm) for ⅝" (15.9 mm) DensDeck® Prime Fireguard® Type X.

Refer to the installation instructions for the specific roof system to be installed for additional requirements.

Technical Data

Flame spread 0, smoke developed 0, when tested in accordance with ASTM E84 or CAN/ULC-S102. Noncombustible when tested in accordance with ASTM E136.

DensDeck® Prime Fireguard®: UL Classified when tested in accordance with ASTM E119.

¼" (6.35 mm) DensDeck® Prime Roof Board has been tested at FM approvals for 60 psf and 90 psf wind uplift for BUR, EPDM, thermoplastics, and modified bitumen roof systems. Higher wind uplift ratings have been achieved by numerous membrane manufacturers using DensDeck® Prime Roof Boards in their FM-approved construction designs.

Note: *DensDeck® is a registered trademark of Georgia Pacific.*

Product Specifications (nominal)

Thickness	¼" – 6 mm; ½" – 13 mm; ⅝" – 15.9 mm Fireguard® Type X
Widths	4' – 1.22 m standard, ⅛" – 3 mm tolerance
Lengths	8' – 2,440 mm standard, tolerance ¼" – 6.35 mm; Optional: 4' (1,220 mm) Available
Edges	Square
Spanning	¼" (6.35 mm) DensDeck® Prime Roof Board spans flute widths up to 2 ⅝" (66.7 mm) ½" (12.7 mm) DensDeck® Prime Roof Board spans flute widths up to 5" (127 mm) ⅝" (15.9 mm) DensDeck® Prime Roof Board spans flutes up to 8" (203 mm) wide

Distributed by:

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DENSDECK® PRIME ROOF BOARD (2 of 2)

Manufactured by:

Georgia-Pacific Gypsum

133 Peachtree Street, N.E.
Atlanta, GA 30303
Technical: 1-800-225-6119

Installation

1. DensDeck® Prime Roof Board should be used with fasteners specified in accordance with FM requirements and roof membrane manufacturer's written recommendations.
2. For wind uplift/FM compliance where DensDeck® Prime Roof Board is mechanically attached to metal decks, DensDeck® Prime Roof Board shall be installed to the specifics of the FM design assembly.
3. For installations involving BUR, EPDM, thermoplastics, and modified bitumen roof systems, call GP's Technical Hotline at 1-800-225-6119 for fastener patterns of Georgia-Pacific's FMRC uplift assemblies.
4. In accordance with approved shop drawings, FM-approved fasteners shall be installed with plates through the DensDeck® Prime Roof Board, flush with the surface.
5. Where DensDeck® Prime Roof Board is installed over combustible wood decks or insulation, all joints should be staggered. The optional separator sheet should be installed prior to DensDeck® Prime Roof Board installation.
6. Edge joints should be located on, and parallel to, deck ribs. End joints of adjacent lengths of DensDeck® Prime Roof Board should be staggered.
7. DensDeck® Prime Roof Board shall be installed with ends and edges butted tightly.
8. DensDeck® Prime Roof Board is manufactured to meet ASTM C1177.

PHYSICAL PROPERTIES

PROPERTIES	1/4" (6.4 mm)	1/2" (12.7 mm)	5/8" (15.9 mm)
Thickness, nominal	1/4" (6.4 mm) ± 1/16" (1.6 mm)	1/2" (12.7 mm) ± 1/32" (0.8 mm)	5/8" (15.9 mm) ± 1/32" (0.8 mm)
Width, standard	4' (1,219 mm) ± 1/8" (3 mm)	4' (1,219 mm) ± 1/8" (3 mm)	4' (1,219 mm) ± 1/8" (3 mm)
Length, standard	4' (1,219 mm) & 8' (2,438 mm) ± 1/4" (6.4 mm)	4' (1,219 mm) & 8' (2,438 mm) ± 1/4" (6.4 mm)	4' (1,219 mm) & 8' (2,438 mm) ± 1/4" (6.4 mm)
Weight nominal, lbs./sq. ft. (Kg/m²)[7]	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 (>970)
R Value[4], ft²•°F•hr/BTU (m²•K/W)	.28	.56	.67
Lineal Variation with Change in Temp., in/in °F (mm/mm/°C)	8.5x10⁶ (15.3x10⁶)	8.5x10⁶ (15.3x10⁶)	8.5x10⁶ (15.3x10⁶)
Lineal Variation with Change in Moisture	6.25x10⁶	6.25x10⁶	6.25x10⁶
Water Absorption[5], % max	<10.0	<10.0	<10.0
Compressive Strength[6], psi nominal	900	900	900
Surface Water Absorption, grams, nominal[1]	<2.0	<2.0	<2.0
Flame Spread, Smoke Developed (ASTM E84, UL 723, CAN/ULC-S102)	0/0	0/0	0/0
Fire Classification	UL Classified FM Approvals	UL Classified FM Approvals	UL Classified FM Approvals
Bending Radius	4' (1,219 mm)	6' (1,829 mm)	8' (2,438 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 C518 (heat flow meter). *[5] Specified values per ASTM C1177.* *[6] Tested in accordance with ASTM C473.*
[7] Represents approximate weight for design and shipping purposes. Actualweight may vary based on manufacturing location and other factors.

MOLD RESISTANCE. *When tested, as manufactured, in accordance with ASTM D3273, DensDeck® Roof Boards have scored a 10, the highest level of performance for mold resistance under the ASTM D3273 test method. The score of 10, in the ASTM D3273 test, indicates no mold growth in a 4-week controlled laboratory test. The mold resistance of any building product when used in actual job site conditions may not produce the same results as were achieved in the controlled, laboratory setting. No material can be considered mold proof. For additional information, go to www.buildgp.com/safetyinfo.*

EnergyGuard™ Polyiso Insulation
20 & 25 PSI
Data Sheet

Updated: 6/16

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North America's Largest Roofing Manufacturer!™

ENERGYGUARD™
POLYISO INSULATION, 20 & 25 PSI (1 of 2)

Description
EnergyGuard™ Polyiso Insulation is made of glass fiber-reinforced cellulosic felt facers bonded to a core of polyisocyanurate foam. Available in 4' x 4' (1.21 m x 1.21 m) or 4' x 8' (1.21 m x 2.44 m) and in thicknesses ranging from 1" to 4.6" (25.4 mm - 116.8 mm).

Uses
- EnergyGuard™ Polyiso Insulation is designed for use over structural roof decks where R-values of 5.7 or higher are required, along with comprehensive UL and FM approvals.
- Meets FM 4450/4470 and UL1256/790/263.
- When properly installed, it is suitable for use under built-up, modified bitumen, and most single-ply roofing systems.
- Refer to the application specifications in the current membrane manufacturer's application and specifications manual for proper membrane installation procedures.
- Meets ASTM C1289 Type II, Class 1, Grade 2 (20 psi), and available in Grade 3 (25 psi).

Advantages
- High insulation value — Excellent "LTTR" value compared to any other FM Class I rated products of equivalent thickness.
- Manufactured with EPA-compliant blowing agents.
- Lightweight — Lighter than most other insulating products offering comparable thermal resistance; as much as five times lighter in weight than many other materials with the same R-value.
- Excellent dimensional stability.
- Low water permeability — Lower overall perm rating than many conventional insulation boards.
- High moisture resistance and no capillarity; is stable and maintains its physical and insulating characteristics.
- Easier handling and faster to install — Because of its light weight, this material is easier to handle on the job site and installs faster. Easier cutting in the field provides the installer with simplified fabricating on the roof deck. Minimizes on-the-job damage.

WARNING: DO NOT EXPOSE TO OPEN FLAME OR EXCESSIVE HEAT. MAY SMOLDER IF IGNITED. IF IGNITED, EXTINGUISH COMPLETELY.

Thermal and Physical Characteristics[1]

Thickness* Inches	Thickness* mm	LTTR (R-Value**)	Max. Flute Spanability Inches	Max. Flute Spanability mm
1.0	25.4	5.7	2 5/8	66.7
1.1	27.9	6.3	2 5/8	66.7
1.2	30.5	6.8	2 5/8	66.7
1.3	33.0	7.4	2 5/8	66.7
1.4	35.6	8.0	4 3/8	111
1.5	38.1	8.6	4 3/8	111
1.6	40.6	9.1	4 3/8	111
1.7	43.1	9.7	4 3/8	111
1.75	44.5	10.0	4 3/8	111
1.8	45.7	10.3	4 3/8	111
1.9	48.3	10.8	4 3/8	111
2.0	51	11.4	4 3/8	111
2.1	53	12.0	4 3/8	111
2.2	56	12.6	4 3/8	111
2.3	58	13.2	4 3/8	111
2.4	61	13.8	4 3/8	111
2.5	64	14.4	4 3/8	111
2.6	66	15.0	4 3/8	111
2.7	69	15.6	4 3/8	111
2.8	71	16.2	4 3/8	111
2.9	74	16.8	4 3/8	111
3.0	76	17.4	4 3/8	111
3.1	79	18.0	4 3/8	111
3.2	81	18.6	4 3/8	111
3.25	83	18.9	4 3/8	111
3.3	84	19.2	4 3/8	111
3.4	86	19.9	4 3/8	111
3.5	89	20.5	4 3/8	111
3.6	91	21.1	4 3/8	111
3.7	94	21.7	4 3/8	111
3.8	97	22.3	4 3/8	111
3.9	99	23.0	4 3/8	111
4.0	102	23.6	4 3/8	111
4.1	104	24.2	4 3/8	111
4.2	106	24.9	4 3/8	111
4.3	109	25.5	4 3/8	111
4.4	112	26.1	4 3/8	111
4.5	114	26.8	4 3/8	111
4.6	116	27.1	4 3/8	111

*Other thicknesses available upon request.
**Long Term Thermal Resistance Values provide a 15-year time weighted average in accordance with CAN/ULC S770.
[1]Note: Physical and thermal properties shown are based on data obtained under controlled laboratory conditions and are subject to normal manufacturing tolerances.

Code Compliance
CLASSIFIED cULus · FM APPROVED · MIAMI-DADE COUNTY APPROVED · PIMA QualityMark* (Statesboro, GA/ Gainesville, TX) · State of Florida Approved

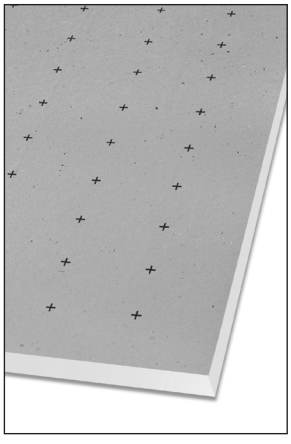
*Product certified at time of publication. Consult with manufacturer and the PIMA quality mark program directory on the PIMA website (www.pima.org).

Typical Physical Properties

Property	Value	Test Method
Water Absorption, % by Volume – 2 hours (under 1" [25.4 mm] water)	1.5 max.	ASTM C209
Dimensional Stability Change, 7 days @158°F (70°C), 97% RH • Length + Width	<2%	ASTM D2126
Compressive Strength — psi (kPa)	25 (172) nom. Grade 3 20 (138) nom. Grade 2	ASTM D1621
Tensile Strength — psf (kPa)	≥ 500 (23.9)	ASTM C209
Moisture Vapor Transmission	<1.5 perm (85.8ng/Pa•s•m²)	ASTM E96 (Procedure A)
Flame Spread[(1),(2)] Index	<75	ASTM E84
Service Temperature	-100 to 200°F (-73.3 to 93.3°C)	

[(1)]Foam core only.
[(2)]These numerical ratings are not intended to reflect hazards presented by these or any other material under actual fire conditions.

EnergyGuard™ Polyiso Insulation



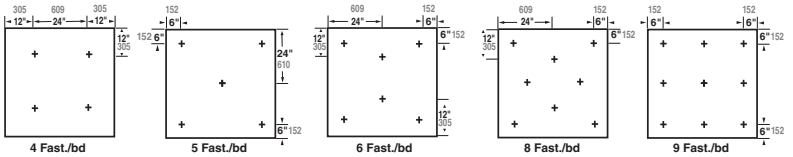
ENERGYGUARD™
POLYISO INSULATION, 20 & 25 PSI (2 of 2)

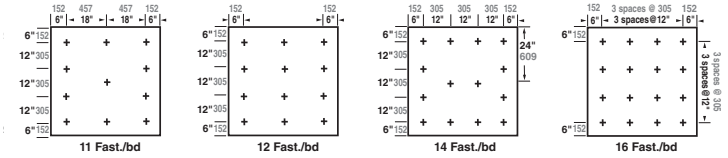
Limitations and Potential Fire Hazard

- EnergyGuard™ Polyiso Insulation is a non-structural, non load-bearing material. It is not designed for direct traffic usage unless adequately protected.
- EnergyGuard™ Polyiso Insulation should be stored protected from the elements. Bundle wrap is not for use as waterproofing for boards. No more insulation should be installed than can be completely covered with roofing on the same day.
- As unprotected polyisocyanurate will burn, fire safety precautions should be observed wherever insulation products are used.
- Direct mopping of modified bitumen roofing or built-up roofing (BUR) to EnergyGuard™ Polyiso Insulation is not approved.

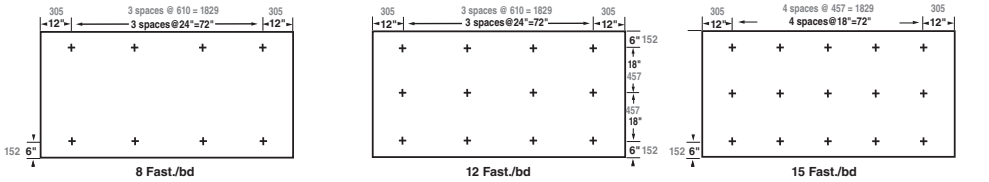
Design Considerations – Suggested Insulation Fastener Patterns (NOTE: Measurements in GRAY are in millimeters)

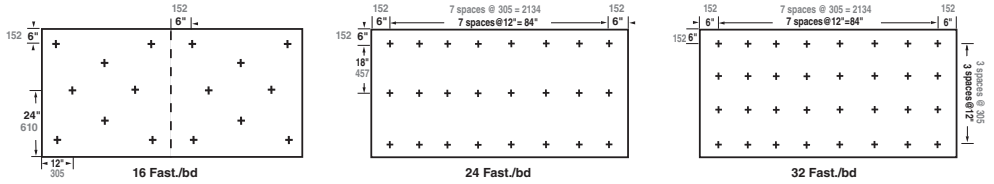
4' x 4' (1220 x 1220) Boards





4' x 8' (1220 x 2440) Boards





NOTE: These patterns are for FM Approved decks utilizing appropriate FM Approved screws and insulation plates when installed per RoofNav. Consult FM Loss Prevention Data Sheets 1-29 for specific perimeter and corner fastening details. For proper attachment, fasteners must penetrate the flange or the metal deck a minimum of 3/4 inch (19.1 mm). Due to ongoing testing programs and changes in FM Global (FM) requirements, the number of fasteners and their placement are subject to change without notice. Consult RoofNav and FM Global Loss Prevention Data Sheets 1-28, 1-29, and 1-29R for approved fastener density for Polyisocyanurate Roof Insulations. If your fastener pattern is not listed, please contact Technical Services at 1-800-766-3411.

EverGuard® Diamond Pledge™ NDL Roof Guarantee

(COMTS700)

Updated: 3/16

Quality You Can Trust…From
North America's Largest Roofing Manufacturer!™

EverGuard® DIAMOND PLEDGE™ NDL ROOF GUARANTEE

No. _____

OWNER: _____ PERIOD OF COVERAGE: _____ YEARS

NAME AND TYPE OF BUILDING: _____

ADDRESS OF BUILDING: _____

ROOF SPECIFICATION: _____ AREA OF ROOF: _____ SQUARES

APPLIED BY: _____

DATE OF COMPLETION: _____ GUARANTEE EXPIRATION DATE: _____

THE GUARANTEE/SOLE AND EXCLUSIVE REMEDY

GAF guarantees to you, the owner of the building described above, that GAF will provide "Edge To Edge" protection by repairing leaks through the GAF roofing membrane, liquid-applied membrane or coating, base flashing, high wall waterproofing flashing, insulation, expansion joint covers, preflashed accessories, and metal flashings used by the contractor of record that meet SMACNA standards (the "GAF Roofing Materials") resulting from a manufacturing defect, ordinary wear and tear, or workmanship in applying the GAF Roofing Materials. There is no dollar limit on covered repairs. Leaks caused by any non-GAF materials, such as the roof deck or non-GAF insulation, are not covered.

GUARANTEE PERIOD

This guarantee ends on the expiration date listed above. **NOTE:** Lexsuco® flashings are covered by this guarantee **ONLY** for the first ten years.

OWNER RESPONSIBILITIES

Notification of Leaks

In the event of a leak through the GAF Roofing Materials, you **MUST** make sure that GAF is notified directly about the leak, in writing, within **30 days** by email (preferred) at guaranteeleak@gaf.com or by postal mail to GAF Guarantee Services, 1 Campus Drive, Parsippany, NJ 07054, or GAF will have no responsibility for making repairs. **NOTE:** The roofing contractor is **NOT** an agent of GAF; notice to the roofing contractor is **NOT** notice to GAF.

By notifying GAF, you authorize GAF to investigate the cause of the leak. If the investigation reveals that the leak is not covered by this guarantee, you agree to pay an investigation cost of $500. This guarantee will be cancelled if you fail to pay this cost within 30 days of receipt of an invoice for it.

Preventative Maintenance and Repairs

A. You must perform regular inspections and maintenance and keep records of this work.

B. To keep this guarantee in effect, you must repair any conditions in the building structure or roofing system that are not covered by this guarantee but that GAF concludes may be threatening the integrity of the GAF Roofing Materials. Any such repairs must be performed by a GAF-certified roofing contractor. Failure to make timely repairs may jeopardize guarantee coverage.

C. You may make temporary repairs to minimize damage to the building or its contents in an emergency, at your sole expense. These repairs will not result in cancellation of the guarantee as long as they are reasonable and customary and do not result in permanent damage to the GAF Roofing Materials.

D. Any equipment or material that impedes any inspection or repair must be removed at your expense so that GAF can perform inspections or repairs.

EXCLUSIONS FROM COVERAGE

(e.g., items that are not "ordinary wear and tear" or are beyond GAF's control)

This guarantee does **NOT** cover conditions other than leaks. This guarantee also does **NOT** cover leaks caused by any of the following:

1. Inadequate roof maintenance, that is, the failure to follow the Scheduled Maintenance Checklists provided with this guarantee (extra copies available by calling Guarantee Services at 1-800-ROOF-411) or the failure to repair owner responsibility items.
2. Unusual weather conditions or natural disasters including, but not limited to, winds in excess of 55 miles per hour, hail, floods, hurricanes, lightning, tornados, and earthquakes, unless specifically covered by an addendum to this guarantee.
3. Impact of foreign objects or physical damage caused by any intentional or negligent acts, accidents, misuse, abuse or the like.
4. Damage to the roof constructed of the GAF Roofing Materials due to: (a) movement, cracking, or other failure of the roof deck or building; (b) improper installation or failure of any non-GAF insulation or materials; (c) condensation or infiltration of moisture through or around the walls, copings, building structure, or surrounding materials except where high wall GAF waterproofing flashings are installed; (d) chemical attack on the membrane, including, but not limited to, exposure to grease or oil; (e) the failure of wood nailers to remain attached to the structure; (f) use of materials that are incompatible with the GAF Roofing Materials; or (g) architectural, engineering, or design defects or flaws.
5. Traffic of any nature on the roof unless using GAF walkways applied in accordance with GAF's published application instructions.
6. Blisters in the GAF Roofing Materials that have not resulted in leaks.
7. Changes in the use of the building or any repairs, modifications, or additions to the GAF Roofing Materials after the roof is completed, unless approved in writing by GAF.
8. Exposure to sustained high-temperature conditions; however, for systems utilizing EverGuard Extreme® TPO membrane, exposure in excess of 195°F.

No representative, employee, or agent of GAF, or any other person, has the authority to assume any additional or other liability or responsibility for GAF, unless it is in writing and signed by an authorized GAF Field Services Manager or Director. GAF does not practice engineering or architecture. Neither the issuance of this guarantee, nor any review of the roof constructed of the GAF Roofing Materials (or the plans for the roof), by GAF shall constitute any warranty of such plans, specifications or construction or the suitability or code compliance of the GAF Roofing Materials for any particular structure. **NOTE:** Any inspections made by GAF are limited to a surface inspection only, are for GAF's sole benefit, and do not constitute a waiver or extension of any of the terms and conditions of this guarantee.

This guarantee MAY BE SUSPENDED OR CANCELLED IF THE ROOF IS DAMAGED BY any cause listed above as AN EXCLUSION FROM COVERAGE that may affect the integrity or watertightness of the roof.

TRANSFERABILITY

You may transfer or assign this guarantee to a subsequent owner of this building for the remaining term only if: 1) the request is in writing to GAF at the address listed below within 60 days after ownership transfer; 2) you make any repairs to the GAF Roofing Materials or other roofing or building components that are identified by GAF after an inspection as necessary to preserve the integrity of the GAF Roofing Materials; and 3) you pay an assignment fee of $500. This guarantee is NOT otherwise transferable or assignable by contract or operation of law, either directly or indirectly.

LIMITATION OF DAMAGES; MEDIATION; JURISDICTION; CHOICE OF LAW

THIS GUARANTEE IS EXPRESSLY IN LIEU OF ANY OTHER GUARANTEES OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, and of any other obligations or liability of GAF, whether any claim against it is based upon negligence, breach of warranty, or any other theory. In NO event shall GAF be liable for any CONSEQUENTIAL OR INCIDENTAL DAMAGES of any kind, including, but not limited to, interior or exterior damages and/or mold growth.

The parties agree that, as a condition precedent to litigation, any controversy or claim relating to this guarantee shall be first submitted to mediation before a mutually acceptable mediator. In the event that mediation is unsuccessful, the parties agree that neither one will commence or prosecute any lawsuit or proceeding other than before the appropriate state or federal court in the State of New Jersey. This guarantee shall be governed by the laws of the State of New Jersey, without regard to principles of conflicts of laws. Each party irrevocably consents to the jurisdiction and venue of the above identified courts.

NOTE: GAF shall have no obligation under this guarantee unless and until all bills for installation and supplies have been paid in full to the roofing contractor and materials suppliers, and the guarantee charge has been paid to GAF.

This guarantee must have a raised seal to be valid.

GAF
1 Campus Drive
Parsippany, NJ 07054

By: _____
Authorized Signature Date

COMTS700

EverGuard® Diamond Pledge™ NDL Roof Guarantee

With True "Edge-To-Edge" Coverage

Important Information On Your Guarantee Coverage...

Congratulations on selecting a GAF EverGuard® Diamond Pledge™ NDL Roof Guarantee. GAF is proud to provide you with extraordinary guarantee coverage for your new roofing system.

- The EverGuard® Diamond Pledge™ NDL Roof Guarantee provides you with comprehensive system protection so that if your new GAF roofing system leaks from a manufacturing defect or workmanship error, the costs of repair are 100% covered (see your *EverGuard® Diamond Pledge™ NDL Roof Guarantee* for complete coverage and restrictions).

First, let's understand the responsibilities of ownership...

- It's common sense... if you own something and you want it to perform, you have to maintain it. After all, you wouldn't expect...
  - a smoke alarm to go off with a dead battery
  - your furnace to perform efficiently if you never changed the filter
  - your car to run if you never changed the oil

Your new roof is no exception.

Simply put... maintenance is a responsibility of ownership. Without basic maintenance, your assets will diminish in value. With basic maintenance, you can preserve them and enjoy years of reliable service.

Your new roof is protected by the extraordinary EverGuard® Diamond Pledge™ NDL Roof Guarantee coverage, plus you may be eligible for the added benefits of...

• Up to 25% of additional duration... with the WellRoof® Guarantee Extension[1]

We've put together a program designed to help reduce the risk of the unexpected expense and unnecessary disruption that may occur if your roof leaks.

The WellRoof® Guarantee Extension can add up to 25% additional duration to your EverGuard® Diamond Pledge™ NDL Roof Guarantee coverage, when you maintain your roof with the services of a **GAF Certified Maintenance Professional.**

Protect your asset and get longer protection from your guarantee with **The WellRoof® Guarantee Extension** and a maintenance program you can trust, executed by a GAF Certified Maintenance Professional. Call 1-800-ROOF-411 or visit gaf.com for information about a Certified Maintenance Professional in your area.

Need more info on saving money with a roof maintenance program? See the WellRoof® Brochure at gaf.com.

[1] See the *WellRoof® Guarantee Extension* for complete coverage and restrictions.