PRRF20251279

Full-Sized legible color report must be on site and made available by the Permittee for all inspections.

SUBMITTAL

Date: 09/25/2025

PREPARED BY: LACEY BOURN – JIMMY'S ROOFING
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To: CENTENNIAL CONSTRUCTION

City of Puyallup
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DURO-LAST® 60-MIL MEMBRANE

Advantages:
Duro-Last® 60-Mil (DL60) is an excellent choice for projects requiring a long lasting, energy efficient roofing membrane. The membrane is available in custom-fabricated sections or as roll goods. A complete line of custom-fabricated accessories and parapets are available for use with DL60.

Description:
DL60 is composed of PVC film laminated to both sides of a reinforcement fabric (weft-inserted scrim).

Duro-Last membranes must not be used with Duro-Last EV membranes.

PVC Film – Proprietary thermoplastic PVC formulation of resins, plasticizers, stabilizers, biocides, flame retardants, and U.V. absorbents.

- PVC film above weft-inserted scrim – 28 mil, nominal

Weft-Inserted Scrim – An 18 x 14 polyester fabric construction with weft insertion, composed of 840 x 1000 denier threads, provides superior tear and puncture resistance. The polyester thread is treated to prevent wicking.

Total Thickness – 60 mil, nominal.

Weight – 0.36 lb. per square foot.

Colors – White, tan, gray and dark gray.

R-Value – 0.1 R (0.1 $ft^2 \cdot °F \cdot hr/Btu$).

Available Configurations:

Custom-fabricated Sections – DL60 is available in custom-fabricated sections as listed within the Ordering and Estimating section on the Duro-Last website.

Roll Dimensions[1]

Width	Length (max.)	Roll Area	Approx. Weight	Approx. Coverage[2]
64 inches	100 ft.	533 sq. ft.	192 lb.	483 sq. ft.
64 inches	50 ft.	267 sq. ft.	97 lb.	241 sq. ft.
32 inches	100 ft.	267 sq. ft.	97 lb.	217 sq. ft.
12 inches	100 ft.	100 sq. ft.	36 lb.	N/A
8 inches	100 ft.	67 sq. ft.	25 lb.	N/A

[1] Custom rolls of maximum 64 in. by 240 ft. may be produced upon request.
[2] Assuming 6-inch overlap.

Energy Efficiency:
White DL60 is an excellent product for complying with California Title 24, LEED® and other energy efficiency programs requiring the use of a highly reflective roof membrane.

Cool Roof Rating Council (CRRC)

	CRRC ID	Solar Reflectance		Thermal Emittance		Solar Reflective Index (SRI)	
		Initial	3-yr	Initial	3-yr	Initial	3-yr
White	0610-0001a	0.86	0.74	0.89	0.89	108	91
Tan	0610-0005	0.39	0.33	0.89	0.89	43	35
Gray	0610-0004	0.47	0.40	0.89	0.89	54	45
Dark Gray	0610-0006	0.26	0.25	0.87	0.89	25	25

LEED-NC & LEED-EB Credits – White DL60 alone can obtain 1 credit in either U.S. Green Building Council's LEED-NC or LEED-EB programs. In combination with other design criteria the membrane may help attain other credits.

LEED-NC Credit Category	Duro-Last Attribute
Sustainable Sites Heat Island Reduction	Solar Reflective Index (SRI) = 108

LEED-EB Credit Category	Duro-Last Attribute
Sustainable Sites Heat Island Reduction	Solar Reflective Index (SRI) = 108

Warranty:
The following warranties are available for projects utilizing DL60. Contact Duro-Last for warranty details.

Available Warranties					
Supreme	15-Year NDL Warranty	20-Year NDL Warranty – 15 Years Consequential Damages And 5 Years Material	20-Year NDL Warranty – 15 Years Consequential Damages And 5 Years Material and Labor		
Ultra	15-Year NDL Hail Warranty[1]	15-Year NDL Hail & High Wind Warranty[1]	15-Year NDL High Wind Warranty[1]	20-Year NDL High Wind Warranty[1]	25-Year NDL High Wind Warranty[1, 2]
Basic	15-Year NDL Warranty[1]	20-Year NDL Warranty[1]	25-Year NDL Warranty[1, 2]		
Residential	15-Year Residential Material Limited Warranty[1]	20-Year Residential Material Limited Warranty[1]			

[1] Excludes consequential damage coverage.
[2] Refer to the 25 and 30-Year Warranty Requirements for additional installation criteria.

Revised: 11/13/2013, 05/28/2014, 06/05/2014, 01/23/2015, 05/18/2015, 01/22/2016, 02/15/2016, 08/15/2017, 03/29/2019, 09/23/2021, 08/04/2022, 05/22/2024

Codes and Standards:
Underwriters Laboratories (US & Canada), UL Evaluation Report (ER10128), FM Approvals, Canadian Construction Materials Centre (CCMC 13299-L), State of Florida, Miami-Dade County, Texas Department of Insurance.

Storage:
Store rolls lengthwise on pallets. Use tarps to keep rolls dry.

Membrane Attachment:

Mechanically Fastened – DL60 may be mechanically fastened to a variety of roof deck and wall materials. An appropriate slip sheet, insulation or cover board may be required. Refer to the Duro-Last Mechanically Fastened Roofing System Specification for custom-fabricated system requirements. If using roll goods, refer to the Duro-Last Roll Good Mechanically Fastened Roofing System Specification.

Induction welded – Induction welding may be used to attach DL60. An appropriate slip sheet, insulation or cover board may be required. Refer to the Duro-Bond® Induction Weld Roofing System Specification for system requirements.

Adhered – DL60 may be adhered to a variety of properly prepared roof decks, walls, cover boards and insulations. Refer to the Adhered Roofing System Specification for system requirements.

Physical Properties:
DL60 has been subjected to the tests required by ASTM D4434 "*Standard Specification for Poly (Vinyl Chloride) Sheet Roofing"* and has been classified as a Type III, internally reinforced sheet. The results of each test are listed below. ASTM's Overall Thickness requirements for the membrane are plus or minus 10% (nominal) of the listed Typical Value.

Physical Property	Test Method	ASTM D4434 Requirement	Result	Typical Value
Overall Thickness	ASTM D751	≥ 0.054 and ≤ 0.066 in. (≥ 54 and ≤ 66 mil)	PASS	0.060 in. (60 mil), nominal
Thickness Over Scrim	ASTM D7635	≥ 0.016 in.	PASS	0.028 in. (28 mil)
Breaking Strength[1]	ASTM D751 Grab Method	≥ 200 lbf./in.	PASS	438 x 390 lbf./in.
Elongation[1]	ASTM D751 Grab Method	≥ 15%	PASS	31% x 31%
Seam Strength	ASTM D751 Grab Method	≥ 328 lbf. (75% of Breaking Strength.)	PASS	431 lbf.
Tear Strength[1]	ASTM D751 Procedure B	≥ 45 lbf.	PASS	132 x 163 lbf.
Low Temp. Bend	ASTM D2136	Must pass at -40° F.	PASS	PASS
Heat Aging	ASTM D3045	Conditioned for 56 days in oven maintained at 176° F.	PASS	PASS
Accelerated Aging	ASTM G155	10,000 hours total test time. Irradiance level of 0.35 W/m^2-340nm. Cycle: 102 minutes light, 18 minutes light + H_20 spray, 63±2.5° C black panel, 30±5% RH	PASS	PASS
Dimensional Stability[1]	ASTM D1204	Conditioned for 6 hours in oven maintained at 176° F. Allowable change: ≤ 0.5%	PASS	-0.45% x -0.20%
Water Absorption	ASTM D570	Immersed in water at 158° F for 168 hours. Allowable weight change: ≤ 3%	PASS	2.6%
Static Puncture	ASTM D5602	≥ 33 lbf.	PASS	56 lbf.
Dynamic Puncture	ASTM D5635	≥ 14.7 ft-lbf. (20 J)	PASS	≥ 14.7 ft-lbf. (20 J)

[1] Typical values are shown for both machine and cross machine directions. The machine direction results are listed first.

Additional Tests

Fungi Resistance	ASTM G21	No Sustained Growth or Discoloration
Moisture Vapor Transmission	ASTM E96, Proc. B, Method A	< 0.35 U.S. perms

Revised: 11/13/2013, 05/28/2014, 06/05/2014, 01/23/2015, 05/18/2015, 01/22/2016, 02/15/2016, 08/15/2017, 03/29/2019, 09/23/2021, 08/04/2022, 05/22/2024

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DURO-GUARD® DENSDECK® 1/2-INCH ROOF BOARD

Description

DensDeck® Roof Board is an exceptional fire barrier, thermal barrier, coverboard and recovery board used in various Duro-Last® roofing systems. The DensDeck Roof Board design employs fiberglass mats, front and back, that are mechanically bonded to a high density gypsum core, providing excellent fire resistance and wind uplift properties. The unique construction of DensDeck Roof Board provides superior flute spanning that stiffens and provides increased foot traffic resistance to the roof deck. Additionally, DensDeck Roof Board has been shown to withstand delamination, deterioration and job-site damage far more effectively than roofing membrane substrates such as paperfaced gypsum board, fiberboard and perlite insulation. DensDeck Roof Board has scored a 10, the highest level of performance for mold resistance per the ASTM D3273 test method.

Primary Uses

DensDeck Roof Board can be used as a substrate board, recovery board and overlayment protection board for polyisocyanurate and polystyrene insulation.

Standards and Code Approvals

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

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

Recommendations and Limitations

DensDeck Roof Boards are manufactured to act with a properly designed roof system following good roofing practices. The actual use of DensDeck Roof Board as a roofing component in any system or assembly is the responsibility of the roofing system's design authority. Consult with the appropriate design authority for system and assembly specifications and instructions on applying other products to DensDeck Roof Board.

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

Moisture Management

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

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

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

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

Although DensDeck Roof Boards are engineered with fiberglass facings and high density gypsum cores, the presence of free moisture can have a detrimental effect on the performance of the product. Moisture accumulation may also significantly decrease wind uplift and vertical pull resistance in the system or assembly. DensDeck Roof Boards containing excessive free moisture content may need to be evaluated for structural stability to assure wind uplift performance.

Created: 01/07/2015

Fire Resistance Classifications

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

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

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

FM Class 1 Approvals. DensDeck Roof Boards are included in numerous roofing assemblies with a Factory Mutual (FM) Class 1 fire rating. For more information concerning FM Approvals and FM Class 1 assemblies with DensDeck Roof Boards, consult FM or RoofNav®.

UL Fire Resistance Ratings. For information concerning UL fire rated assemblies, please visit www.ul.com.

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

Wind Uplift

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

Handling and Use–CAUTION

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

Physical Properties

Properties	1/2" (12.7 mm)
Thickness, nominal	1/2" (12.7 mm) ± 1/32" (.8 mm)
Width, standard	4' (1219 mm) ± 1/8" (3 mm)
Length, standard	8' (2438 mm) ± 1/4" (6.4 mm)
Weight, nominal, lbs./sq. ft. (Kg/m^2)	2.0 (9.8)
Surfacing	Fiberglass mat
Flexural Strength[1], parallel, lbf. min.	≥80 (356)
Flute Spanability[2]	5" (127 mm)
Permeance[3], Perms	>35 (1995)
R Value[4], ft^2•°F•hr/BTU (m^2•K/W)	.56
Linear Variation with Change in Temp., in/in °F (mm/mm/C°)	8.5 x 10^{-6} (15.3 x 10^{-6})
Linear Variation with Change in Moisture	6.25 x 10^{-6}
Water Absorption[5], % max	<10
Compressive Strength[6], psi nominal	900
Surface Water Absorption, grams, nominal	<2.5
Flame Spread, Smoke Developed (ASTM E84)	0/0
Bending Radius	8' (2438 mm)

1. Tested in accordance with ASTM C473 method B.
2. Tested in accordance with ASTM E661.
3. Tested in accordance with ASTM E96 (dry cup method).
4. Tested in accordance with ASTM C518 (heat flow meter).
5. Tested in accordance with ASTM C1177.
6. Tested in accordance with ASTM C473.

FIRE SAFETY CAUTION

Passing a fire test in a controlled laboratory setting and/or certifying or labeling a product as having a one-hour, two-hour, or any other fire resistance or protection rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other specified fire resistance or protection in an actual fire. In the event of an actual fire, you should immediately take any and all actions necessary for your safety and the safety of others without regard for any fire rating of any product or assembly/system.

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DURO-GUARD® EPS TYPE I

FLUTE FILLER

Description:

Duro-Guard® EPS Type I, for use as flute filler within metal retrofit roof systems, is a premium insulation consisting of a superior closed-cell, lightweight and resilient expanded polystyrene (EPS). It meets or exceeds the requirements of ASTM C 578, *Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.*

- Available in both straight and taper-cut panels to conform to metal flute configurations.
- Provides long-term thermal insulation value.
- Does not contain CFCs or HCFCs.
- Superior moisture resistance.
- 100% recyclable.
- Available in 1.0 pcf density per ASTM C 578.
- Refer to Table 2 for physical properties.

Recommended Uses:

- Flute filler **only** within metal retrofit roof systems.

Underwriters Laboratories Inc.:

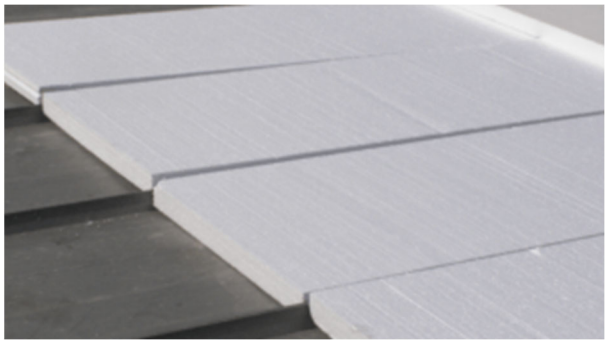
- Refer to the Duro-Last® UL Listings (TGFU.R10128) for assembly details (www.ul.com).

Factory Mutual Global:

- Refer to RoofNav® for details on FM Approved systems (www.roofnav.com)**.**

Panel Sizes:

- Length: 4 ft. (1220 mm) or 8 ft. (2440 mm).
- Width: Custom (straight or taper-cut).
- Thickness: Up to 4 in. (102 mm).



Straight-Cut Flute Filler

Taper-Cut Flute Filler

Installation below ISO and Duro-Last membrane

Created: 10/19/2021

Installation:

- Refer to Detail Drawing 8005 for rigid board insulation and cover board requirements above the flute filler.
- Duro-Guard fan fold **must not** be used above Duro-Guard EPS Type I. Refer to Detail Drawing 8000 for requirements when using Duro-Guard fan fold.
- Flute filler must be kept dry before, during and after installation. Install only as much flute filler as can be covered the same day with completed roofing.
- Abut flute filler edges together.

Panel Attachment:

- Flute filler may be attached to the roof deck using mechanical fasteners or insulation adhesive. It is acceptable to use these products in combination.

Mechanically Fastened

- Hold the flute filler in place with at least 1 approved Duro-Last plate/fastener.
- Only use fasteners and plates supplied by or approved by Duro-Last, Inc.

Adhered

- Insulation adhesive must be supplied by Duro-Last, Inc. Refer to the adhesive's product data sheet for application guidelines.

  Acceptable products:
  - Duro-Grip® insulation adhesives.
- Maximum flute filler length is 4 ft. when adhering.

Storage:

- Flute filler must be protected from open flame and kept dry at all times.
- Factory-applied packaging is intended only for protection during transit. Slit or remove the packaging to prevent accumulation of condensation.
- Store elevated (at least 3 inches) and completely covered with a weatherproof covering such as a tarpaulin.
- Do not use flute filler which is wet or damaged.

TABLE 1. TYPICAL THERMAL VALUES

Thickness*		R-Value
Inches	mm	Type I
1.00	25	3.9
1.50	38	5.8
2.00	51	7.8
2.50	64	9.7
3.00	76	11.7
3.50	89	13.6
4.00	102	15.6

TABLE 2. TYPICAL PHYSICAL PROPERTIES

Property	Test Method	Type I
Density (nominal)	ASTM C 303	1.00 pcf
R-Value (per inch) @25°F @40°F @75°F	ASTM C 518 or C 177	4.35 4.17 3.85
Compressive Strength (10% deformation)	ASTM D 1621	10 psi
Flexural Strength	ASTM C 203	25 psi
Dimensional Stability	ASTM D 2126	≤ 2.0%
Water Vapor Permeance (at 1 inch thick)	ASTM E 96	5.0 perm
Water Absorption	ASTM C 272	3.0%
Flame Spread	ASTM E 84	< 20
Smoke Developed	ASTM E 84	150 - 300

Limitations:

- Duro-Last, Inc. will not be responsible or liable for any defects or problems related to building or roof design by others, to deficiencies in construction, to dangerous conditions on the job site, or to improper storage, handling or installation by others.

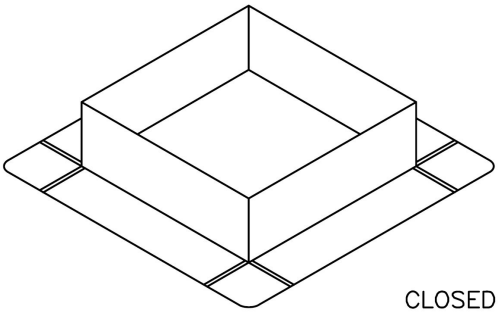
Created: 10/19/2021

DURO-LAST® CURB FLASHINGS

DESCRIPTION:

Duro-Last® Curb Flashings are designed to be used on rectangular penetrations encountered on a roofing project. The curb flashings are made with Duro-Last specially formulated roofing membrane. The combination of reinforced membrane and prefabrication ensures a long lasting, watertight flashing. They are available in white, tan, gray and dark gray colors as well as in the Designer Series membranes (slate gray Shingle-Ply, sandstone Shingle-Ply and Rock Ply).

Curb flashings are easily heat welded (hot-air) to the Duro-Last membrane over which the flashings are installed. Hot-air seaming eliminates the need for chemicals, torches and other unsafe, non-manageable seaming systems. Duro-Last Curb Flashings are prefabricated using Duro-Last's outside corners to eliminate field welds in the critical corner areas. Curb flashings are ordered to the dimensions of individual penetrations. The table below show the minimum sizes available.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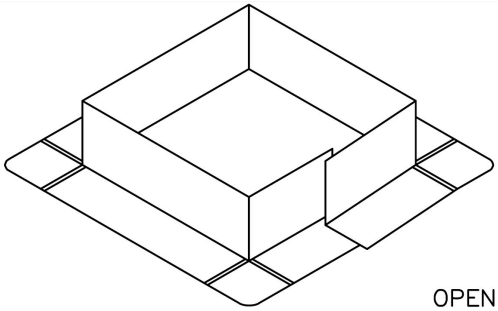
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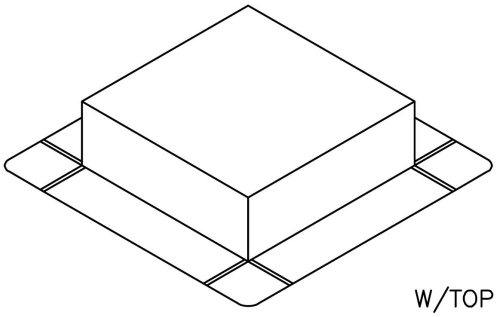

W/TOP

INSTALLATION:

1. The roof membrane installed around the penetration must be fastened prior to installing the curb flashing. Use the same fastener spacing that was used to install the roof membrane but do not exceed 18 in. (457 mm) on center. At least one fastener must be installed on each side of the penetration. On reroofing applications, remove the existing flashings to ensure a watertight fit.
2. It is not necessary to place fasteners at the corners.
3. The flashing must extend a minimum of 8 in. (203 mm) in vertical height (note: a curb flashing with top does not have a minimum height requirement.)
4. The curb flashing may be terminated with termination bar or extended onto the inside of the curb. (See details 4010 & 4020). (Note: A curb flashing with top does not require termination.)

NOTE:

- An "open" curb flashing requires a heat weld (hot-air) to close the flashing. The extra material necessary for this weld is included as part of the flashing.
- A curb flashing for a canted curb should be ordered using the dimensions above the cant. A curb flashing with a 12 in. (305 mm) wide skirt will provide additional membrane to cover the cant.
- A curb flashing with a top can be no greater than 60 in. (1525 mm) in width and can only be ordered closed.
- Add 1/4 in. (6.3 mm) to width and length dimensions for a better fitting curb flashing.
- Call Duro-Last for assistance in ordering curb flashings that need to be designed for special situations.

MINIMUM CURB SIZES AVAILABLE				
	Width (A)	Length (B)	Height (C)	Skirt
Open	2 in. (51 mm)	2 in. (51 mm)	8 in. (203 mm)	6 in. (152 mm)
Closed	2 in. (51 mm)	2.5 in. (63.6 mm)	8 in. (203 mm)	6 in. (152 mm)
w/Top	3.5 in. (89 mm)	3.5 in. (89 mm)	3 in. (76 mm)	6 in. (152 mm)

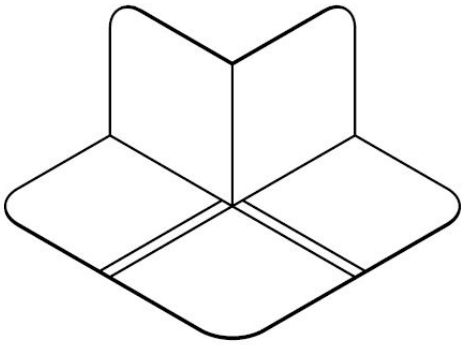
Created: 01/01/2009 Revised: 12/31/2015

DURO-LAST® INSIDE AND OUTSIDE CORNERS

DESCRIPTION:

Duro-Last® Inside and Outside Corners are to be used in corner areas encountered on a roofing project. The corners are made with Duro-Last specially formulated roofing membrane. The combination of reinforced membrane and prefabrication ensures a long lasting, watertight flashing.

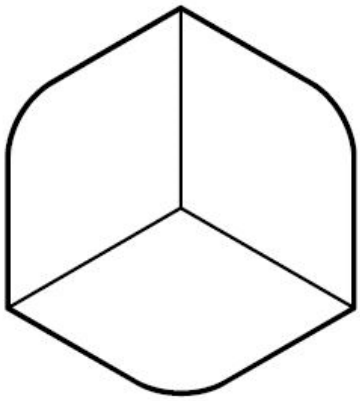
Inside and outside corners are available in white, tan, gray and dark gray colors as well as in the Designer Series membranes (slate gray Shingle-Ply, sandstone Shingle-Ply and Rock Ply). They can be ordered in 6 x 6 in. (152 x 152 mm) or 6 x 18 in. (152 x 457 mm) sizes.



OUTSIDE CORNER

INSTALLATION:

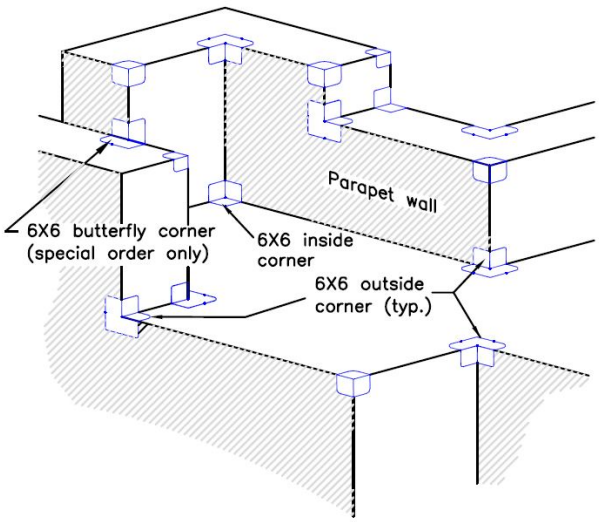
1. Prefabricated inside and outside corners shall be heat welded (hot-air) to the field membrane and/or parapet flashings.
2. The use of outside corners is required but the use of inside corners is optional depending on the configuration of the flashing membrane.
3. Refer to detail 1180 for additional information.



INSIDE CORNER

NOTE:

- Inside and outside corners are manufactured from Duro-Last membrane and shall be furnished by Duro-Last Roofing, Inc.
- Outside corners must be manufactured by Duro-Last.
- Inside corners may be fabricated in the field or purchased from Duro-Last Roofing, Inc.
- Butterfly corners are also available for use as shown in the drawing on the right.



LOCATIONS TO USE CORNERS

Created: 12/21/2015 Revised: 12/31/2015

DURO-LAST® STACK FLASHINGS

DESCRIPTION:

Duro-Last® Stack Flashings are required for all round penetrations encountered on a roofing project. The stack flashings are made with Duro-Last specially formulated roofing membrane. The combination of reinforced membrane and prefabrication ensures a long lasting, watertight flashing.

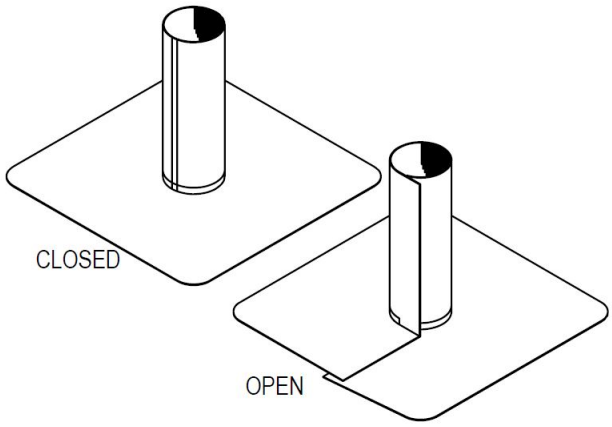
Stack flashings are available in white, tan, gray and dark gray colors. They can also be ordered with Designer Series membrane (slate gray Shingle-Ply, sandstone Shingle-Ply or Rock-Ply) bases and solid color risers. They are available in diameters of 1 in. (25 mm), 1.5 in. (38 mm) and in 1 in. increments between 2 and 15 in. (51-381 mm). Stack Flashings with diameters of 16 in. (406 mm) and larger are available in 2 in. (51 mm) increments.

The flashings are manufactured oversized to account for the thickness a schedule 40 pipe wall by the following amounts:

- 1.5 - 4 in. (38 - 101 mm) diameter stack flashings are 5/8 in. (15 mm) oversized.
- All other sizes are 3/8 in. (9 mm) oversized.

INSTALLATION:

1. The roof membrane installed around the penetration must be fastened prior to installing the stack flashing. Use the same fastener spacing that was used to install the roof membrane but do not exceed 18 in. (457 mm) on center. At least one fastener must be installed. On reroofing applications, remove the existing flashings to ensure a watertight fit.
2. Place the stack flashing around the penetration. Heat weld the vertical seam if the stack was ordered “open”.
3. Weld the stack flashing skirt to the roof membrane. Care should be taken to smooth out the skirt so that it is wrinkle-free.
4. Apply a bead of Duro-Caulk Plus® to the penetration 1/4 in. (6 mm) below the top of the stack flashing.
5. Install a stainless steel band approximately 1/4 in. (6 mm) from the top of the stack flashing. Tighten the band to draw the flashing firmly into the sealant. Apply a bead of the Duro-Caulk Plus around the top of the flashing to assure a positive seal.



6. See details 4070, 4080 and 4081 for information on installing stack flashings to specific types of round penetrations.

NOTE:

- Stack flashings and bands shall be furnished by Duro-Last, Inc.
- Field fabrication of flashings for round penetrations is not allowed.
- Stack flashings with diameters 16 in. (406 mm) and larger are available "open" only.
- An "open" stack flashing requires a heat weld (hot-air) to close the flashing. The extra material necessary for this weld is included as part of the stack flashing.

STACK FLASHING DIMENSIONS

Diameter	Available		Height	Base/Skirt
	Closed	Open		
1 in. (25 mm)	Yes	No	8 in. (203 mm)	18 x 18 in. Base (457 x 457 mm)
1.5 in. (38 mm)	Yes	Yes	8 in. (203 mm)	18 x 18 in. Base (457 x 457 mm)
2 – 8 in. (51 – 203 mm)	Yes	Yes	8 in. (203 mm)	18 x 18 in. Base (457 x 457 mm)
9 – 15 in. (228 – 381 mm)	Yes	Yes	8 in. (203 mm)	24 x 24 in. Base (609 x 609 mm)
16 in. (406 mm) and Larger	No	Yes	8 in. (203 mm)	6 or 12 in Skirt (152 or 305 mm)

Created: 12/21/2015 Revised: 12/31/2015

DURO-LAST® PLENUM VENT

DESCRIPTION:

Duro-Last® Plenum Vents are fabricated from a rigid exterior vinyl and have a 6-inch skirt made from Duro-Last's proprietary thermoplastic roofing membrane.

The Plenum Vent incorporates a vent screen to allow passive air exchange between unconditioned attic space and the outside atmosphere. A large vent cap is secured over the vent screen to protect against water infiltration.

Plenum Vents are available in white, tan and dark gray colors.

ORDERING:

The Plenum Vent can be ordered individually or in cases of 10.

STORAGE AND HANDLING:

Keep product clean and dry until ready to install.

PRECAUTIONS:

- Read Safety Data Sheets (SDS) prior to using.
- Wear proper personal protective equipment, such as gloves and eye protection, per the SDS.

INSTALLATION:

1. Limitations
   a. **Use only for passive venting of unconditioned attic space.**
   b. **Do <u>not</u> use to ventilate the Duro-Last Roofing System.**
2. Cut a hole through the deck assembly no larger than 10-1/4 inches.
3. Backseal underneath the Duro-Last deck membrane, around the hole, with an approved sealant.
4. Center the Plenum Vent above the hole, pull back the membrane skirt and fasten into the deck, through the sealant, at all of the predrilled hole locations.
5. Weld the membrane skirt to the deck membrane using a hot-air welder to achieve a minimum weld width of 1-1/2 inches.
6. Locate the 2 raised marks on the sides of the vent base. Predrill 3/16-inch holes and fasten 4-inch #14 screws (not included) through the sides of the vent cap and vent base directly above each raised mark. The holes should be located 2 inches up from the bottom of the vent cap.
7. Refer to Detail Drawing 5025 for more installation information.

INTERNATIONAL BUILDING CODE (IBC) REQUIREMENTS

<u>IBC R806.2 Minimum vent area</u>

The minimum net free ventilating area shall be 1/150th of the area of the vented space.

Exception: The minimum net free ventilation area shall be 1/300th of the vented space provided one or more of the following conditions are met:

1. In Climate Zones 6, 7 and 8, a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.
2. At least 40 percent and not more than 50 percent of the required ventilating area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located no more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the required ventilation provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet (914 mm) below the ridge or highest point of the space shall be permitted.

Created: 11/08/2016

PRRF20251279

CALCULATIONS

To determine the amount of attic area covered per vent, multiply the net free area (54 sq. in.) by either 150 or 300 sq. ft. (refer to *IBC REQUIREMENTS* on page 1) and then divide by 144 sq. in.

To determine the quantity of required vents, divide the unconditioned attic space by the attic area per vent. Round up to the next whole number for any fractional amounts.

Note: It is the responsibility of the installing contractor of record to ensure that all applicable specifications, building codes, regulations and ordinances are complied with and followed.

VENTILATION REQUIREMENTS WITHOUT A VAPOR RETARDER (144 SQ. IN. NET FREE AREA PER 150 SQ. FT.)

Attic Area	Plenum Vent Net Free Area	Unconditioned Attic Area per Vent without Eave Vents	Number of Plenum Vents Required	Plenum Vent Net Free Area	Unconditioned Attic Area per Vent with Eave Vents	Number of Plenum Vents Required
Sq. Ft.	Sq. In.	Sq. Ft.	Each	Sq. In.	Sq. Ft.	Each
100	54	56.25	2	54	112.50	1
200	54	56.25	4	54	112.50	2
300	54	56.25	6	54	112.50	3
400	54	56.25	8	54	112.50	4
500	54	56.25	9	54	112.50	5
600	54	56.25	11	54	112.50	6
700	54	56.25	13	54	112.50	7
800	54	56.25	15	54	112.50	8
900	54	56.25	16	54	112.50	8
1,000	54	56.25	18	54	112.50	9
1,100	54	56.25	20	54	112.50	10
1,200	54	56.25	22	54	112.50	11
1,300	54	56.25	24	54	112.50	12
1,400	54	56.25	25	54	112.50	13
1,500	54	56.25	27	54	112.50	14

VENTILATION REQUIREMENTS WITH A VAPOR RETARDER (144 SQ. IN. NET FREE AREA PER 300 SQ. FT.)

Attic Area	Plenum Vent Net Free Area	Unconditioned Attic Area per Vent without Eave Vents	Number of Plenum Vents Required	Plenum Vent Net Free Area	Unconditioned Attic Area per Vent with Eave Vents	Number of Plenum Vents Required
Sq. Ft.	Sq. In.	Sq. Ft.	Each	Sq. In.	Sq. Ft.	Each
100	54	112.50	1	54	112.50	1
200	54	112.50	2	54	112.50	2
300	54	112.50	3	54	112.50	3
400	54	112.50	4	54	112.50	4
500	54	112.50	5	54	112.50	5
600	54	112.50	6	54	112.50	6
700	54	112.50	7	54	112.50	7
800	54	112.50	8	54	112.50	8
900	54	112.50	8	54	112.50	8
1,000	54	112.50	9	54	112.50	9
1,100	54	112.50	10	54	112.50	10
1,200	54	112.50	11	54	112.50	11
1,300	54	112.50	12	54	112.50	12
1,400	54	112.50	13	54	112.50	13
1,500	54	112.50	14	54	112.50	14

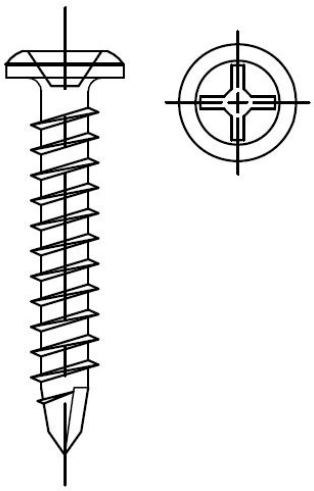
Created: 11/08/2016

DURO-LAST® HD SCREWS

DESCRIPTION:

Duro-Last®, Inc. requires the use of Duro-Coated Screws for mechanical fastening of the Duro-Last roofing system. Duro-Last HD Screws are #14 diameter, are equipped with a P-3 truss head and are available with either a drill point or a spade point.

Duro-Last HD Screws can be used in most types of roofing applications. These Duro-Coated Screws must pass twice the FM 4470 standard for corrosion resistance, totaling 30 cycles in a Kesternich cabinet. Duro-Last, Inc. also requires that all Duro-Coated Screws pass 20° and 40° bend tests (hardness) and be able to penetrate a 20 gauge deck in under three seconds with a 50 lb. (222 N) load.



INSTALLATION:

1. Penetration into all approved deck types is 1 inch (25 mm) minimum, from the top surface of the deck.

NOTE:

- Duro-Last, Inc. stocks HD screws in the sizes noted in the table to the right. Additional sizes are available on a drop ship basis. Please allow adequate time for ordering and delivery of special orders.

HD SCREW DIMENSIONS		
Length	Thread Length	Quantity per Bucket
1.5 in. (38 mm)	1.5 in. (38 mm)	2,000
2 in. (51 mm)	2 in. (51 mm)	2,000
2.5 in. (64 mm)	2.5 in. (64 mm)	1,000
3 in. (76 mm)	3 in. (76 mm)	1,000
3.5 in. (89 mm)	3 in. (76 mm)	1,000
4 in. (102 mm)	3 in. (76 mm)	1,000
4.5 in. (115 mm)	3 in. (76 mm)	1,000
5 in. (127 mm)	4 in. (102 mm)	1,000
5.5 in. (140 mm)	4 in. (102 mm)	1,000
6 in. (152 mm)	4 in. (102 mm)	1,000
7 in. (178 mm)	4 in. (102 mm)	500
8 in. (203 mm)	4 in. (102 mm)	500
9 in. (229 mm)	4 in. (102 mm)	500
10 in. (254 mm)	4 in. (102 mm)	500
11 in. (279 mm)	4 in. (102 mm)	500
12 in. (305 mm)	4 in. (102 mm)	500

Created: 01/01/2009 Revised: 04/06/2011, 01/05/2016

DURO-LAST® CLEAT PLATE™

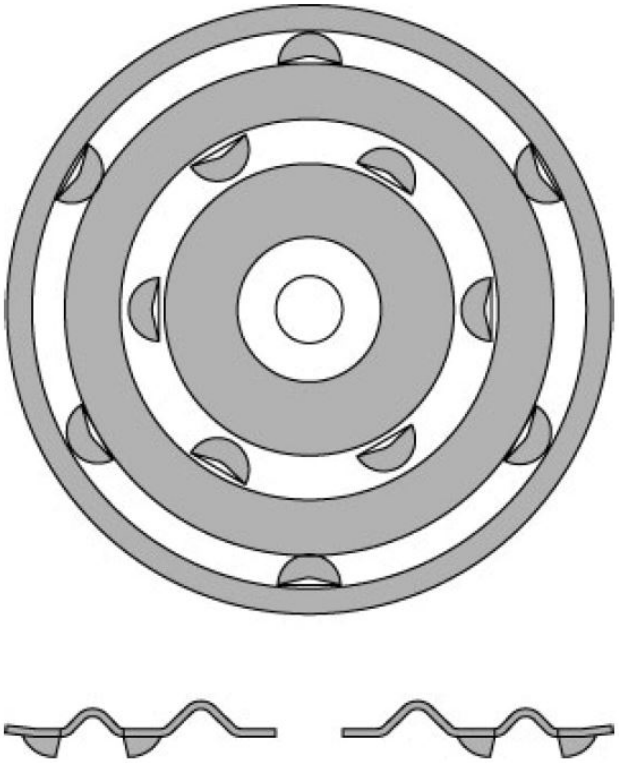
DESCRIPTION:

The Duro-Last® Cleat Plate™ is a 0.035-inch (0.9-mm) thick, 2-3/8-inch (60.3-mm) diameter galvalume plate. The Galvalume finish has proven weatherability and resiliency. Cleat Plates are packaged and sold in quantities of 1,000.

Cleat Plates are stamped to include a recessed 0.265-inch (6.7-mm) diameter hole in the center and a series of ribs for added strength. The configuration of the ribs and the hole is used to prevent the screw head from coming in contact with the Duro-Last roofing membrane.

In addition to the stamped ribs, there are “cleats” stamped into the plate to hold the Duro-Last roofing membrane in place without tearing or puncturing the membrane in high-stress load applications. Also, because the cleats are not sharp, they are easier to handle.

The Cleat Plate is a long-lasting and durable plate that is available from Duro-Last, Inc.



INSTALLATION:

The Cleat Plate is installed with the “cleats” toward the membrane.

When used with prefabricated mechanically fastened systems, the Cleat Plate can be used for securing Duro-Last membranes to the deck along the prefabricated fastening tabs and the edges of the sheet parallel to the tab direction. The Cleat Plate must be installed with the edge flush to the edge of the fastening tab.

When used with the Duro-Roof® Roofing System, the Cleat Plate must be installed along the center of the 6-inch (152-mm) fastening tab.

When used with adhered systems, the Cleat Plate must not be used for attachment of insulation or cover boards.

Created: 10/01/2005 Revised: 01/01/2009, 01/06/2016, 05/24/2016

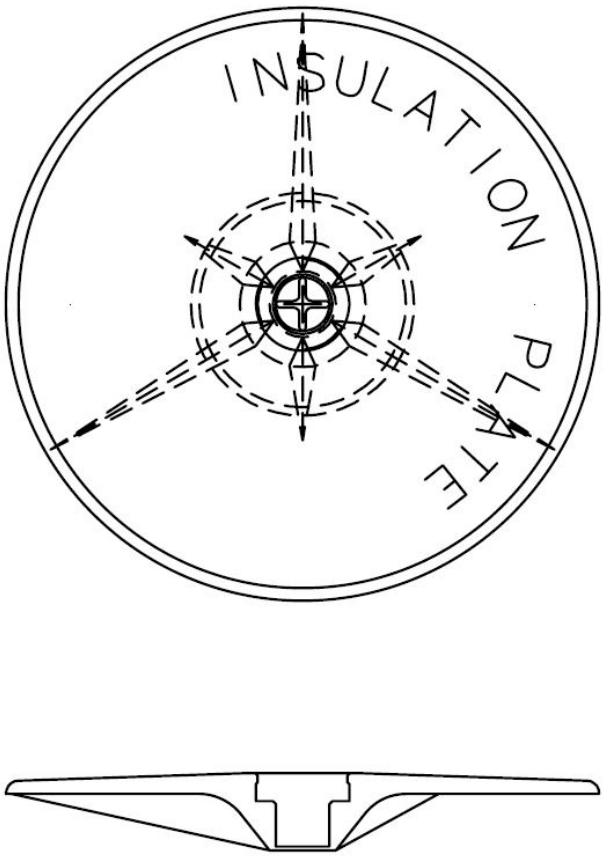
DURO-LAST® INSULATION PLATE

DESCRIPTION:

The Duro-Last® Insulation Plate is a 0.375 inch (9.5mm) thick, 3 inch (76.5mm) diameter distribution plate designed to hold insulation and underlayment boards under the Duro-Last roofing system. Duro-Last Insulation Plates are packaged and sold in quantities of 1,000.

The Duro-Last Insulation Plate includes a recessed 0.280 inch (7 mm) diameter hole in the center, keeping the head of the fastener from coming into contact with the Duro-Last roofing membrane. To maintain necessary strength and position, the Duro-Last Insulation Plate is manufactured with a thick center that embeds into the insulation and a thin flexible exterior to help reduce facer tear. In addition, there are tabs pressing against the fastener head to prevent the fastener from backing out.

The Duro-Last Insulation Plate is a long-lasting, durable plate that is available only from Duro-Last, Inc.



MATERIAL SAFETY DATA SHEET:

Product Identity: Duro-Last Insulation Plates

INSTALLATION:

1. Refer to details 1020 and 1030 installation information.

NOTE:

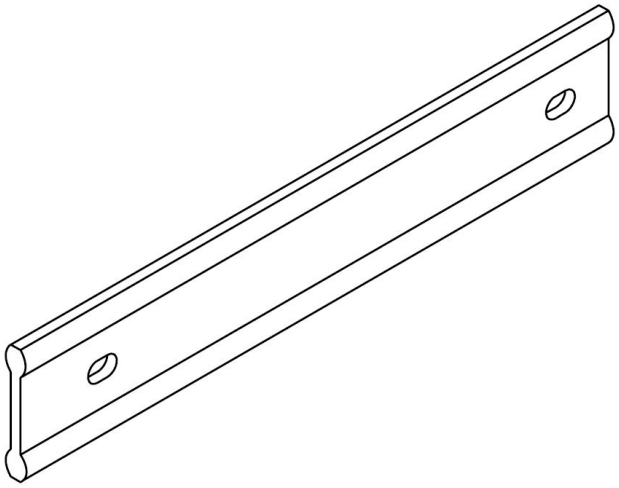
- Duro-Last Insulation Plates shall only be used to attach insulation or cover boards in mechanically fastened systems. They shall not be used in adhered systems.

Created: 01/01/2009 Revised: 01/06/2016, 05/24/2016

DURO-LAST® TERMINATION BAR

DESCRIPTION:

Duro-Last® Termination Bar (available in white, gray and tan colors) is fabricated from a rigid exterior vinyl with slotted holes 6 inches (152 mm) on center. Duro-Last Termination Bar may be used as perimeter detail for the Duro-Last roofing system and as termination on any square or rectangular penetration. Because of its symmetrical design, it is reversible.



Duro-Last Termination Bar is available in 10 ft. (3 m) lengths only. Duro-Last, Inc. will supply the termination bar in multiples of 10 ft. (3 m) and has two standard packages. The small tube package contains a maximum of 170 ft. (52 m) while a large box contains a maximum of 500 ft. (152 m).

MATERIAL SAFETY DATA SHEET:

Product Identity: 10 foot Extrusions

MSDS Number: 1225

INSTALLATION:

1. Duro-Last Termination Bar shall be fastened 6 inches (152 mm) on center with approved fasteners.
2. All termination bar must be fastened 1 inch (25 mm), maximum, from each corner or end of the bar.
3. The top edge of all sections of termination bar must be caulked.
4. It is necessary to leave a ¼ inch (6.3 mm) space between all sections of termination bar to account for expansion and contraction.
5. All vertical applications require caulk on both sides.
6. Refer to details 3010 & 3020 for installation information.

Created: 01/01/2009 Revised: 01/06/2016

DURO-CAULK® PLUS

DESCRIPTION:

Duro-Caulk® Plus is a one-component, non-sag, elastomeric, neutral-cure silicone sealant. It is available in white, gray, tan and bronze colors. Duro-Caulk Plus is formulated for use with all Duro-Last® roofing system details that require sealant.

Duro-Caulk Plus is unaffected by most atmospheric conditions and will typically cure within 48 hours. It is formulated to bond to substrates such as PVC, glass, aluminum, steel, plastic, ceramics, concretes, and wood. Its high-tack properties ensure a weather-tight seal around penetrations, terminations and drain inserts.

ORDERING:

Duro-Caulk Plus is supplied in 10.1-ounce cartridges and can be ordered individually or in cases of 30. One cartridge will cover approximately 18 to 20 linear feet.

STORAGE AND HANDLING

1. Duro-Caulk Plus has a 12-month shelf life from the date of manufacture printed on the cartridge.

PRECAUTIONS:

1. Read Safety Data Sheets (SDS) prior to using.
2. Wear proper personal protective equipment, such as gloves and eye protection, per the SDS.
3. **Keep away from children.**

INSTALLATION:

1. Limitations
   a. Apply to clean, dry surfaces free of contaminants (oils, greases, coatings, etc.) that can adversely affect adhesion.
   b. Do not apply to surfaces that bleed oils or solvents.
   c. Product is not paintable.
2. Apply using a standard caulking gun. Do not open the cartridge until you are ready to apply the sealant.
3. Apply the sealant using consistent, positive pressure to force sealant into the joint, creating a bead approximately 3/8 inch (9.53 mm) in diameter.
4. Tool the sealant to create a concave joint shape to shed water and ensure maximum adhesion and coverage. Dry tooling is recommended. DO NOT use soapy water or other liquids when tooling.
5. Sealant may be applied below freezing temperatures.
6. Product will skin over within 20 minutes of application. The time may vary depending on humidity and temperature at the time of application.

STANDARDS:

This product conforms with the following requirements and standards: ASTM C-920, Type S, Grade NS, Class 25, Use NT, T, M, G, A, O: TT-2-00230C, Type II, Class A; TT-S-001543A, Class A; CAN-19.13-M87, AAMA 802.3 Type I & II, AAMA 803.3 Type I,AAMA 805.2, AAMA 808.3 and California Air Resources Board 2003 requirements for Volatile Organic Compound content.

DURO-CAULK PLUS PROPERTIES		
Sag resistance	Non-sagging	ASTM D2202
Bond durability to glass, aluminum and concrete	±25%	ASTM C793
Movement capability	±25%	ASTM C719
Tensile strength	300 psi	ASTM D412
Elongation at break	325	ASTM D412
Hardness, Shore A	35 ±5	ASTM C661
Accelerated weathering	No change	QUV Weatherometer
Tack-free time	10 minutes	ASTM C679

Created: 01/01/2009 Revised: 07/16/2014

DOWNSPOUT

DESCRIPTION:

Duro-Last Downspouts are available with an open or closed face. Both open and closed face downspouts are available in standard 10' lengths.

- Custom sizes and assemblies are available.
- A- and B-Style Elbows, Square-to-Round Adaptors and Drop/Outlets available.
- LEED® compliant.

FEATURES (OPEN-FACE)

- Help eliminate blockage due to ice and debris build-up.
- Will nest together by cutting a 1" notch out of each side of the receiving piece.

FEATURES (CLOSED-FACE)

- Standard 24-gauge downspouts feature a Pittsburgh seam for a professional finish that also eliminates the need for rivets.
- Tapered ends nest together up to 3" and eliminate field notching and crimping.

INSTALLATION:

1. Install in accordance with Duro-Last Details #2080, #2085, and #2086.
2. Any deviation from the requirements set forth in detail drawings must be pre-approved, in writing, by the Duro-Last Technical Department.

WARRANTY:

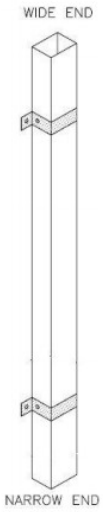
Duro-Last offers a finish and substrate warranty.

Closed-Face

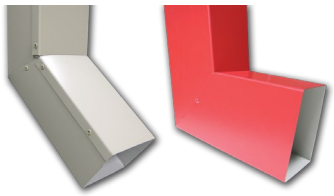
Open-Face

Drop/Outlet

Downspout



Square-To-Round Adaptor



A-Style B-Style Elbow

Material	Gauge	Finish
Aluminum	.040	Mill or Kynar®
Stainless Steel	24-gauge	N/A
Bonderized Steel	24-gauge	N/A
Galvalume®	24-gauge	Mill or Kynar®
Copper	16 oz.	Mill

Created: 11/22/2024

GUTTERS

DESCRIPTION:

Duro-Last offers four box-style gutter profiles in three sizes each. Support straps are provided based on 30" centers.

- Front edge of gutter is 2" lower than the back edge.
- Internal splice plates eliminate the need to completely rivet sections together.
- Riveted inside and outside miters can be fabricated to any angle.
- Roof flanges can be bent to accommodate various roof pitches or eliminated altogether.
- Custom sizes and profiles are available.
- LEED® compliant.

DX - Style

EX - Style

LX - Style

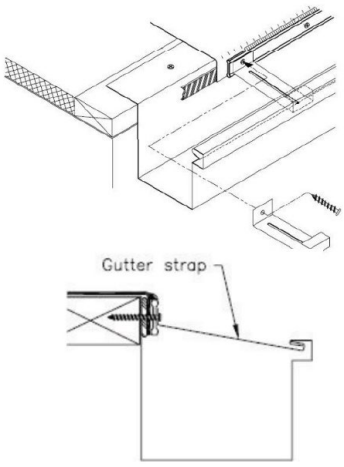
MX - Style

INSTALLATION:

1. Install in accordance with Duro-Last Details #2091 and #3025.
2. Any deviation from the requirements set forth in detail drawings must be pre-approved, in writing, by the Duro-Last Technical Department.

WARRANTY:

Duro-Last offers a finish and substrate warranty.



Material	Gauge	Finish
Aluminum	.040	Mill or Kynar®
Stainless Steel	24-gauge	N/A
Bonderized Steel	24-gauge	N/A
Galvalume®	24-gauge	Mill or Kynar®
Copper	16 oz.	Mill

ROOF TRAK® III WALKWAY PAD

Description:

Roof Trak® III is a non-skid, maintenance-free walkway/protection pad. Roof Trak III is an extruded pad made from both recycled Duro-Last® membrane and an oriented-strand polyester reinforcement.

Duro-Last, Inc. manufactures the Roof Trak III Walkway Pad to provide protection in heavily traveled rooftop areas. It also provides added protection around mechanical equipment and as a separator for sleepers that support mechanical equipment. Field and laboratory testing have proven that Roof Trak III can be used in all seasons and applications.

Roof Trak III utilizes factory-attached, 4-inch wide, white membrane skirts for attachment to the field membrane by heat welding (hot-air).

Duro-Last, Inc. manufactures Roof Trak III in the colors and skirt configurations shown in the table below.

TABLE 1. ROOF TRAK III AVAILABLE COLORS AND SKIRT CONFIGURATIONS

Sizes	Colors	Attachment Skirts
30 in. x 60 in.	White, Tan and Gray solid colors. White with safety-yellow skirts.	2 skirts along 60-in. sides
60 in. x 60 in.	White, Tan and Gray solid colors. White with safety-yellow skirts.	2 skirts along 60-in. sides
30 in. x 60 in.	White solid color. White with safety-yellow skirts.	Fully skirted along all 4 sides

Installation:

1. Roof Trak III attachment skirts shall be heat-welded (hot-air) to the field membrane using a 1.5-inch wide weld along the entire length of the skirt.
2. Walkway pads installed directly over field seams shall have one side unattached to allow for the inspection of field seams for warranty purposes. Following inspection, the unattached skirt must be welded to the roof membrane.
3. A 1-inch gap is required between sections of walkway pad to allow for proper water drainage.

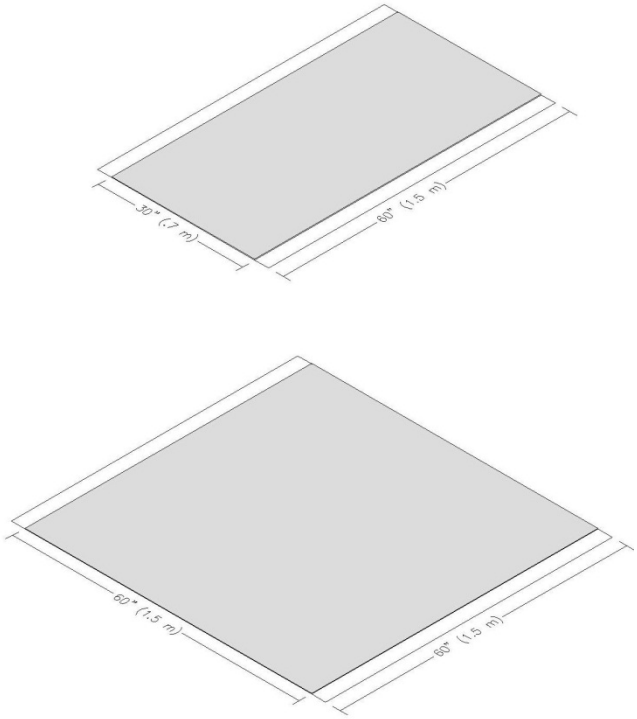


Figure 1. Roof Trak III Available Sizes

TABLE 2. TYPICAL PHYSICAL PROPERTIES

Property	Result (US)	Result (metric)
Thickness	0.135 in.	3 mm
Weight	0.79 lb./ft.^{2}	3.9 kg/m^2
Breaking Strength (machine direction)	516 lb.	2,296 N
Breaking Strength (cross machine direction)	489 lb.	2,176 N
Elongation (machine direction)	50%	50%
Elongation (cross machine direction)	64%	64%
Tear Strength (machine direction)	45 lb.	200 N
Tear Strength (cross machine direction)	71 lb.	316 N
Static Coefficient of Friction (Dry)	0.95	
Static Coefficient of Friction (Wet)	1.19	

Created: 01/01/2009 Revised: 10/14/2013, 01/12/2016

PRRF20251279

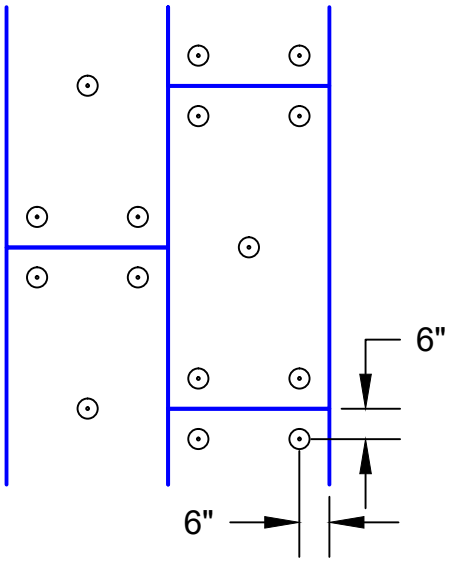
DETAIL DRAWINGS

DURO-LAST
THE WORLD'S BEST ROOF

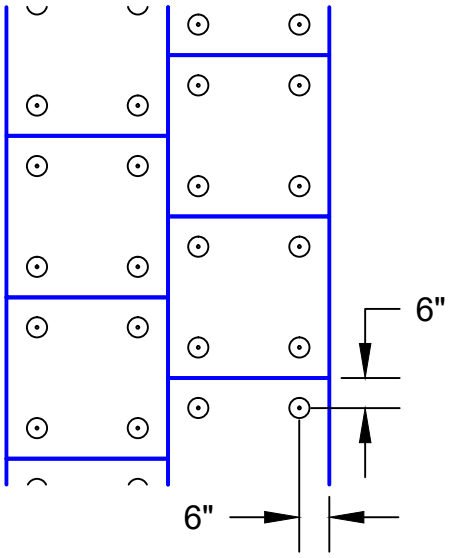
DETAIL 1020

PRRF20251279

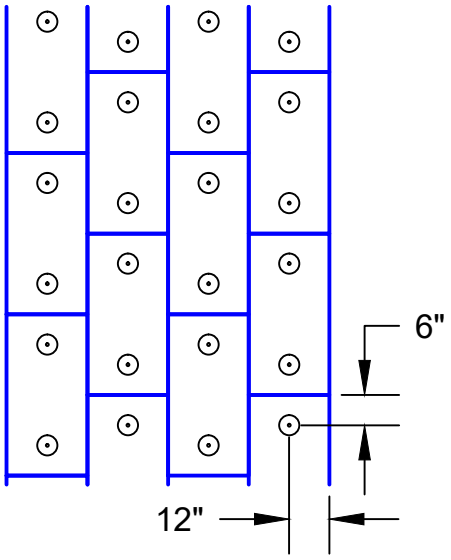
4 □8 ft
Approved Insulation



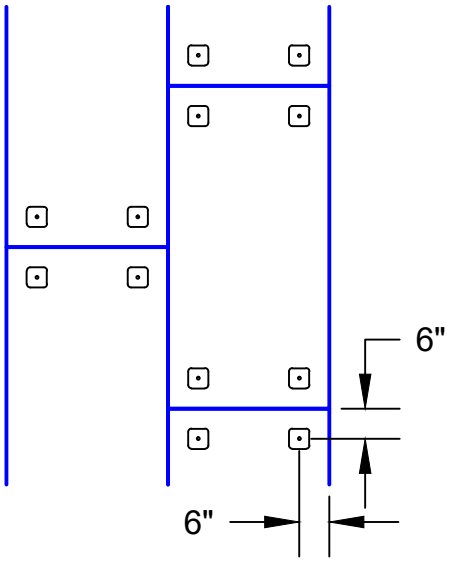
4 □4 ft
Approved Insulation



2 □4 ft
Approved Insulation



4 □8 ft
Approved Cover Board



Note 1: It is recommended to stagger all □oints between boards by 50□ from row to row and layer to layer.

Note 2: Ad□oin panel edges together. Neatly fit to the roof deck and around penetrations with no gaps greater than 1/4 inch.

Note 3: Fasten with approved plates and fasteners.

Note 4: **These fastening patterns are to be used with mechanically fastened systems only.**

REVISED:	01/30/2017	GENERAL DETAIL FOR MECHANICALLY FASTENED SYSTEMS
PREVIOUS:	01/01/2009	INSULATION AND RECOVER FASTENING
SCALE:	NONE	NEW CONSTRUCTION OR RE-ROOF

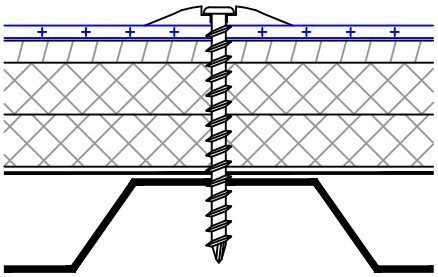
DURO-LAST
THE WORLD'S BEST ROOF

DETAIL 1040

PRRF20251279

CORRECT

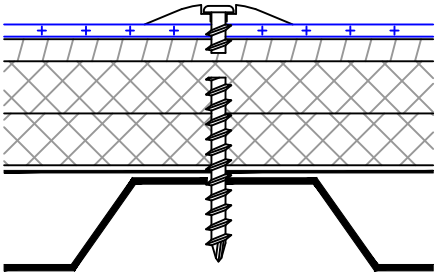
Fastener driven perpendicular



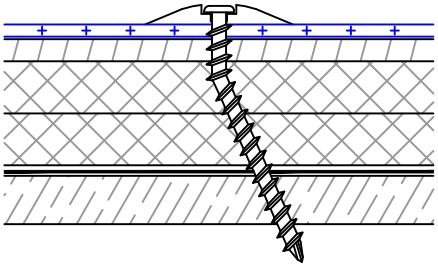
Overlapping membrane not shown for clarity of details.

INCORRECT

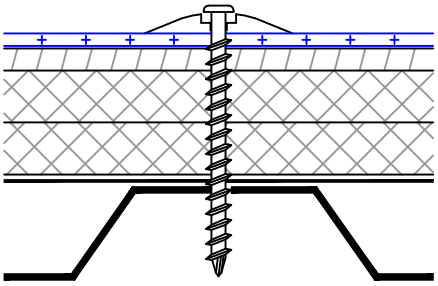
Fastener snapped



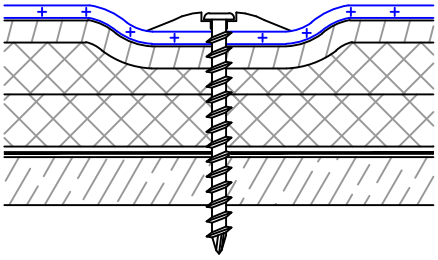
Fastener bent



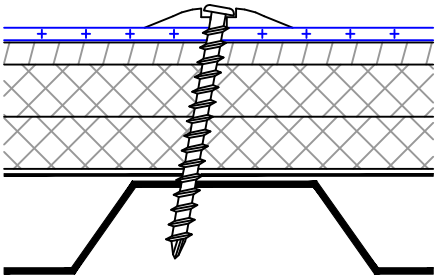
Fastener underdriven



Fastener overdriven



Fastener driven at an angle



Note 1: Fasteners may penetrate through the top or bottom flute of metal decks.

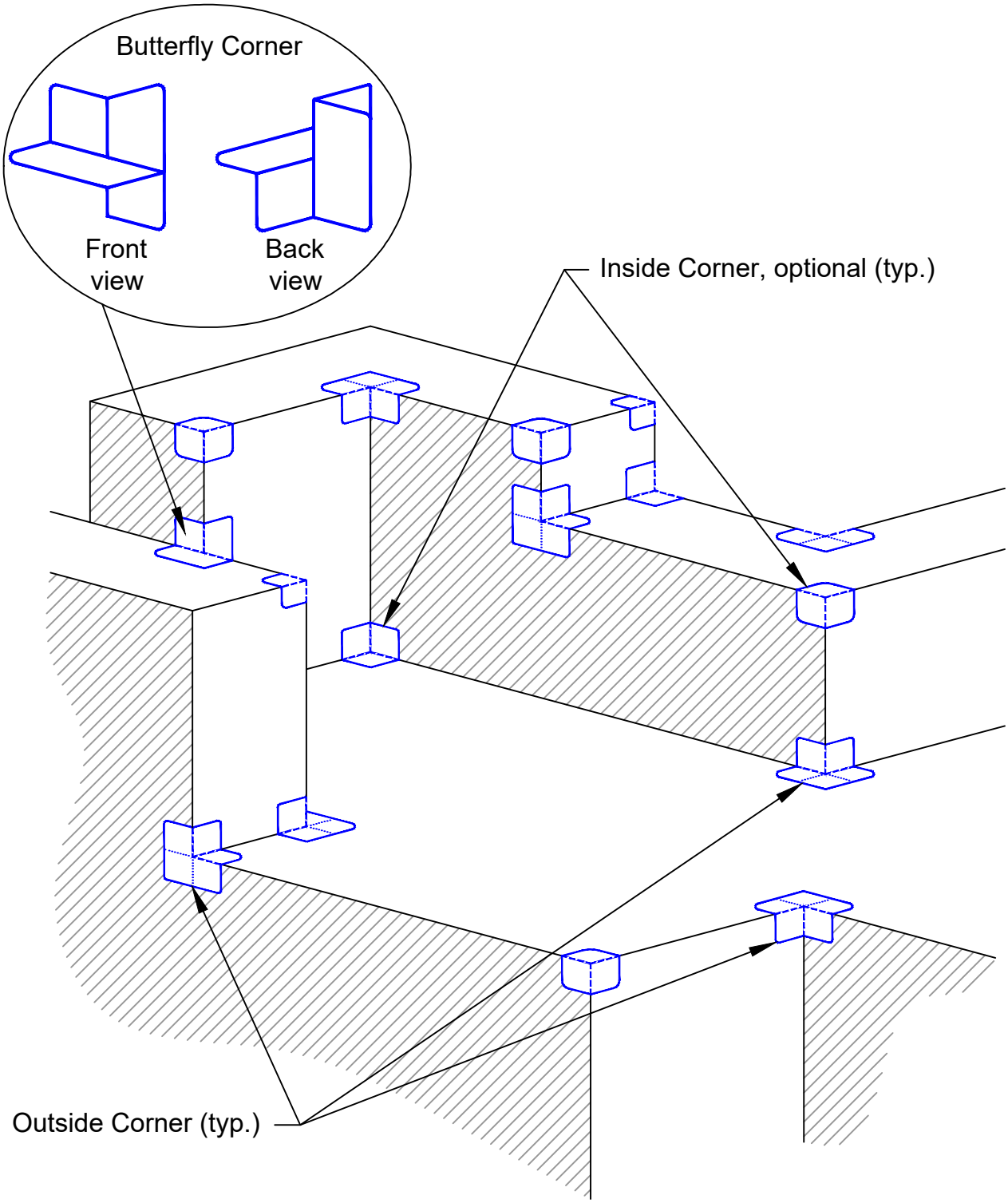
Note 2: Fasteners must penetrate metal, wood and structural concrete decks by 1 inch, measuring down from the top of the deck.

REVISED:	01/30/2017	GENERAL DETAIL FOR MECHANICALLY FASTENED SYSTEMS
PREVIOUS:	01/01/2009	FASTENING INTO METAL AND WOOD DECKS
SCALE:	NONE	NEW CONSTRUCTION OR RE-ROOF

DURO-LAST
THE WORLD'S BEST ROOF

DETAIL 1180

PRRF20251279



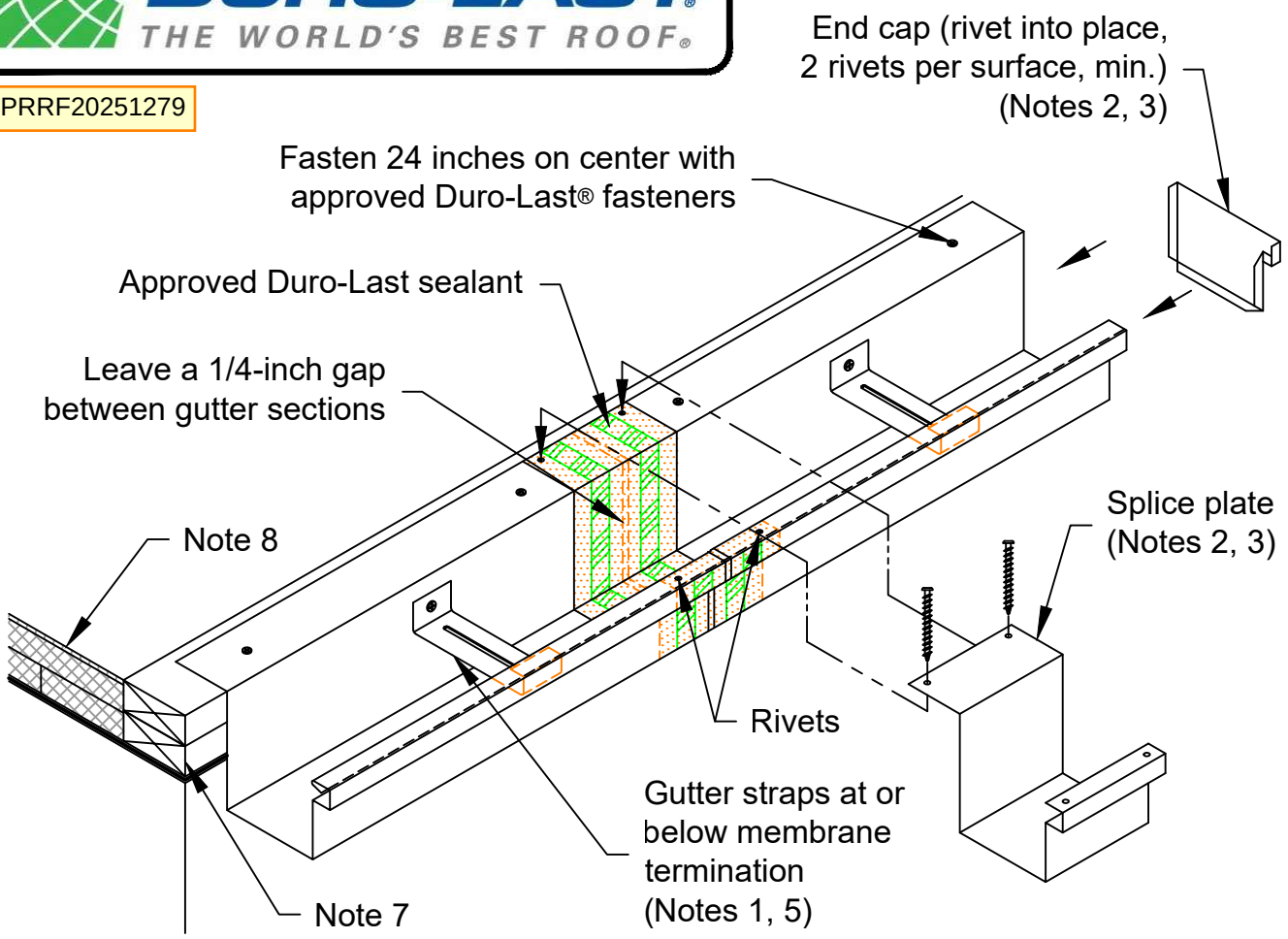
Note: Ensure that the correct side of the membrane is facing out.

REVISED:	01/31/2017	GENERAL DETAIL
PREVIOUS:	01/01/2009	INSIDE AND OUTSIDE CORNERS
SCALE:	NONE	NEW CONSTRUCTION OR RE-ROOF

DURO-LAST®
THE WORLD'S BEST ROOF®

DETAIL 2090

PRRF20251279



Note 1: For membrane installation, refer to Detail Drawing 3020.

Note 2: All joints, splices, corners and end caps are to be riveted into position. On splice plates, a minimum of 2 rivets and 2 fasteners are to be installed as shown above.

Note 3: All joints, splices, corners and end caps must have approved Duro-Last sealant applied to them to ensure a water-tight application. Apply a bead of approved Duro-Last sealant to the splice plate on both sides of joint.

Note 4: For every 40 to 50 feet of gutter, install 1 expansion joint. Refer to Detail Drawing 2095.

Note 5: Gutter straps spaced 24 to 30 inches on center.

Note 6: Drainage slopes and drain sizes are to be determined by local building code requirements and are contractor's responsibility to follow.

Note 7: Wood nailers must withstand a minimum force of 180 pounds per lineal foot (per building code). Any pull values greater than 270 pounds will allow for a fastener spacing of 18 inches on center. Pull values less than 270 pounds will require additional fasteners. **The installing contractor is responsible for meeting building codes.**

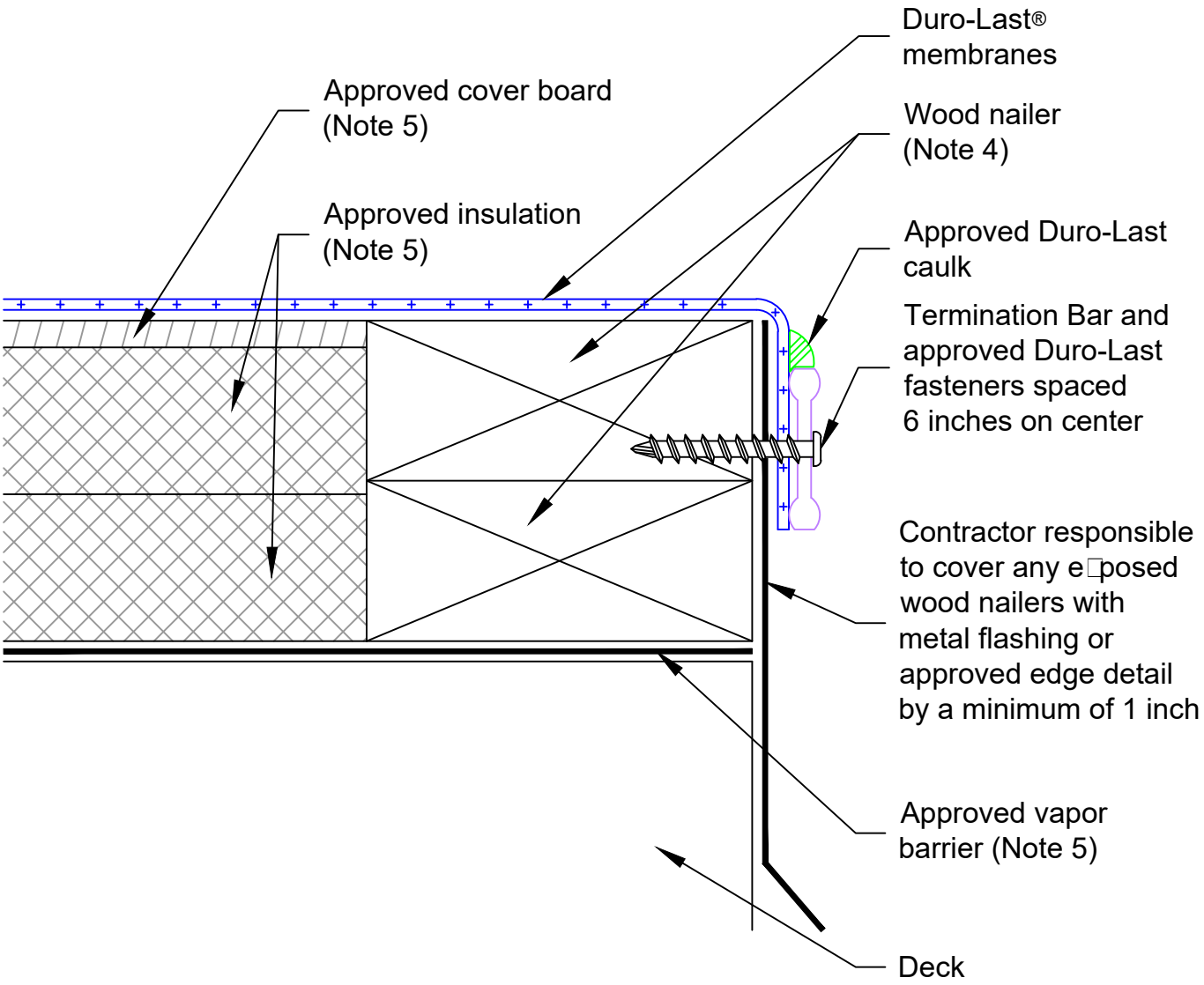
Note 8: Refer to specifications for vapor barrier, insulation and cover board requirements.

REVISED: 05/05/2017	DRAINAGE DETAIL
PREVIOUS: 01/01/2009	GUTTER ATTACHMENT - -SERIES
SCALE: NONE	NEW CONSTRUCTION OR RE-ROOF

DURO-LAST®
THE WORLD'S BEST ROOF®

DETAIL 3010

PRRF20251279



Note 1: This detail may also be used on parapet walls.

Note 2: A 1/4-inch gap is required between sections of Duro-Last Termination Bar.

Note 3: All vertical applications require approved Duro-Last caulk to be applied on both sides of the Termination Bar.

Note 4: Wood nailers must withstand a minimum force of 180 pounds per lineal foot (per building code). Any pull values greater than 270 pounds will allow for a fastener spacing of 18 inches on center. Pull values less than 270 pounds will require additional fasteners. **The installing contractor is responsible for meeting building codes.**

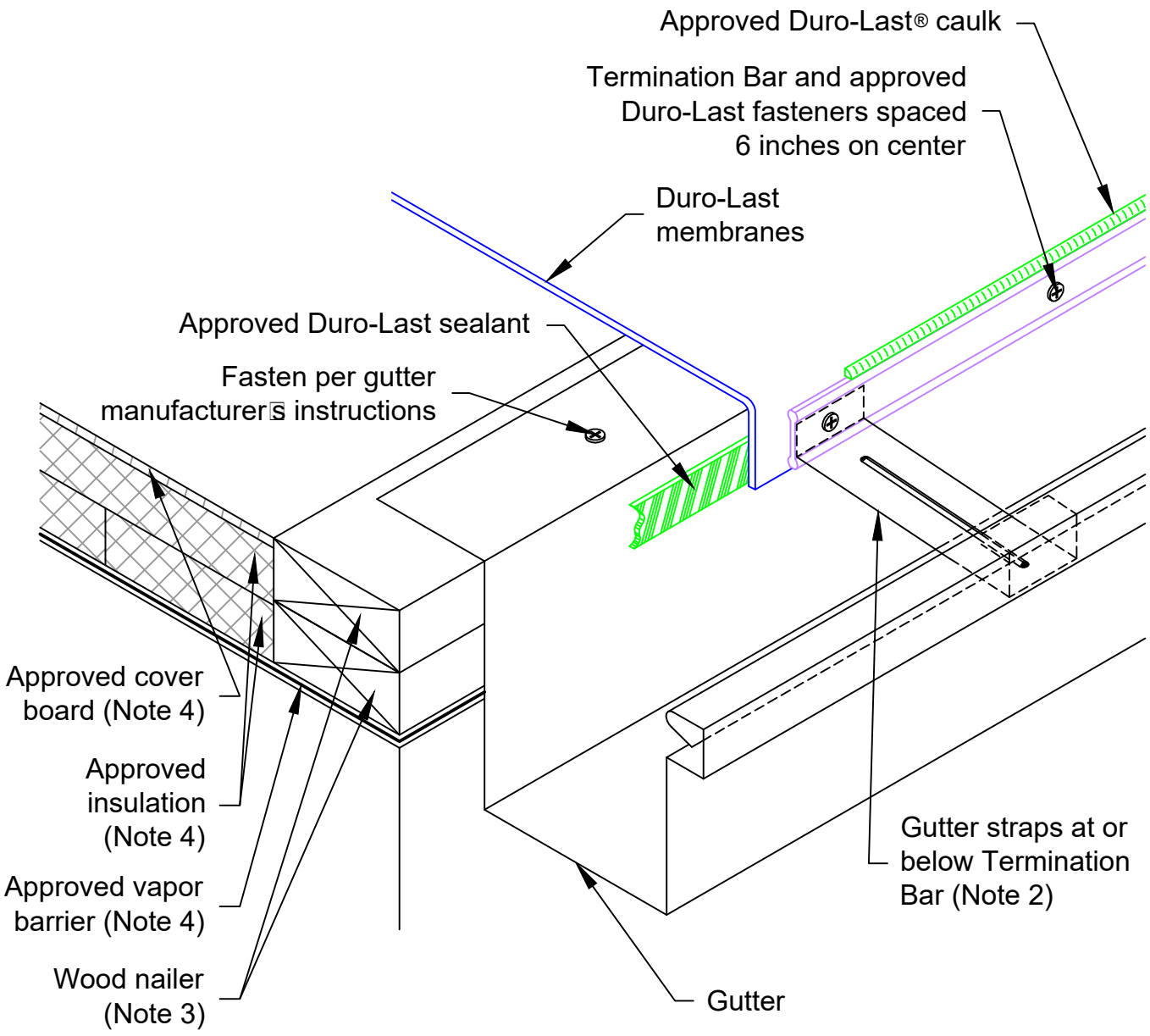
Note 5: Refer to specifications for vapor barrier, insulation and cover board requirements.

REVISED:	02/01/2017	EDGE DETAIL FOR MECHANICALLY FASTENED SYSTEMS
PREVIOUS:	01/01/2009	TERMINATION BAR
SCALE:	NONE	NEW CONSTRUCTION OR RE-ROOF

DURO-LAST
THE WORLD'S BEST ROOF®

DETAIL 3020

PRRF20251279



Note 1: A 1/4-inch gap is required between sections of Duro-Last Termination Bar.

Note 2: Gutter strap spacing per gutter manufacturer's instructions.

Note 3: Wood nailers must withstand a minimum force of 180 pounds per lineal foot (per building code). Any pull values greater than 270 pounds will allow for a fastener spacing of 18 inches on center. Pull values less than 270 pounds will require additional fasteners. **The installing contractor is responsible for meeting building codes.**

Note 4: Refer to specifications for vapor barrier, insulation and cover board requirements.

REVISED:	02/01/2017	EDGE DETAIL FOR MECHANICALLY FASTENED SYSTEMS
PREVIOUS:	01/01/2009	TERMINATION BAR INTO GUTTER
SCALE:	NONE	NEW CONSTRUCTION OR RE-ROOF

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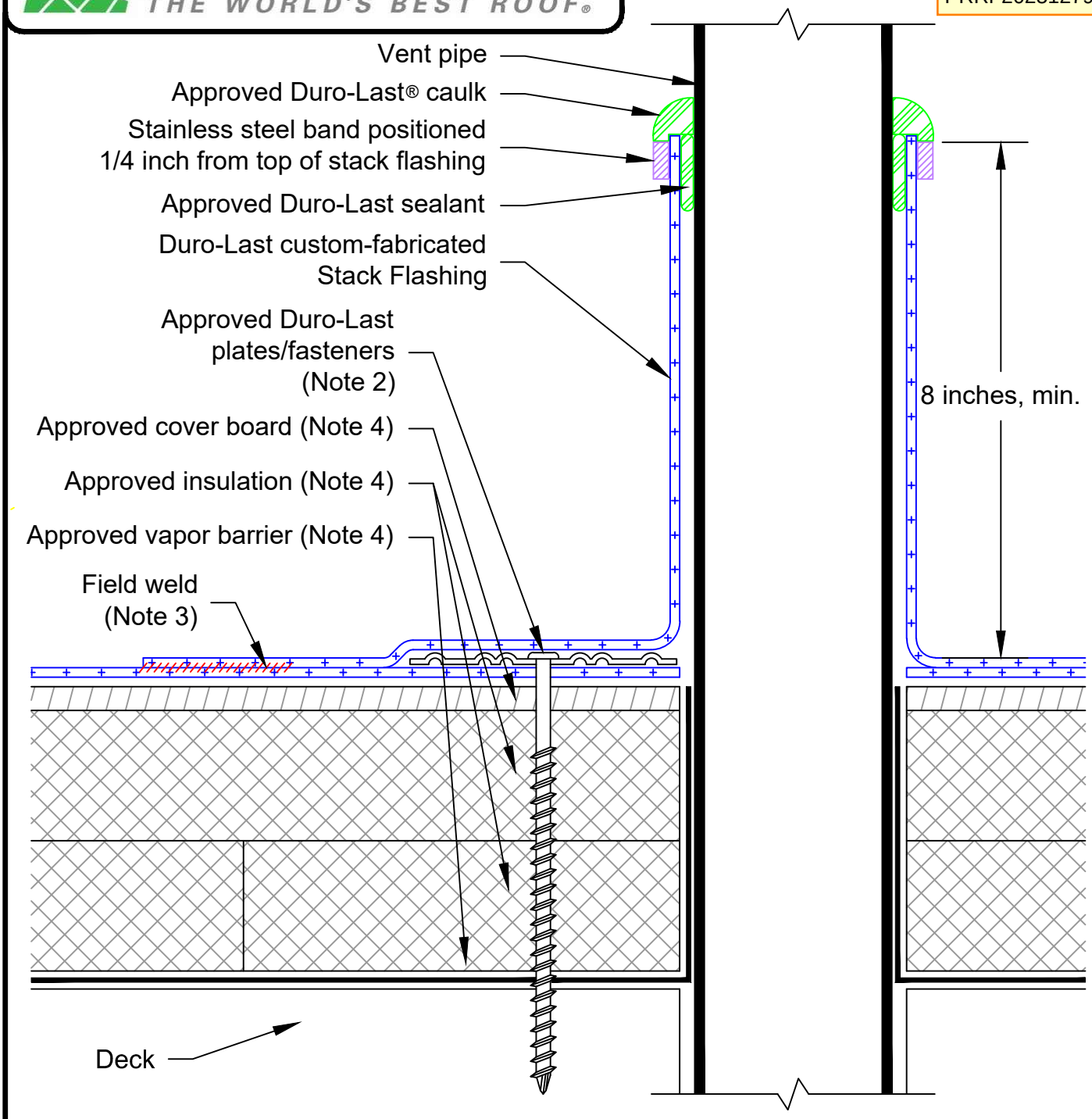
THE WORLD'S BEST ROOF

DETAIL 4070

PRRF20251279



Note 1: Lead flashings must be removed prior to installing Duro-Last Stack Flashings.

Note 2: Deck membrane shall be fastened around the perimeter of the Duro-Last Stack Flashing as per the respective □one the Duro-Last Stack Flashing is located within (field, perimeter, corner), no less than one fastener per flashing.

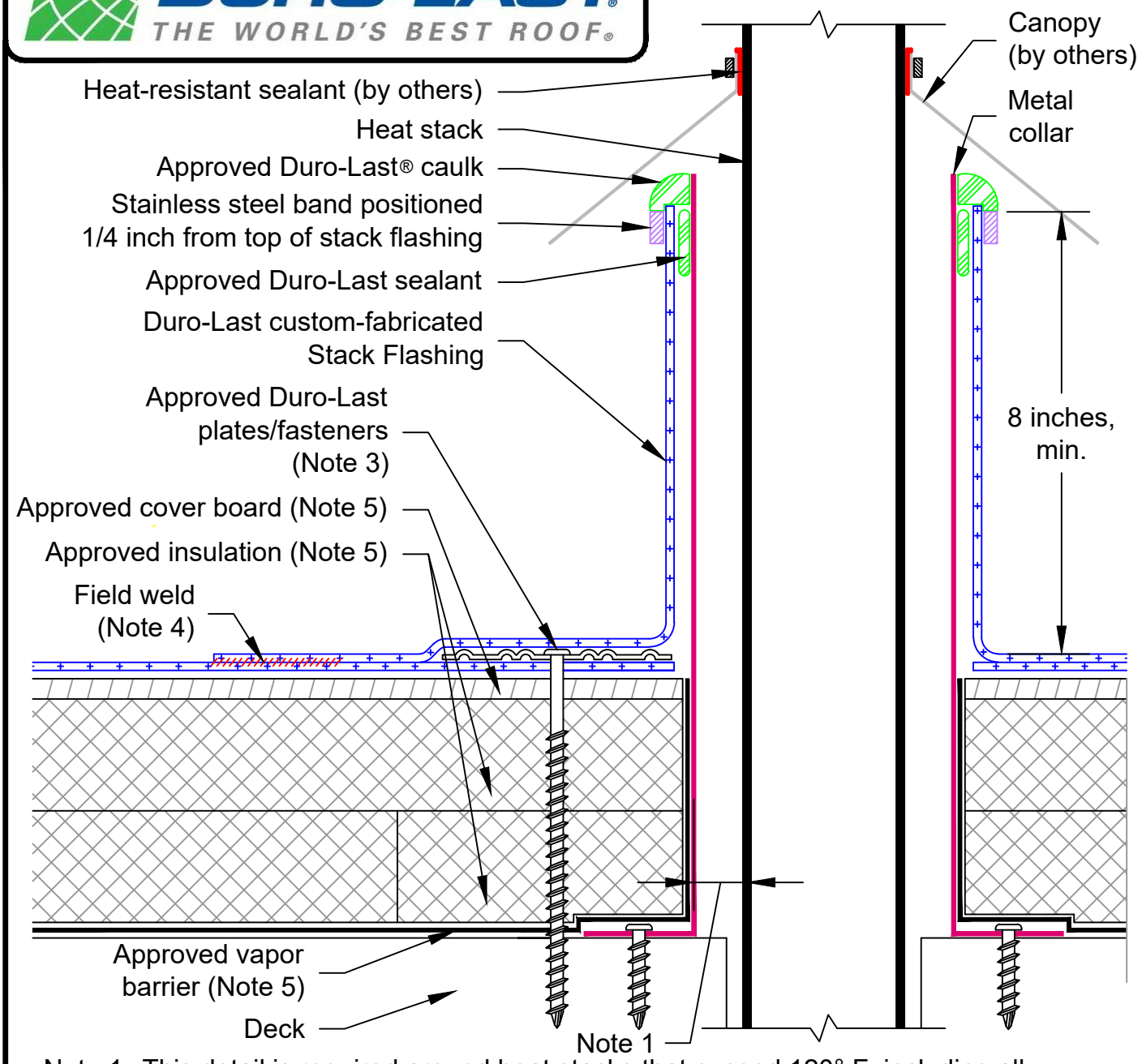
Note 3: All field welds shall be a minimum of 1-1/2 inches wide.

Note 4: Refer to specifications for vapor barrier, insulation and cover board requirements.

REVISED: 02/02/2017	ROOF PENETRATION DETAIL FOR MECHANICALLY FASTENED SYSTEMS
PREVIOUS: 01/01/2009	ROUND PENETRATION
SCALE: NONE	NEW CONSTRUCTION OR RE-ROOF

DURO-LAST®
THE WORLD'S BEST ROOF®

DETAIL 4080



Note 1: This detail is required around heat stacks that exceed 120° F, including all insulated chimney stacks. A minimum of 1-inch air space is required between the metal collar and heat stack. The canopy must be positioned to allow adequate air flow above the termination.

Note 2: Lead flashings must be removed prior to installing Duro-Last Stack Flashings.

Note 3: Deck membrane shall be fastened around the perimeter of the Duro-Last Stack Flashing as per the respective □one the Duro-Last Stack Flashing is located within (field, perimeter, corner), no less than one fastener per flashing.

Note 4: All field welds shall be a minimum of 1-1/2 inches wide.

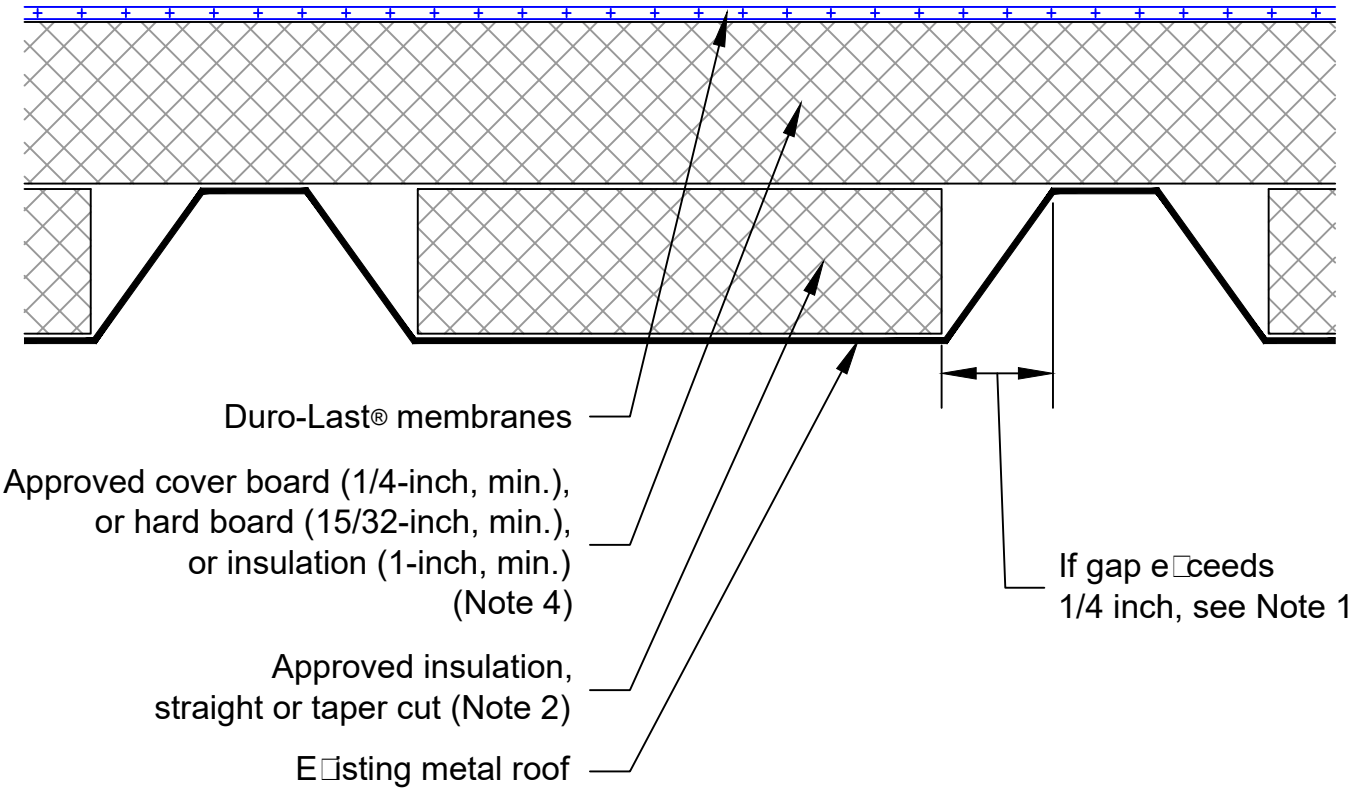
Note 5: Refer to specifications for vapor barrier, insulation and cover board requirements.

REVISED:	02/02/2017	ROOF PENETRATION DETAIL FOR MECHANICALLY FASTENED SYSTEMS	
PREVIOUS:	01/01/2009	HEAT STACK	
SCALE:	NONE	NEW CONSTRUCTION OR RE-ROOF	PRRF20251279

DURO-LAST®
THE WORLD'S BEST ROOF®

DETAIL 8005

PRRF20251279



Note 1: Gaps must not exceed spanability of insulation, cover board or hard board. See Product Data Sheet for spanability of each specific product used.

Note 2: Flute filler must have a minimum density of 1 lb. Hold in place with at least 1 approved Duro-Last plate/fastener. High density wood fiberboard can not be used as a flute filler.(If Duro-Guard® fan fold is used as top layer, refer to Detail Drawing 8000 for flute filler requirements.)

Note 3: High density wood fiberboard may be used as a hard board when roof slope is 1 inch per 12 inches, or greater.

Note 4: Refer to Duro-Last's UL TGFU.R10128 for approved fire-rated assemblies.

REVISED:	08/14/2017	METAL ROOF RECOVER
PREVIOUS:	03/11/2017	STRAIGHT-CUT FLUTE FILLER
SCALE:	NONE	NEW CONSTRUCTION OR RE-ROOF

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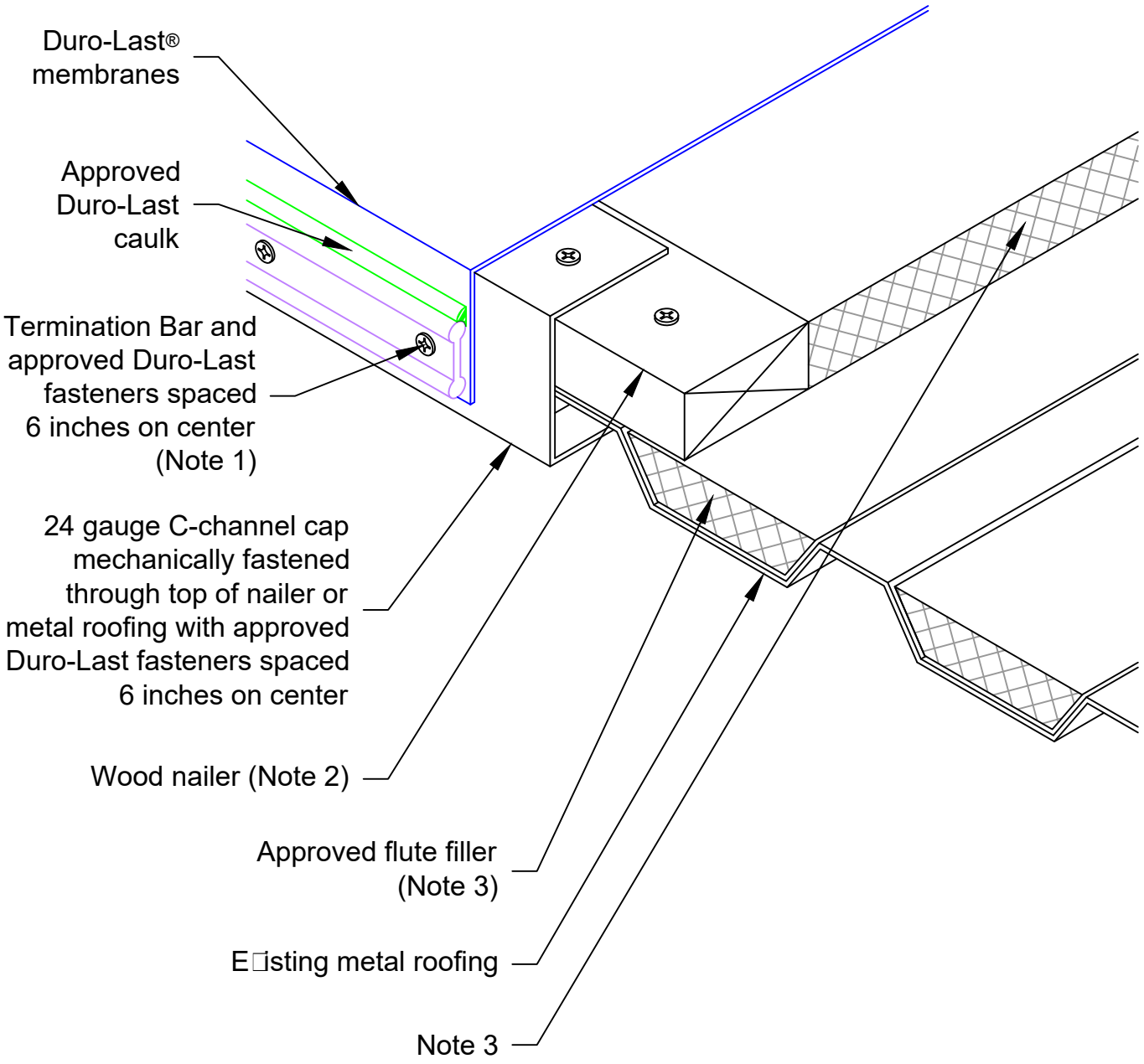
THE WORLD'S BEST ROOF

DETAIL 8010

PRRF20251279



Note 1: Approved edge details may be used in place of Termination Bar.

Note 2: Wood nailers must withstand a minimum force of 180 pounds per lineal foot (per building code). Any pull values greater than 270 pounds will allow for a fastener spacing of 18 inches on center. Pull values less than 270 pounds will require additional fasteners. **The installing contractor is responsible for meeting building codes**.

Note 3: Refer to Detail Drawings 8000 and 8005 for insulation, cover board and hard board installation requirements.

REVISED: 03/16/2017	METAL ROOF RECOVER
PREVIOUS: 01/01/2009	EDGE TERMINATION
SCALE: NONE	NEW CONSTRUCTION OR RE-ROOF

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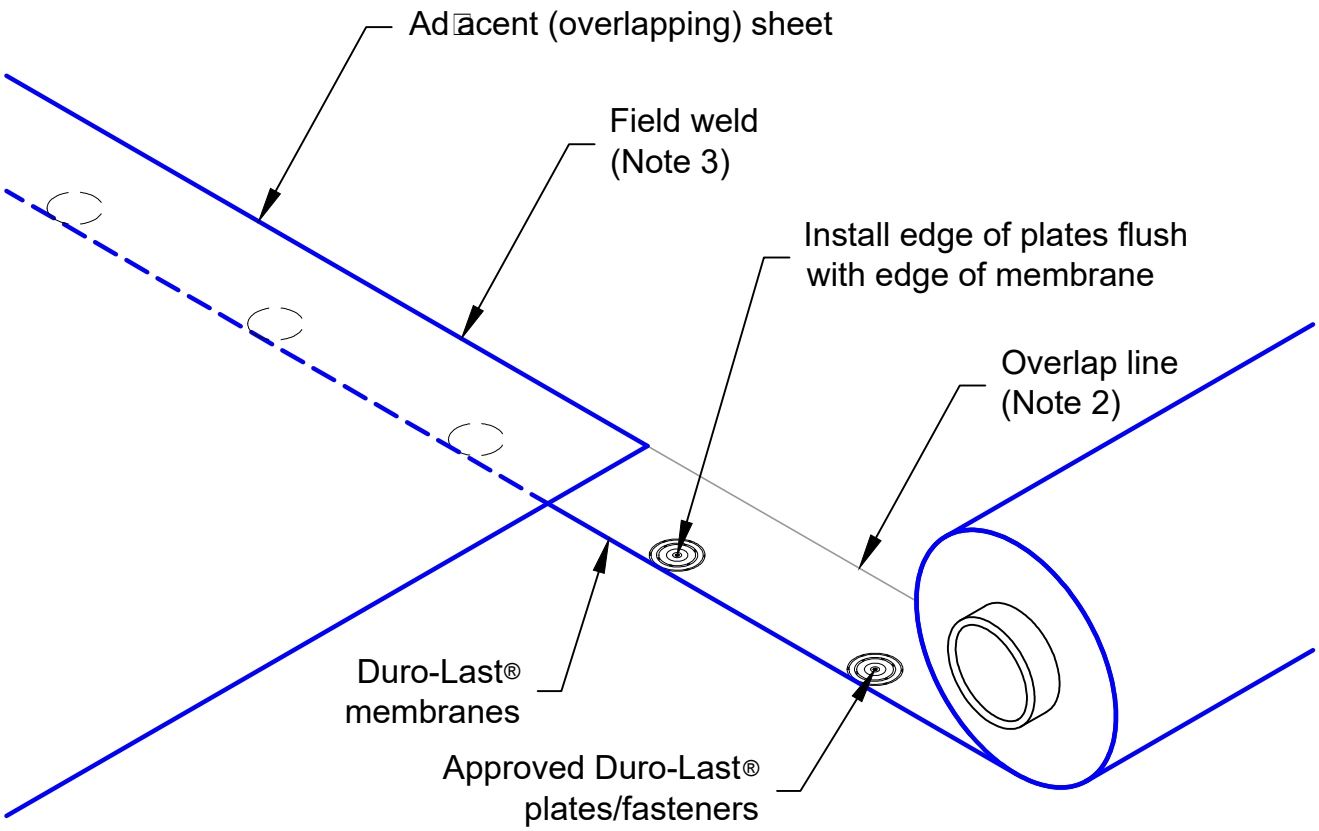
DETAIL RG1062

PRRF20251279



Note 1: Proper fastener spacing can be determined using the Fastener Spacing Tables in the *Roll Good Mechanically Fastened Roofing System* specification.

Note 2: Some membranes will have an overlap line located 6 inches from the edge of the sheet, and lines or dots placed at 6-inch intervals for ease of fastener placement.

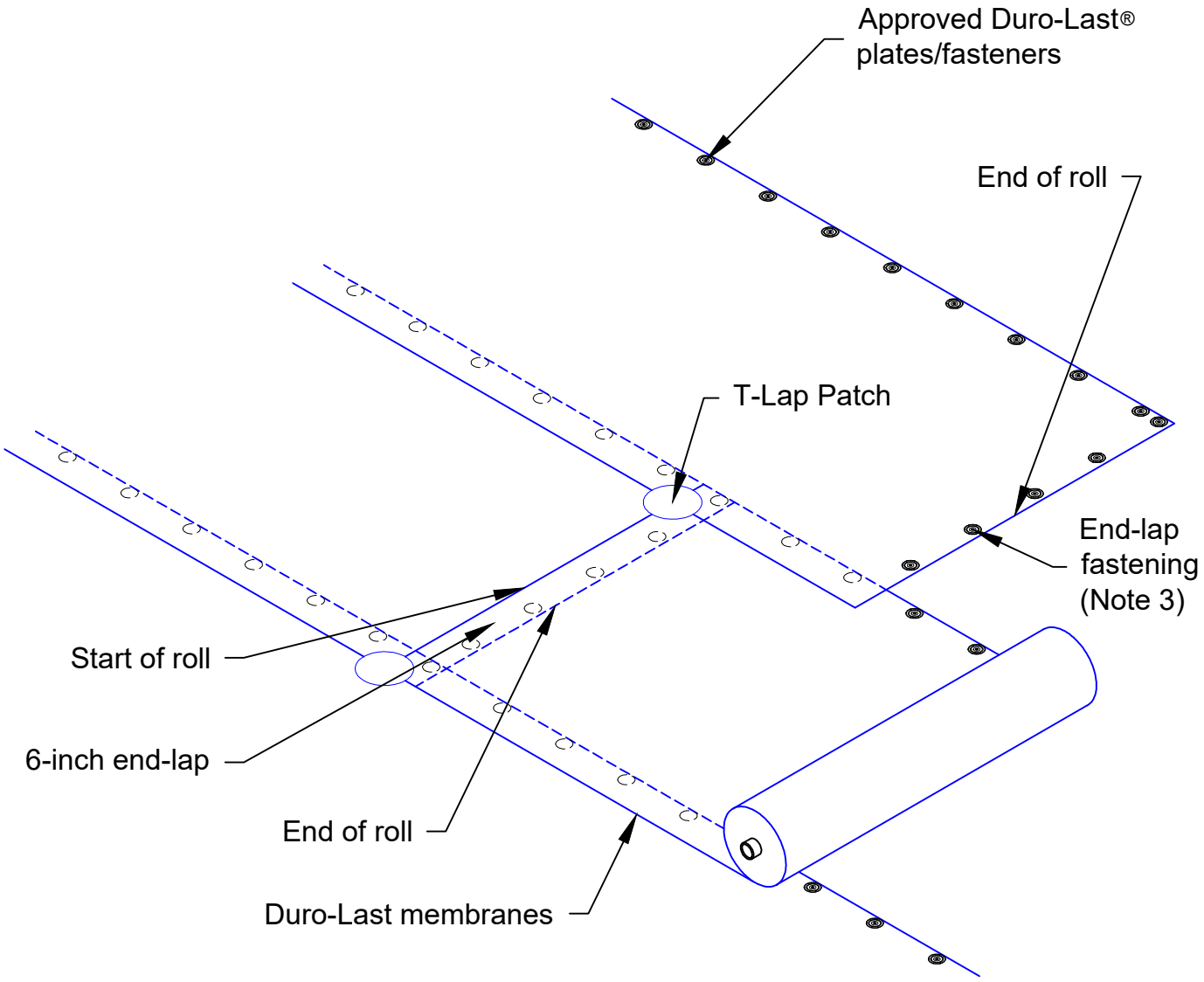
Note 3: All field welds shall be a minimum of 1-1/2 inches wide.

REVISED:	02/03/2017	GENERAL DETAIL FOR ROLL GOOD MECHANICALLY FASTENED SYSTEMS
PREVIOUS:	08/01/2012	FASTENER PLACEMENT AND SHEET OVERLAP
SCALE:	NONE	NEW CONSTRUCTION OR RE-ROOF

DURO-LAST
THE WORLD'S BEST ROOF®

DETAIL RG1064

PRRF20251279



Note 1: This detail applies to roll good membrane installations.

Note 2: Install fasteners so edge of plate is flush with edge of membrane.

Note 3: End of roll fastening should be same as lap fastening as per respective □one (field, perimeter, corner).

Note 4: Position ne□t roll so that it overlaps end of installed roll a minimum of 6 inches. Duro-Last EV, Duro-Tuff® and Duro-Fleece® are all premarked with lap lines set 6 inches from edge of membrane.

Note 5: Install patches at T-Laps per Detail Drawing RG1066.

REVISED:	02/03/2017	GENERAL DETAIL FOR ROLL GOOD MECHANICALLY FASTENED SYSTEMS
PREVIOUS:	04/03/2014	END-LAP FASTENING AND OVERLAP
SCALE:	NONE	NEW CONSTRUCTION OR RE-ROOF

DURO-LAST®
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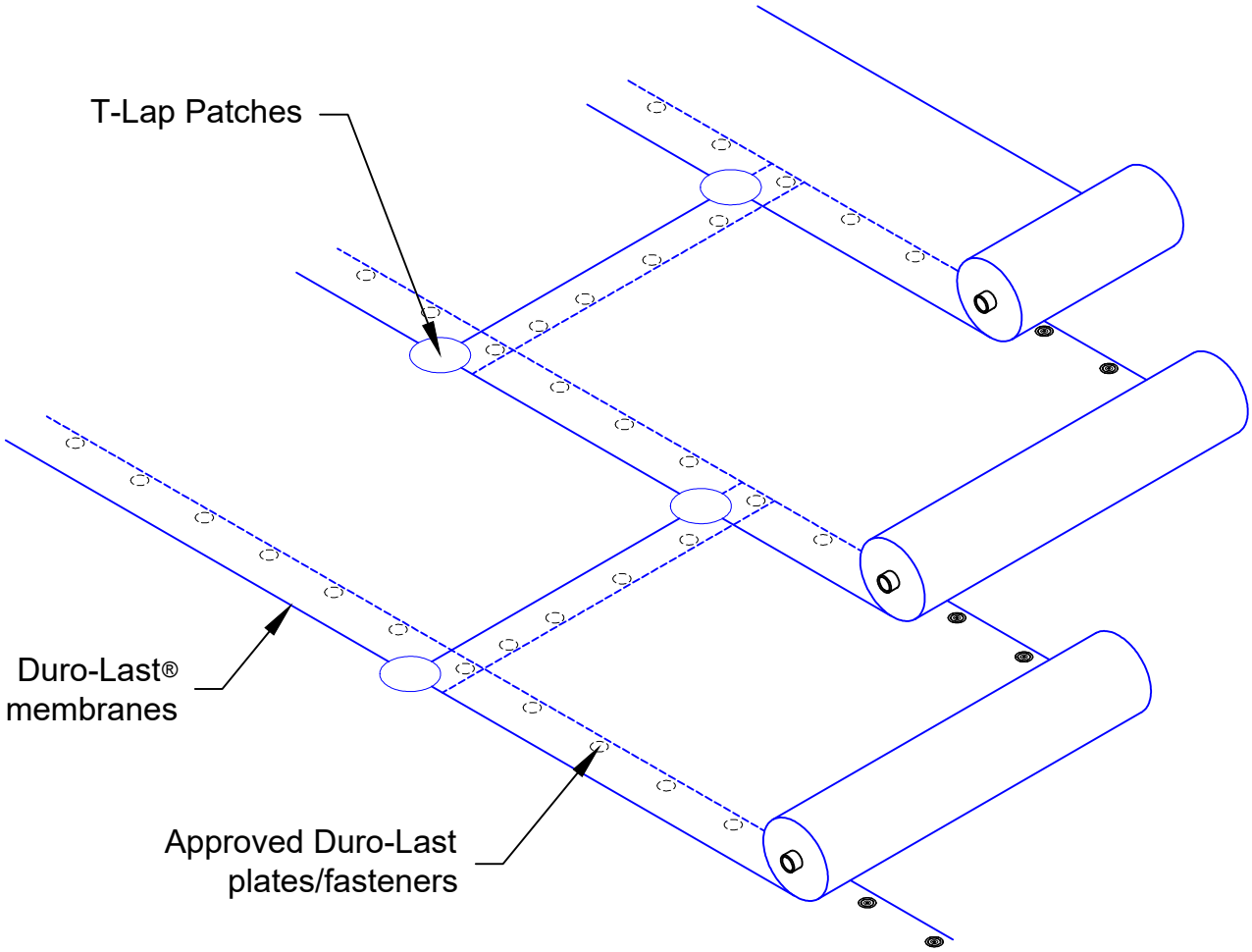
DETAIL RG1066

PRRF20251279



Note 1: This detail applies to all 50 mil or greater roll good membrane installations (excluding Shingle-Ply®). A patch is required at all lap areas where 3 or more layers of membrane intersect (T-Lap) as illustrated above. If 1 of the 3 layers is 40-mil, a patch is not required.

Note 2: Patches can be made of either DT or DL membrane of any thickness. DL EV patches shall only be used on DL EV membranes.

Note 3: Minimum patch size is 4×4 inches if rectangular and 4 inches in diameter if circular.

Note 4: All field welds shall be a minimum of 1-1/2 inches wide.

Note 5: Refer to RG1064 for fastener placement and sheet overlap.

REVISED:	02/03/2017	GENERAL DETAIL FOR ROLL GOOD MECHANICALLY FASTENED SYSTEMS
PREVIOUS:	08/01/2012	LOCATION OF T-LAP PATCHES
SCALE:	NONE	NEW CONSTRUCTION OR RE-ROOF

PRRF20251279

INSTALLER AUTHORIZED LETTER

PRRF20251279

DURO-LAST®
THE WORLD'S BEST ROOF®

September 12, 2025

Re: Jimmy's Roofing
11401 E. Montgomery #2
Spokane Valley, WA 99206

To Whom It May Concern:

Please be advised that Jimmy's Roofing, of Spokane Valley, Washington, has been an authorized dealer/contractor for Duro-Last Roofing, Inc. since December, 2012. They have fulfilled all of our requirements and are in good standing to install all Duro-Last materials. Jimmy's Roofing has achieved the distinguished level of Duro-Last Elite Contractor, based on over 2,316,649 square feet of membrane installed and consistent high inspection scores. They have received and maintained the necessary training to install the Duro-Last Roofing System. They may purchase Duro-Last materials and are entitled to the services and privileges which accompany such authorization.

Upon payment of all related invoices and completion of a satisfactory inspection by a Duro-Last Technical Representative, the standard Duro-Last warranty will be issued. Duro-Last Roofing Systems® are proudly manufactured in the United States of America.

Please feel free to contact us, should you require further assistance.

Sincerely,

Troy Jenison
Vice President of Sales
West

525 Morley Drive, Saginaw, MI 48601
Phone: 800-248-0280 • Fax: 800-432-9331 • www.duro-last.com
Other Locations: Grants Pass, OR • Jackson, MS • Sigourney, IA • Carrollton, TX

PRRF20251279

MANUFACTURER'S CERTIFICATE

PRRF20251279

DURO-LAST®
THE WORLD'S BEST ROOF®

September 12, 2025

RE: WSDOT HQ Facilities – Retrofits
281154 US Hwy. 101, Port Townsend, WA 98368
15 Twidwell Road, Elma, WA 98368
2120 R. W. Johnson Blvd., S.W., Tumwater, WA 98512
3150 s. Meridian, Puyallup, WA 98373
17526 State Route 507 S.E., Yelm, WA 98597

This letter is to confirm that Duro-Last Roofing meets and/or exceeds the manufacturer's qualification requirements for the project referenced above. If you or your customers have further questions, please contact me at (800) 248-0280.

Thank you for your interest in the Duro-Last Roofing System.

Sincerely,

Troy Jenison
Vice President of Sales
West

525 Morley Drive, Saginaw, MI 48601
Phone: 800-248-0280 • Fax: 800-432-9331 • www.duro-last.com
Other Locations: Grants Pass, OR • Jackson, MS • Sigourney, IA • Carrollton, TX

PRRF20251279

WARRANTY

PRRF20251279

DURO-LAST®

20-Year NDL Warranty

Warranty No. _____

I. TERMS and CONDITIONS

Duro-Last®, Inc., ("Duro-Last") grants this No-Dollar Limit ("NDL") Warranty to the owner of a building ("Owner") containing a **Duro-Last Roofing System** ("**Duro-Last System**") installed by a Duro-Last Authorized Dealer/Contractor ("Contractor"), subject to the terms and conditions and limitations contained herein.

Duro-Last's obligation during the 1st through 20th year shall be to repair any leak in the Duro-Last System caused by any defect in a component of the Duro-Last System or by the workmanship of the Contractor, but only as the workmanship relates to the installation of the Duro-Last System itself and not as it relates to other work performed, if any. Duro-Last's obligation includes, at Duro-Last's discretion, either the repair or replacement of part or all of the Duro-Last System and also includes the furnishing or cost of labor to repair the Duro-Last System provided the following conditions are met:

A. Duro-Last and Contractor have been paid in full for the Duro-Last System, its installation and any outstanding invoices issued by Duro-Last that arise after the installation;

B. The Duro-Last System has been approved by Duro-Last following inspection by an authorized Duro-Last Quality Assurance Technical Representative ("Duro-Last QA Tech Rep"), this No-Dollar Limit Warranty has been signed by a Duro-Last QA Tech Rep or Quality Assurance Manager, and the Contractor confirms that the Duro-Last System was installed in accordance with Duro-Last's specifications and written installation requirements;

C. The Owner has notified Duro-Last within 14 days of the discovery of any leak, failure or other alleged Duro-Last System defect. Owner must notify Duro-Last by calling the Duro-Last Quality Assurance Department at 1-866-284-9424, by e-mailing ws@duro-last.com, or by certified mail, return receipt requested;

D. The Owner allows Duro-Last's QA Tech Rep(s) and/or Duro-Last Contractor(s) access to the roof including, if necessary, the removal and replacement by Owner at Owner's expense any and all obstructions, including but not limited to: rooftop gardens, earth, soil, pavers, ballast, decks, patio and walking surface materials, photovoltaic system, and other overburden; and

E. Duro-Last authorizes the repair and, at Duro-Last's option, either Duro-Last's QA Tech Rep(s) or an authorized Contractor makes the repair.

II. OWNER'S RESPONSIBILITIES

The Owner is not entitled to recover under this No-Dollar Limit Warranty unless Owner exercises reasonable and diligent care in the maintenance of the Duro-Last System, including but not limited to inspecting and maintaining the Duro-Last System regularly and as needed, including after storms or natural disasters, and for removing any debris from the Duro-Last System, rooftop, and adjacent areas, and maintaining and keeping all drains in working order and clear of debris and other obstructions.

III. LIMITATIONS and EXCLUSIONS

A. This No-Dollar Limit Warranty does not apply to a Duro-Last System installed on a single-family residence.

B. Duro-Last shall not be liable for damages arising from defects in the design or construction of the building or roof assembly, including inadequate or insufficient drainage; nor shall Duro-Last be liable for any other products aside from the Duro-Last System.

C. Duro-Last is not liable for any Duro-Last System failure nor for subsequent damages arising from Acts of God or causes outside Duro-Last's control including, but not limited to:

1) Damage caused by fire, lightning, hurricane, gale, hail, tornado, flood, earthquake, animals, insects; or

2) Damage caused by accident, vandalism, intentional act, negligence or failure to use reasonable care, whether on the part of the Owner or another; or

3) Damage caused by any unauthorized modification to the Duro-Last System including, but not limited to: damage caused by unauthorized components used in installation or repair, by additional equipment or structures added to or made a part of the roof, by traffic, or by chemicals not normally found in nature or the like; or

4) Interior condensation and/or moisture entering the Duro-Last System through walls, copings, structural defects, HVAC systems, or any part of the building structure, including from adjacent buildings.

D. Duro-Last does not warrant the watertightness of metal products that are located outside of the termination of the Duro-Last membrane.

E. Duro-Last does not warrant against color change and/or pattern change and/or print change in the Duro-Last System.

F. Duro-Last shall have no liability under any theory of law for any claims, repairs, or other damages relating to the presence of asbestos or any vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like on or in the Duro-Last System or in the building or in the air or water serving the building.

G. This No-Dollar Limit Warranty is transferable to subsequent Owners only upon the express written consent of Duro-Last and at Duro-Last's sole discretion. Duro-Last reserves the right to require an inspection of the Duro-Last

OVER: CONTINUED ON BACK

PRRF20251279

System prior to transfer of this No-Dollar Limit Warranty. The Owner (undersigned below) must pay a $500 warranty transfer fee and must pay for any non-warranted repairs identified by Duro-Last during any pre-transfer inspection. A transfer of this No-Dollar Limit Warranty shall not be effective unless all outstanding Duro-Last invoices have been satisfied.

H. This No-Dollar Limit Warranty must be signed by a Duro-Last QA Tech Rep or Quality Assurance Manager. Coverage under the terms of this No-Dollar Limit Warranty begins on the Effective Date. The Effective Date is determined by Duro-Last. Failure of the Owner or Contractor to sign this No-Dollar Limit Warranty does not alter the Effective Date.

I. This No-Dollar Limit Warranty shall be governed by the laws of the State of Michigan without regard to principles of conflicts of law. Duro-Last and Owner hereby agree that the Circuit Court for the County of Saginaw, State of Michigan, or the United States Federal District Court for the Eastern District of Michigan in Bay City, shall have the exclusive jurisdiction to determine any and all disputes, or claims relating to this No-Dollar Limit Warranty and do hereby submit themselves to the sole personal jurisdiction of those Courts.

J. No claim, suit, or other proceeding arising out of or related to the Duro-Last products or these terms, including without limitation this No-Dollar Limit Warranty, may be brought by the Owner or anyone else after one (1) year from the date it accrues.

K. Duro-Last does not waive any rights under this No-Dollar Limit Warranty by refraining from exercising its rights in full in one or more instances.

THIS NO-DOLLAR LIMIT WARRANTY AND THE RESPONSIBILITIES AND REMEDIES STATED HEREIN ARE EXPRESSLY AGREED TO BY OWNER AND DURO-LAST AND CONSTITUTE THE SOLE WARRANTY AND REMEDIES OF THE OWNER FOR ANY ALLEGED DEFECT OR FAILURE OF THE DURO-LAST SYSTEM, WHETHER MEMBRANE, ACCESSORIES, OR CONTRACTOR WORKMANSHIP.

THERE ARE NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE (EITHER EXPRESS OR IMPLIED IN FACT, LAW OR CUSTOM) THAT EXTEND BEYOND THE EXPRESS TERMS STATED IN THIS NO-DOLLAR LIMIT WARRANTY TO THE FULL EXTENT DISCLAIMER IS PERMITTED BY LAW. OWNER AND DURO-LAST TOGETHER JOINTLY DISCLAIM ANY OTHER OR FURTHER WARRANTIES EXCEPT THOSE INCLUDED IN THIS DOCUMENT. IN ANY EVENT, ANY IMPLIED WARRANTY THAT MAY ARISE BY LAW IS LIMITED IN DURATION TO THE TERM HEREIN. THE REPAIR, OR REPLACEMENT PROVIDED HEREIN IS EXCLUSIVE AND IN LIEU OF ALL OTHER REMEDIES. DURO-LAST WILL HAVE NO LIABILITY TO ANYONE FOR CONSEQUENTIAL, SPECIAL, INCIDENTAL, INDIRECT, EXEMPLARY, OR PUNITIVE DAMAGES OF ANY KIND WHATSOEVER, INCLUDING WITHOUT LIMITATION PROPERTY DAMAGE, LOST PROFITS, LOST USE OR ANY OTHER PECUNIARY DAMAGE, WHETHER DUE TO ANY DEFECT IN THE PRODUCTS, BREACH OF THIS AGREEMENT, DELAY, NON-DELIVERY, NON-PERFORMANCE, RECALL, OR ANY OTHER REASON. ALL CLAIMS FOR NEGLIGENCE AND FOR FAILURE OF ESSENTIAL PURPOSE ARE EXPRESSLY WAIVED, RELEASED, AND EXCLUDED.

THERE ARE NO THIRD-PARTY BENEFICIARIES TO THESE TERMS. OWNER ACKNOWLEDGES THESE LIMITATIONS AND WAIVERS, DECLARES THAT THEY HAVE BEEN READ AND UNDERSTOOD, AND AGREES TO BE SO BOUND. ANY PAYMENT FOR THE DURO-LAST SYSTEM OR REGISTRATION OF THE WARRANTY WITH DURO-LAST SIGNIFIES THAT THE OWNER HAS VOLUNTARILY AND KNOWINGLY CONSENTED TO ALL TERMS.

The Contractor is not an agent of Duro-Last and does not have authority to bind Duro-Last. If any Contractor or sales representative made any statements about Duro-Last, its products, services, obligations, or warranties, those statements cannot be relied upon by Owner or any other party and cannot be attributed to Duro-Last. Furthermore, no person may change or modify any terms or conditions of this No-Dollar Limit Warranty, unless in writing and signed by the authorized representative of the Owner and by a Duro-Last officer or by the Duro-Last Quality Assurance Manager.

SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO SUCH A LIMITATION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE. If any provision or individual term herein is invalid or unenforceable under any applicable law, the provision or term will be ineffective to that extent and for the duration of the illegality, but the remaining provisions and terms will be unaffected.

DURO-LAST®, INC.
525 Morley Drive
Saginaw, MI 48601

_____
Signature of Duro-Last QA Tech Rep or QA Manager

_____
Name of Building

_____
Signature of Owner

_____
Address of Building

_____
Owner (printed)

_____
City, State & Zip of Building

_____
Signature of Contractor

_____
Building Designation

_____
Contractor (printed)

_____
Effective Date

_____
Square Footage

_____
Serial No.

_____
Warranty No.

PRRF20251279

MAINTENANCE DATA

PRRF20251279

Protecting Your Duro-Last Roofing Investment

If a leak should appear, you should do the following:

- Call Duro-Last immediately at 800-248-0280.
- Duro-Last must be notified in writing within 30 days in order to meet the terms and conditions of the warranty. Caution should be taken when reporting leaks, as the Duro-Last warranty does not provide for leak investigations of claims not attributable to Duro-Last or not covered by the warranty terms.
- You should inspect the leak area to verify that the cause of the leak is indeed covered by the Duro-Last warranty. If an authorized contractor or Duro-Last representative is sent to investigate a leak and finds the leak is due to a cause not covered by the Duro-Last warranty, you will (as with all manufacturers) be invoiced for the cost of the investigation by the contractor or Duro-Last.
- Even if a problem is reported to an authorized Duro-Last contractor, it must also be reported directly to Duro-Last as well.

Our records have proven that many damages are the result of individuals or companies performing maintenance or construction on a building during or after the installation of the Duro-Last roofing system. These persons are liable for any damages to your roofing system.

If emergency repairs are required, the building owner should take immediate action to prevent entry of water into the roofing system and building interior. The building owner must still notify Duro-Last of the repair no later than the next working day. Emergency repairs must be reasonably controlled in the judgment of Duro-Last Roofing, Inc. to have not significantly increased the scope of necessary permanent repairs.

Safety Measures

Rooftop repair and construction can be a dangerous activity requiring strict compliance with the recommended safety procedures. The building owner must always protect anyone on the roof. Consult OSHA and local safety agencies for safety guidelines. Safety should always be your number one priority.

Any emergency repairs must be undertaken with all necessary cautions. Two-person teams should be used and an inspection of the roof area should be made to insure that electrical hazards are not present. If an electrical hazard is present, the electricity should be shut off until it is repaired, and then the emergency roof repairs should be completed. If the roof is in danger of collapse from a build-up of water, snow or ice, the building should be evacuated immediately and then corrective action(s) taken.

Why Regular Inspections and Maintenance?

Roofs are constantly under attack by weather, structural movement, and stresses as well as chemicals present in the atmosphere. While normal aging will occur on all roofs, small problems stemming from neglect, abuse, contamination, error or accident can result in costly repairs or premature failure of the roofing system, if not detected. A regular program of inspection and repairs will help detect minor problems before they become serious, avoiding interruptions of the internal functions within the building, and most importantly, protecting the owner's investment by adding years to the life of the roof.

Setting up a Maintenance Program

A maintenance program has two areas of responsibility.

SCHEDULING ROOF INSPECTIONS. At least two inspections should be made every year. Ideally, inspections should take place in the spring to check on damage that may have occurred in the winter, so repairs can be scheduled during the fair weather, summer months. The second inspection should be in the fall to be sure that the roof is in good condition for the upcoming winter months. Inspection should also be made after any other occurrences that might affect the roof. (Example: storms, construction activities, fires, etc.)

CONDUCTING INSPECTIONS. All components of the roofing system should be closely inspected and a record made of any signs of deterioration, unusual traffic patterns, poor drainage, accumulated debris, displacement or loss of ballast, or other conditions.

Sealants

The primary area of maintenance is the sealants on the roofing system. All pitch pan fillers, caulking, and sealants must be examined during all regular inspections. Sealants are a major item in any maintenance program due to the extreme stresses created in these areas. Sealants are susceptible to cracking, pulling away from the walls or other surfaces, and splitting. Sealant replacement should take place at the first sign of deterioration. Duro-Last uses only the highest quality sealants for the Duro-Last roofing system. Sealants must be supplied by Duro-Last.

Drainage

The roof structure should provide for positive drainage to eliminate ponding water whenever possible. **Note: Duro-Last does not exclude ponding water in the Duro-Last warranty; but Duro-Last shall have no liability for any structural damage which may result from ponding water.** The weight of ponding water may deflect the decking and framing members, causing damage to the structure and the roofing system. Proper roof drainage is a very important item in a maintenance program. These structural issues should be addressed with your engineering and architectural advisors.

Drains should be kept clear, and any debris that may clog a drain such as tennis balls, baseballs, beverage cans, etc. should be removed during each inspection. Every drain should have a clean "leaf" grate present to prevent clogging of the drainpipes.

A roof inspection in the late fall should also include the removal of leaves. A clean industrial broom can be used to sweep the leaves from the drainage path(s). Another way of removing leaves and other debris as well as observing drainage patterns and activity, is to "wash" the roof. Washing also removes the dirt from the roof surface, which is helpful for reviewing typical membrane wear during the roof inspection.

Washing will also help maintain the Duro-Last white membrane's solar reflectivity. When cleaning the membrane surface, use a non-sudsing, non-abrasive, powdered cleanser (Ex. "Spic-n-Span").

Parapet Walls

Parapet walls should be inspected for deteriorating copings, cracked or open mortar joints or other signs of wear and tear. Degradation of the parapet wall can lead to water penetration into the structure, which is not only harmful to a structure, it may also cause the failure of parts of the roofing system. Insulation, decking, framing members, and the fasteners in a mechanically-attached roofing system may all be adversely affected by moisture penetration.

Building Structure

The condition of the interior and exterior of the building structure should be visually checked during your regularly scheduled inspections. Defects within a structure can affect the roofing system because of the interactions between the structure and the roofing system.

Building Structure: Interior
If a drop ceiling is present, the interior can be viewed by removing ceiling tiles. The walls should be viewed for settling, cracking or movement. The decking should not be rusted (if metal) or deteriorating (if wood). Any water stains that become evident after the installation of the Duro-Last roofing system will require research to determine the entry point of the water/moisture. A concrete deck should be checked for spalling, cracking and/or distortion of the deck to reveal possible structural defects. Any or all of these items can affect the roofing system because of the stresses revealed. Contact Duro-Last Roofing, Inc. for an evaluation when encountering any of these items.

Building Structure: Exterior
The exterior of the structure should be inspected for open mortar joints, poor laps in siding, concrete spalling, loose fascia or general degradation. Any of these items will allow water and moisture penetration, which may affect the longevity of the roofing system, and the structure itself. New water stains on exterior walls may indicate that the coping or other terminations are leaking.

Roof Tie-Ins

Tie-in areas should be thoroughly inspected for any sign of failure. Tie-ins have different materials in contact, which may create an area of stress. The sealants and other items in these areas should be reviewed for cracking, splitting or gaps. Degradation of the other roofing system may have direct impact on the performance of the Duro-Last roofing system. Any questions regarding the life of a tie-in should be directed to Duro-Last for warranty considerations.

+Air Conditioning Units

Care must be taken to insure that any small, sharp debris is removed from the roof. Check around air conditioning equipment, other penetrations and elevation changes, and areas of access. Air conditioners should be checked to insure that the access panels are properly fastened in place, and that the drainage lines are functioning properly. Clogged drain lines and missing panels are items that create leakage into the structure.

Ballast

If a ballasted system has been installed, make sure the ballast is evenly distributed. Extreme care should be taken when inspecting the ballast, reviewing the corners, perimeter, and around penetrations for bare spots due to the increased wind effects in these areas. The ballast should be redistributed, taking care to not damage the membrane. If your inspections reveal that the ballast is being moved repeatedly, it may be necessary to place an interlocking paver system in these areas. The even distribution of ballast can have a direct correlation to the longevity of a roofing system.

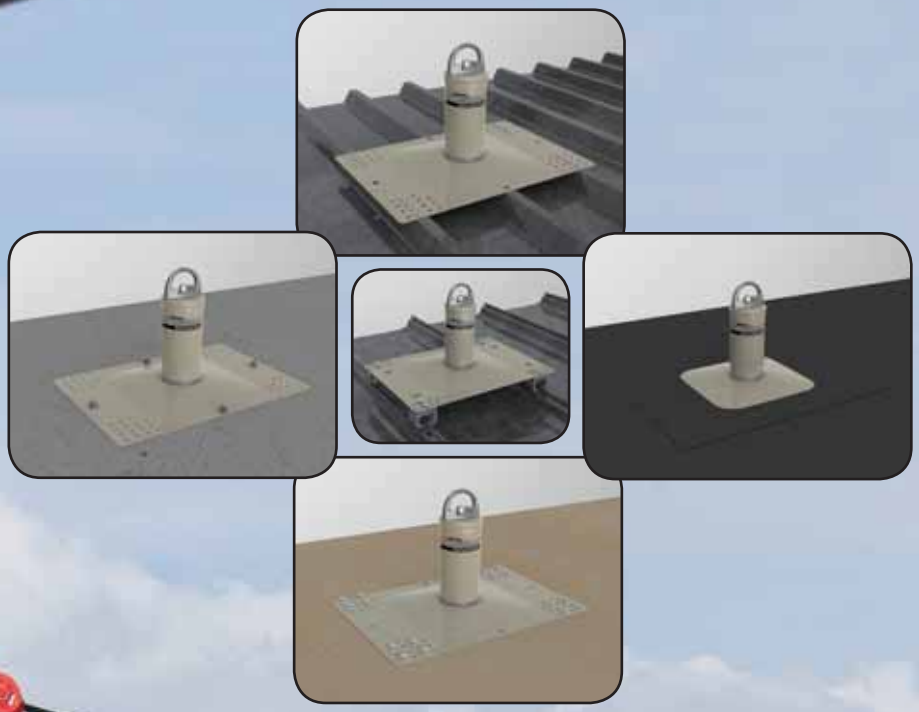
Good Housekeeping

The final area of inspection is the general appearance of the roof and the surface conditions of the membrane. General appearance is primarily a function of housekeeping. Debris, poor drainage or ponding water can directly affect the roofing system. An effective maintenance program will address these items and prevent damages to the roofing system.

PRRF20251279

MILLER®

by Honeywell



Fusion™ Roof Anchor Posts

User Instruction Manual

Manuel D'utilisation / Manual de Instrucciones para El Usuario

I302 Rev. D / MFP9720165
16 January 2012

PRRF20251279

Table of Contents

Thank You

Thank you for your purchase of Miller Fall Protection equipment. Miller brand products are produced to meet the highest standards of quality at our ISO 9001 certified facility. Miller Fall Protection equipment will provide you with years of use when cared for properly.

⚠ WARNING

All persons using this equipment must read, understand and follow all instructions. Failure to do so may result in serious injury or death. Do not use this equipment unless you are properly trained.

Questions?

CALL
1.800.873.5242

It is crucial that the authorized person/user of this fall protection equipment read and understand these instructions. In addition, it is the employer's responsibility to ensure that all users are trained in the proper use, inspection, and maintenance of fall protection equipment. Fall protection training should be an integral part of a comprehensive safety program.

Proper use of fall arrest systems can save lives and reduce the potential of serious injuries from a fall. The user must be aware that forces experienced during the arrest of a fall or prolonged suspension may cause bodily injury. Consult a physician if there is any question about the user's ability to use this product. Pregnant women and minors must not use this product.

1.0 Purpose

The Fusion Roof Anchor Post is designed to be used as a single point anchorage connector on flat roofs. Three versatile bases permit the roof post to accommodate a variety of roof structures, such as standing seam, metal sheathing, membrane and built-up roofs, wood and concrete. A D-ring anchor located at the top of the post allows for compatible connection of the user's personal fall arrest system.

The Fusion Roof Anchor Post may also be used as an intermediate (non-end, non-corner) support within an approved Miller horizontal lifeline system.

2.0 General Requirements, Warnings and Limitations

2.1 General Fall Protection Requirements

All warnings and instructions shall be provided to authorized persons/users. Warnings and instructions must be read and understood prior to using this equipment.

All authorized persons/users must reference the regulations governing occupational safety, as well as applicable standards. The Fusion Roof Anchor Post meets OSHA and ANSI Z359.1 & A10.32-2004.

Proper precautions should always be taken to remove any obstructions, debris, material, or other recognized hazards from the work area that could cause injuries or interfere with the operation of the system.

All equipment must be inspected before each use according to the manufacturer's instructions.

All equipment should be inspected by a qualified person on a regular basis.

To minimize the potential for accidental disengagement, a competent person must ensure system compatibility.

Equipment must not be altered in any way. Repairs must be performed only by the equipment manufacturer, or persons or entities authorized, in writing, by the manufacturer.

Any product exhibiting deformities, unusual wear, or deterioration must be immediately discarded.

Any equipment subject to a fall must be removed from service.

The user shall have a rescue plan and the means at hand to implement it when using this equipment.

Never use fall protection equipment for purposes other than those for which it was designed. Fall protection equipment should never be used for towing or hoisting.

Never remove product labels, which include important warnings and information for the authorized person/user.

2.2 Warnings and Limitations

System Compatibility
The Fusion Roof Anchor Post is designed for use with Miller approved components. Substitution or replacement with non-approved component combinations, sub-systems, or both, may affect or interfere with the safe function of each other and endanger the compatibility within the system. This incompatibility may affect the reliability and safety of the total system.

Miller Fall Protection requires the use of a Miller full-body harness and shock-absorbing lanyard, self-retracting lifeline/fall limiter or rope grab and vertical lifeline with this device. All instructions and warnings provided with the body wear and connecting device must be read and understood before using the equipment.

Limits of Use
The Fusion Roof Anchor Post is designed to be used as a single anchorage point for a personal fall arrest system or as an intermediate anchorage post for approved Miller horizontal lifeline systems. Do not use the Fusion Post as an end or corner anchorage in a horizontal lifeline application unless approved by Miller Fall Protection.

The Fusion Roof Anchor Post is engineered for temporary or permanent installation and must always be installed in an upright position. Installation to wood sheathing is for temporary use only.

Capacity
Maximum capacity is one user at a maximum 310lbs (140.6kg), combined tool, clothing and body weight.

When used as a component within an approved Miller horizontal lifeline system, the system capacities apply. All instructions and warnings provided with the horizontal lifeline system must be read and understood before using the equipment.

Free Fall
Personal fall arrest systems must be rigged to limit a free fall to the shortest possible distance [6ft (1.8m) maximum].

In situations where free fall may exceed the 6ft (1.8m) maximum, a Miller lanyard with a MAX shock absorber pack must be used to keep fall arrest forces at or below 1800lbs (8kN). Free fall must never exceed 12ft (3.7m). All standards requirements for a free fall exceeding 6ft (1.8m) must be met. (See Approved Connecting Devices in 5.0 Connection to the Fusion Roof Anchor Post for other important considerations regarding free fall.)

Fall Arrest Forces
The Fusion Roof Anchor Post is uniquely engineered to absorb energy minimizing fall arrest forces imposed on the worker and the structure. The energy-absorbing, load distribution component within the Fusion Post activates at 1,000lbf (4.5kN).

Permissable Direction of Loading
In the event of a fall, the Fusion Roof Anchor Post orients in the direction of the force to provide 360° protection.

Fall Clearance
Ensure that adequate clearance exists in the potential fall path to avoid striking a lower level or other object. The potential for a swing fall must be minimized. Refer to 6.0 Fall Clearance in this manual and also to the instructions provided with the connecting device being used to calculate fall clearance distance. An extra 1ft (0.3m) of fall clearance must always be added into the calculation to account for the tip-over, energy-absorbing action of the roof anchor post. (See also Approved Connecting Devices in 5.0 Connection to the Fusion Roof Anchor Post for other important considerations regarding calculating fall clearance.)

Anchorage Requirements
The roof structure that the Fusion Roof Anchor Post is installed to must be capable of supporting a 5,000lb (22.2kN) static load in the direction of loading or meet OHSA requirements for a safety factor of two.

Anchorage requirements based on ANSI are as follows:
- For fall arrest systems, anchorages must withstand a static load of 5,000lbs (22.2kN) for non-certified anchorages or two times the maximum arresting force for certified anchorages.
- For positioning systems, anchorages must withstand a static load of 3,000lbs (13.3kN) for non-certified anchorages or two times the foreseeable force for certified anchorages.
- For travel restraint, anchorages must withstand a static load of 1,000lbs (4.5kN) for non-certified anchorages or two times the foreseeable force for certified anchorages.
- For rescue systems, anchorages must withstand a static load of 3,000lbs (13.3kN) for non-certified anchorages or five-times the applied load for certified anchorages.
- When more than one personal fall arrest system (PFAS) is attached to an anchorage, the above anchorage strengths must be multiplied by the number of PFASs attached to the anchorage.

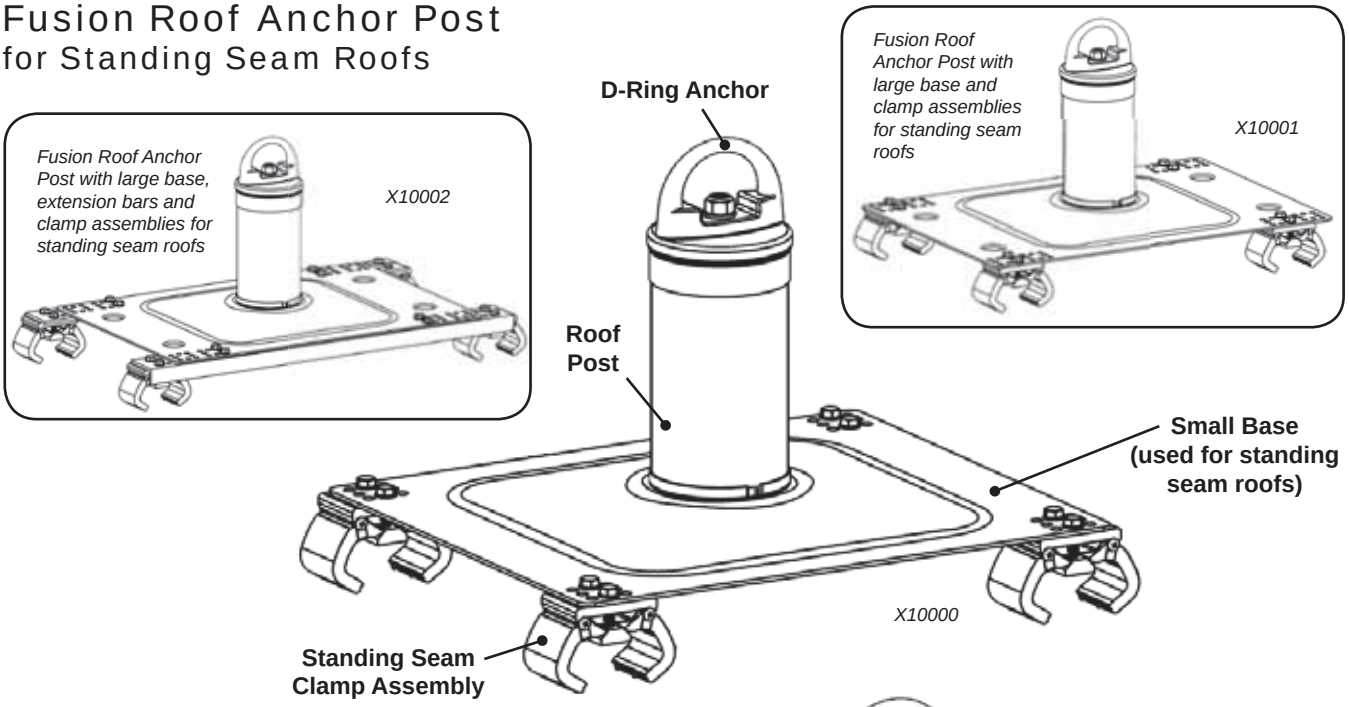
The Fusion Roof Anchor Post is designed for either flat or low slope (less than 4:12 pitch) roof structures. This guideline makes the assumption that the roof can be safely traversed by workers without needing constant force against the connecting device to maintain footing or balance. The Fusion Roof Anchor Post may be used on a roof structure with greater than a 4:12 pitch providing proper footing is maintained. Typically, applicable standards and/or site requirements will require systems such as toe boards for properly working on steep slope roof surfaces.

The Fusion Roof Anchor Post, depending on model, is compatible with most industrial roof designs, including standing seam, membrane, built-up, metal sheathing, trapezoidal, concrete and wood. For additional requirements regarding specific roof types, refer to 3.0 Fusion Roof Anchor Post Diagrams and Descriptions and 4.0 Installation of Fusion Roof Anchor Posts. Fusion Roof Anchor Post models for steel decking, concrete and wood installations may also be installed on other Miller approved non-roof structures so long as all anchorage requirements are met. (Contact Miller Technical Services if there are additional questions regarding approved roof structures and applications.)

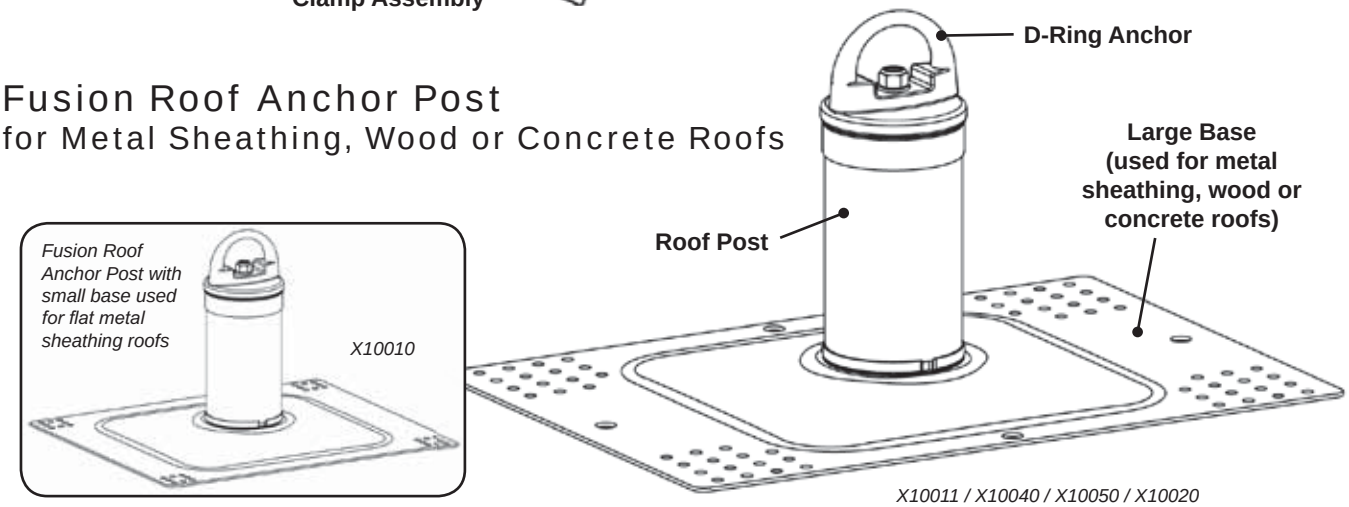
Environmental Hazards
Use of this equipment in areas where environmental hazards exist may require additional precautions to limit the possibility of injury to the user or damage to the equipment. Hazards may include, but are not limited to, extreme temperatures, caustic chemicals, corrosive environments, high voltage power lines, explosive or toxic gases, moving machinery, and sharp edges. Do not expose the equipment to any hazard which it is not designed to withstand. Consult the manufacturer in cases of doubt.

3.0 Fusion Roof Anchor Post Diagrams and Descriptions

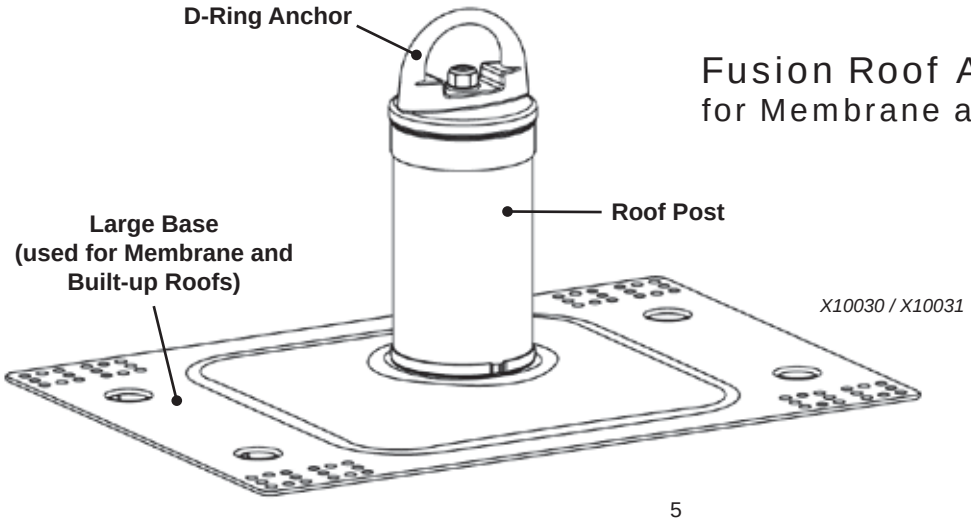
Fusion Roof Anchor Post
for Standing Seam Roofs



Fusion Roof Anchor Post
for Metal Sheathing, Wood or Concrete Roofs

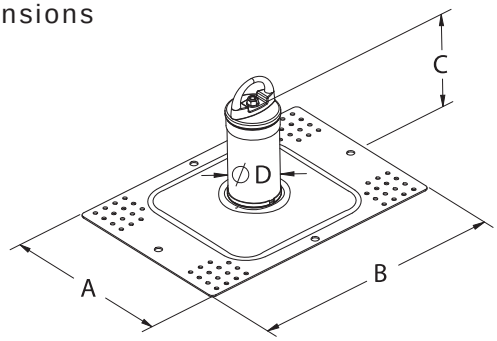


Fusion Roof Anchor Post
for Membrane and Built-up Roofs



Part No.	Description	Attachment Method/ Hardware Included	Designed to Accommodate
Vector Fusion Roof Posts for Standing Seam Roofs			
X10000	Roof post with small base and D-ring anchor	4 clamp assembly kit	Standing seam spacing from 11.75 in. (298mm) to 17 in. (432mm)
X10001	Roof post with large base and D-ring anchor	4 clamp assembly kit	Standing seam spacing from 11.75 in. (298mm) to 21.25 in. (540mm)
X10002	Roof post with large base, extension bars and D-ring anchor	4 clamp assembly kit; 2 extension bars and bolts	Standing seam spacing from 11.75 in. (298mm) to 24 in. (610mm)
Vector Fusion Roof Posts for Metal Sheathing Roofs			
X10010	Roof post with small base and D-ring anchor	Rivet kit with sealing washers and mastic tape	Metal sheathing with minimum thickness of 24 gauge (0.024 in. [0.61mm])
X10011	Roof post with large base and D-ring anchor	Rivet kit with sealing washers and mastic tape	Metal sheathing with minimum thickness of 24 gauge (0.024 in. [0.61mm]); trapazoidal spacing of 8 in. (203mm) to 20 in. (508mm) in one-inch (25.4mm) increments
Vector Fusion Roof Posts for Membrane and Built-up Roofs			
X10030	Roof post with large base and D-ring anchor	5.5 in. toggle bolt kit	Fastens through membrane, insulation and into metal sheathing, wood sheathing or concrete with a combined thickness of up to 5.5 in. (140mm)
X10031	Roof post with large base and D-ring anchor	10.5 in. toggle bolt kit	Fastens through membrane, insulation and into metal sheathing, wood sheathing or concrete with a combined thickness between 5.5 in. (140mm) and 10.5 in. (267mm)
Vector Fusion Roof Post for Wood Sheathing Roofs *(Temporary installations only)*			
X10040	Roof post with large base and D-ring anchorage connector	Lag screw kit	Plywood with a minimum thickness of 5/8-in. (15.9mm) CDX
Vector Fusion Roof Post for Concrete Roofs			
X10050	Roof post with large base and D-ring anchorage connector	Concrete expansion bolt anchor kit	Concrete decking with minimum thickness of 6.5 in. (165mm) and minimum concrete compressive strength of 3000 PSI (20.7 MPa)
Vector Fusion Roof Post for Metal Decking, Wood or Concrete Roofs			
X10020	Roof post with large base and D-ring anchorage connector	Hardware not included	With Miller approved hardware, accommodates same as X10011, X10040 and X10050, depending on application.

Dimensions



Part No.	Width A	Length B	Height C	Post Dia. D
X10000 X10010	15.25in (387mm)	18in (457mm)	8.6in (218mm)	4in (102mm)
X10001 X10011 X10020 X10040 X10050		22in (559mm)		
X10030 X10031			9in (229mm)	
X10002	15.6in (396mm)	26in (660mm)	9.56in (243mm)	

Specifications

Roof Anchor Post Materials

Energy Absorber:	Stainless Steel
Internal Connecting Components:	Stainless Steel
Top and Bottom Post Plates:	Anodized Cast Aluminum
Standing Seam/Wood/Metal Base Plate:	Two-layer Zinc/Powder-Coated Steel
Post/Base Plate Seal:	HDPE
Post Cap:	Vinyl w/UV Inhibitor
D-Ring Anchor:	Zinc Chromate Steel

Connection Component Materials

Standing Seam Clamps:	Anodized Aluminum/ Stainless Steel
Extension Bars:	Stainless Steel
Hardware for Metal Sheathing	Hot Dip Galvanized/Neoprene
Hardware for Membrane:	Zinc-Plated Steel/PVC/Neoprene
Hardware for Wood:	Zinc-Plated Steel
Hardware for Concrete:	Stainless Steel

4.0 Installation of Fusion Roof Anchor Posts

- Before installation, carefully inspect all components of the system according to the manufacturer's instructions (see 8.0 Inspection and Maintenance).
- Some system components may come preassembled. Installation instructions still must be followed to ensure all components are included and properly assembled. All fasteners and connectors must be checked for correct alignment and installation and tightened to required specifications.
- Hardware provided with product at the time of shipment must be used for proper installation. For installation of Model X10020, Miller approved hardware must be used depending on the application. Do not use alternate hardware/parts unless approved by Miller Fall Protection. All installation instructions must be followed, including any installation instructions provided with the hardware. Contact Miller Technical Services if there are any discrepancies.
- Contact Miller Technical Services at 800.873.5242 if there are any questions about the installation requirements and/or procedures.

4.1 Roof Anchor Post Assembly

Post to Base Assembly

1. Set gasket on base aligning the center holes as shown in Fig. 1a.
2. Insert the bolt extruding from the bottom of the post through the gasket and base.
3. Tighten until snug against gasket and base.

D-Bolt Anchor to Post Assembly

1. Place D-bolt anchor over bolt extruding from the top of the post as shown in Fig. 1a.
2. Attach washer and nut.
3. Torque to approximately 20ft.lbs. (20.1Nm).

Fig. 1a

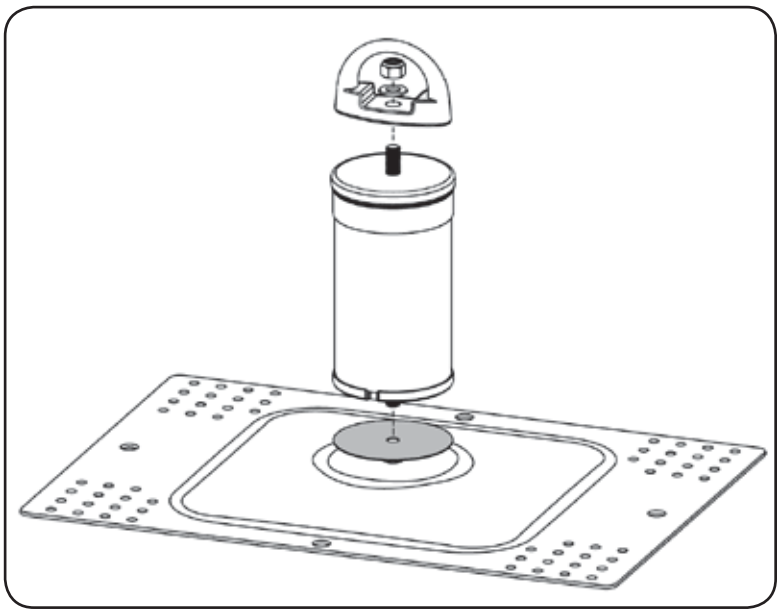
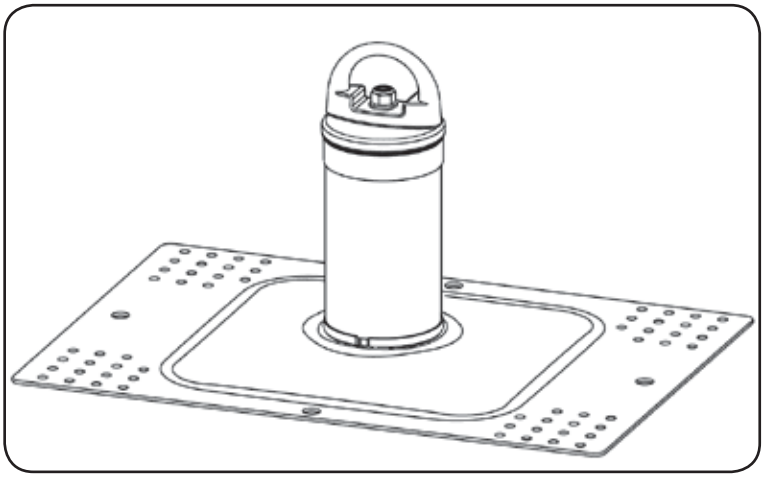


Fig. 1b - Completely Assembled



4.2 Base Installation

- Always follow a previously approved site plan and site work rules when installing a Fusion Roof Anchor Post.
- The roof structure to which the Fusion Roof Anchor Post is being installed must be capable of sustaining the load requirements as set forth in 2.2 System Warnings and Limitations.
- When determining distance from roof edge to install the roof anchor post, it must be verified that the roof structure at the point of installation is able to sustain the potential fall arrest loads. As a general rule, it is recommended that the roof anchor post be installed at least 3ft (0.91m) from the roof edge.
- Proper precautions must be taken to ensure that the installer is not exposed to a fall hazard during the installation process.
- Always install the Fusion Post in the upright position to ensure proper operation.

4.2.1 Installation of Base to Standing Seam Roofs (Models X10000, X10001 and X10002)

Standing seam spacing of roof must be determined before attaching clamp assemblies to small or large standing seam base. Refer to the Small and Large Base Spacing Diagrams (Fig. 2a and 2b) for help in determining the rows needed to create the spacing required for the standing seam roof. Remember that the clamp assemblies are designed to self-center allowing spacing to be off-set slightly. Clamp assemblies may be installed to any two of the corner 0.34in (8.64mm) diameter mounting holes in a row at each of the four corner locations to accommodate the maximum number of standing seam roofs with various spacing requirements. Optional extension bars may be used for additional spacing needs.

Small Base
Spacing Diagram

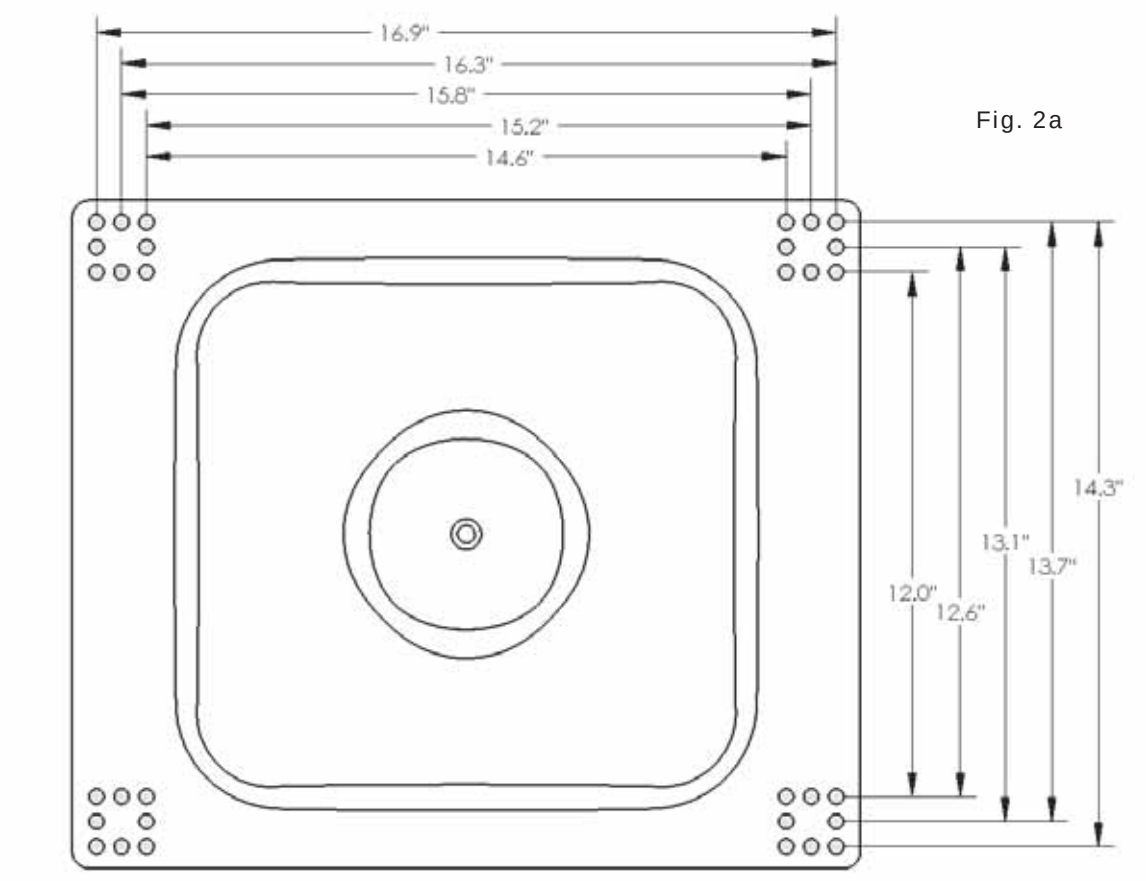


Fig. 2a

Large Base Spacing Diagram

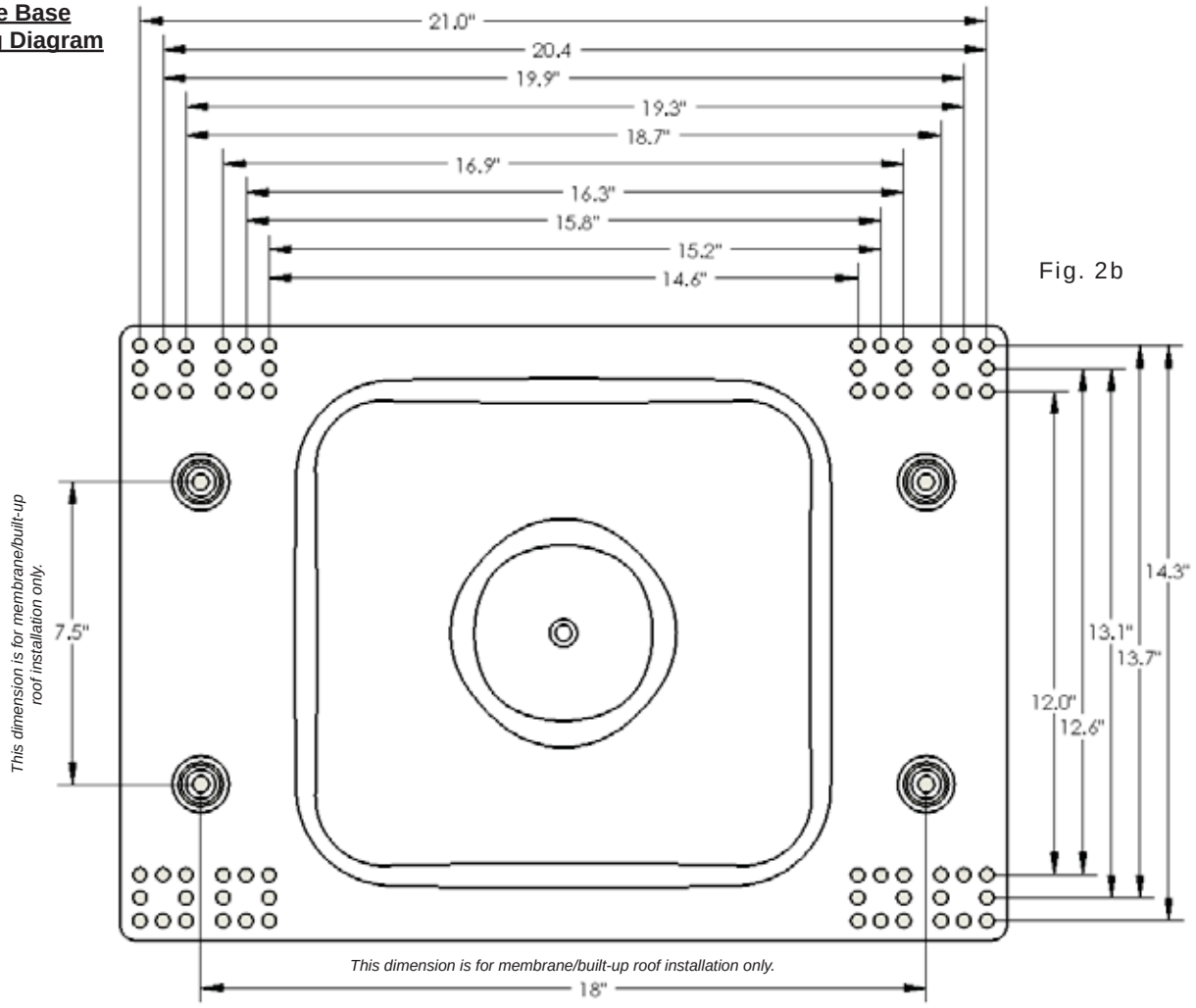


Fig. 2b

Due to the large number of standing seam roof styles, the following illustrations are provided to set guidelines for establishing a correct and secure installation. As a general rule, the clamp assemblies should always be installed to the standing seam as far down as possible below an obstruction (the seam must not be narrower above where the clamp is closed on the seam). Do not install to sloped portions of a standing seam as the clamp may have the potential to slip. If in doubt about proper installation to a particular standing seam roof style, contact Miller Technical Services.

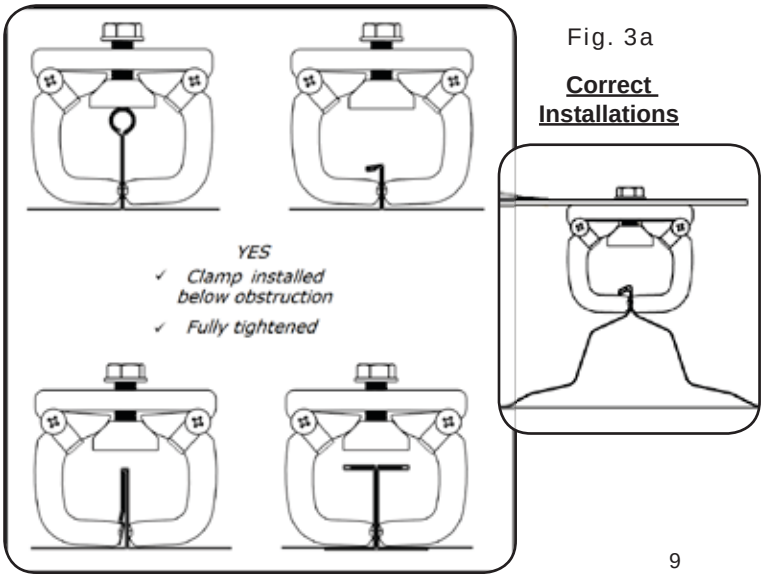
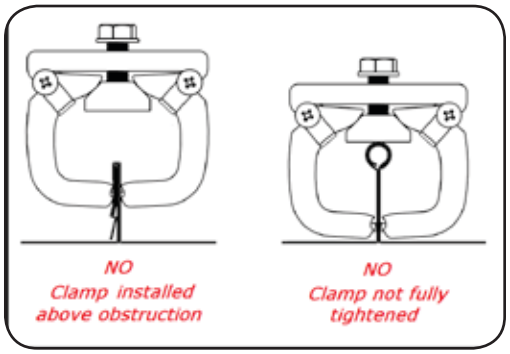


Fig. 3a

Correct Installations

Fig. 3b

Incorrect Installations



Installation of Small Base - Model X10000

1. Once standing seam spacing has been determined, attach one clamp assembly to each of the four corners of the base as shown in Fig. 4a. Install each bolt completely through the washer and base mounting hole and into the corresponding hole in the clamp assembly bar. Do not tighten until the base is set on the standing seam roof.
2. Place base with open clamp assemblies over the standing seams and proceed with closing and tightening clamp assemblies. Clamp assemblies are designed to self-center for proper alignment. Standing seam roofs differ, but in all cases the clamps must close below the seam obstruction to ensure that they are properly secured and will not slip (see Fig. 3a). Torque clamp assemblies to 20ft.lbs., alternating bolts until all bolts have achieved the correct torque value. *Note: Once the first bolt has reached 20ft. lbs., do not tighten the other three bolts more than three times each.*

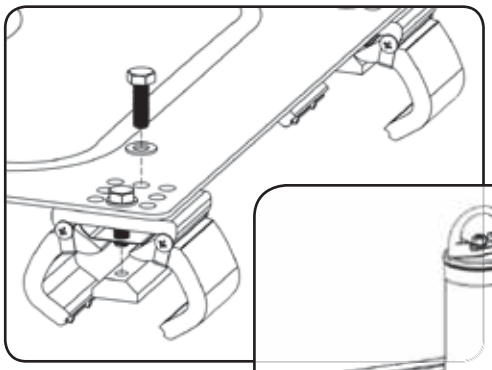


Fig. 4a

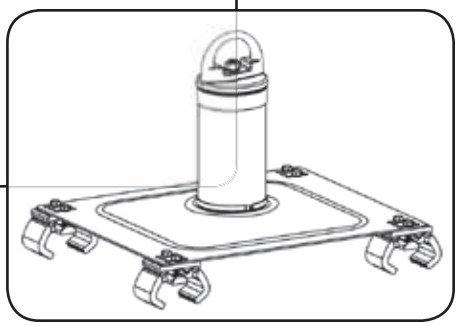
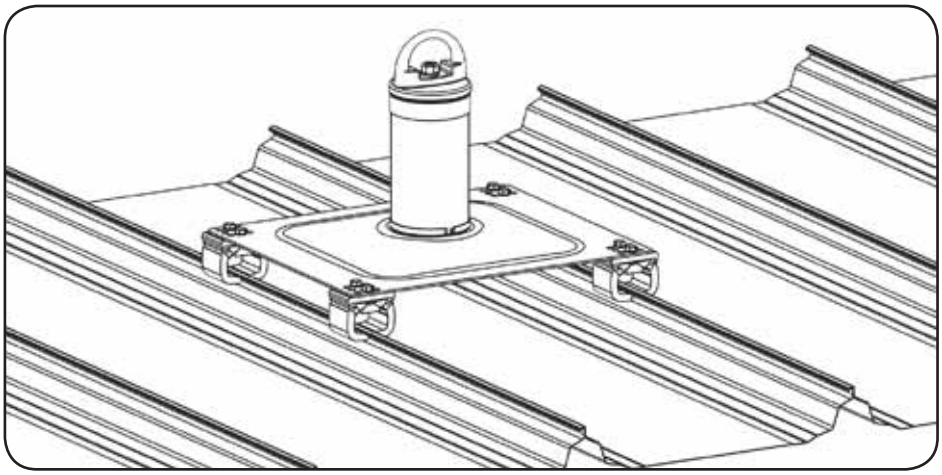


Fig. 4b

Fig. 4c - Completely Installed



Installation of Large Base - Model X10001

1. Once standing seam spacing has been determined, attach one clamp assembly to each of the four corners of the base as shown in Fig. 5a. Install each bolt completely through the washer and base mounting hole and into the corresponding hole in the clamp assembly bar. Do not tighten until the base is set on the standing seam roof.
2. Place base with open clamp assemblies over the standing seams and proceed with closing and tightening clamp assemblies. Clamp assemblies are designed to self-center for proper alignment. Standing seam roofs differ, but in all cases the clamps must close below the seam obstruction to ensure that they are properly secured and will not slip (see Fig. 3a). Torque clamp assemblies to 20ft.lbs., alternating bolts until all bolts have achieved the correct torque value. *Note: Once the first bolt has reached 20ft.lbs., do not tighten the other three bolts more than three times each.*

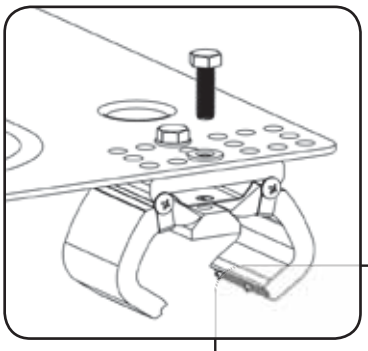


Fig. 5a

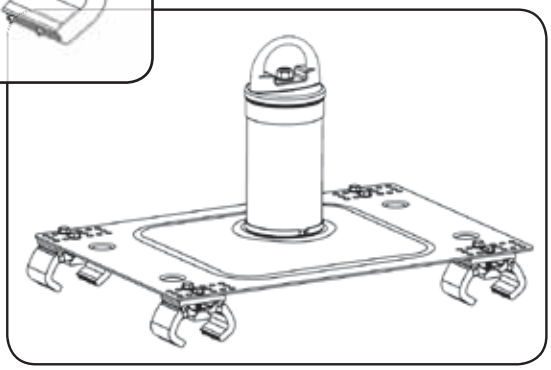
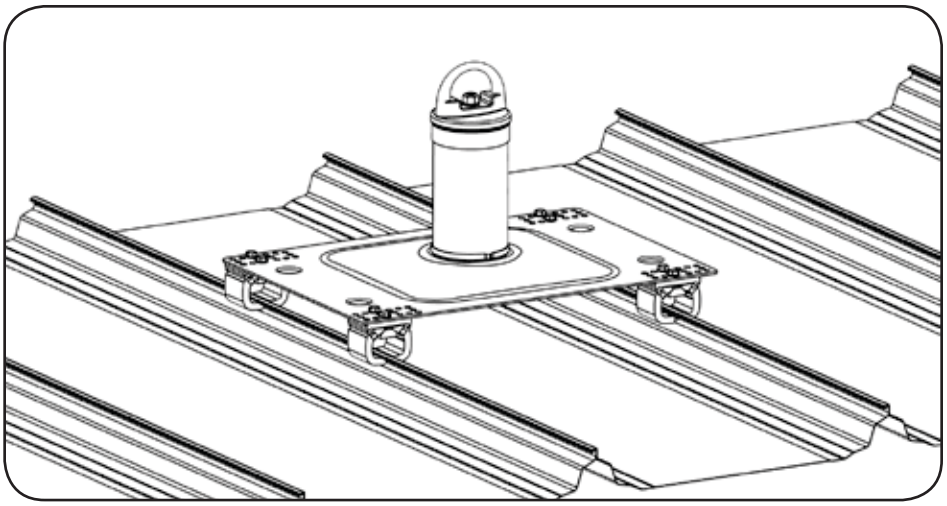


Fig. 5b

Fig. 5c - Completely Installed



Using Extension Bars - Model X10002

For standing seam roofs with spacing greater than 21.25in (540mm) and up to 24in (610mm), extension bars may be added to the base.

1. Place extension bar on the underside of base, aligning holes in base with those on the extension bar.
2. Attach hardware as shown in Fig. 6a. Insert each bolt through washer, base and extension bar and attach washer and nut on the underside. Two bolts must be used on each end of the extension bar (for a total of four bolts) for proper installation.
3. Repeat procedure for extension bar on opposite side of base. Torque extension bar hardware to 20ft.lbs.
4. Once standing seam spacing has been determined, attach one clamp assembly to each extension bar end as shown in Fig. 6b. Install each bolt completely through the washer and extension bar mounting hole and into the corresponding hole in the clamp assembly bar. Do not tighten until the base is set on the standing seam roof.
5. Place base with open clamp assemblies over the standing seams and proceed with closing and tightening clamp assemblies. Clamp assemblies are designed to self-center for proper alignment. Standing seam roofs differ, but in all cases the clamps must close below the seam obstruction to ensure that they are properly secured and will not slip (see Fig. 3a). Torque clamp assemblies to 20ft. lbs., alternating bolts until all bolts have achieved the correct torque value. *Note: Once the first bolt has reached 20ft.lbs., do not tighten the other three bolts more than three times each.*

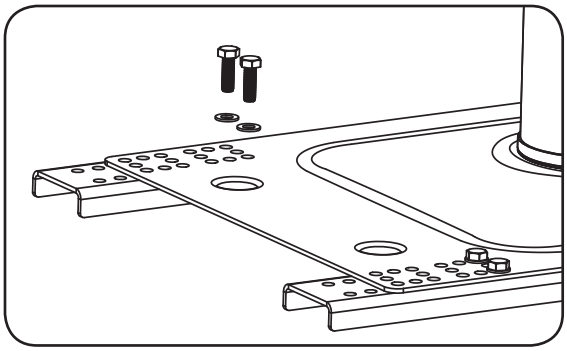


Fig. 6a

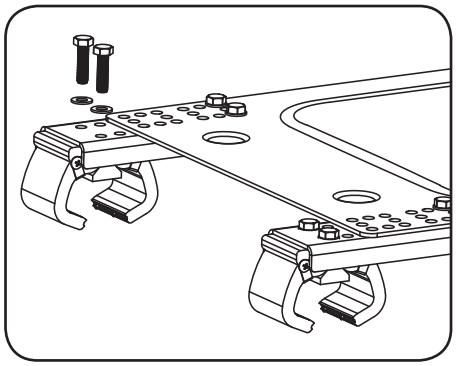
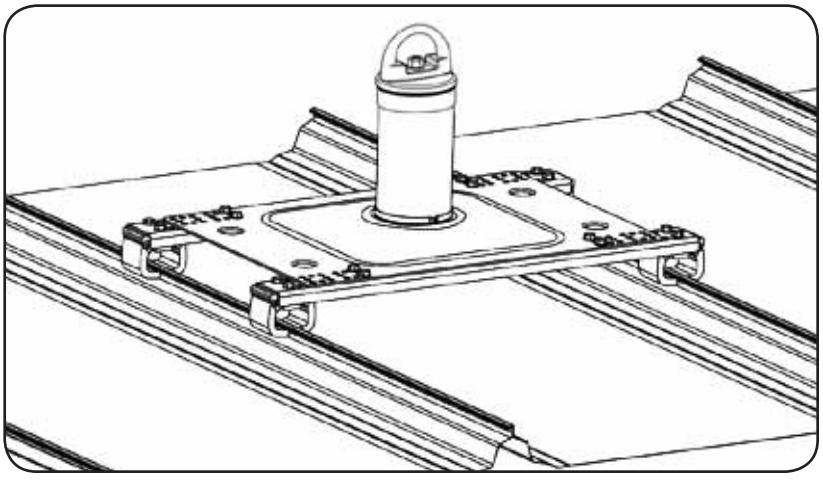


Fig. 6b

Fig. 6c - Completely Installed



4.2.2 Installation of Base to Metal Sheathing (Models X10010 and X10011)

Model X10010 (small base) is designed for installation to flat metal sheathing only. Model X10011 (large base) anchors to flat metal sheathing as well as trapazoid profile/ribbed metal roofs.

Small Base - Model X10010

1. Position the base on metal decking as shown in Fig. 7a.
2. With the base in position, drill four 0.257in (6.53mm) to 0.261in (6.63mm) diameter pilot holes in a square pattern through the metal decking at each of the corner mounting locations for a total of 16 holes.
3. Remove the base and place a length of mastic tape over each set of pilot holes.
4. Reposition the base on the metal decking aligning the pilot holes with the mounting holes on the base plate. Install each of 16 rivets through a sealing washer and the corresponding base mounting hole and into the mastic tape and pilot holes in the metal decking using an appropriate riveting tool.

WARNING: All sixteen (16) rivets with sealing washers must be used to secure the base properly.

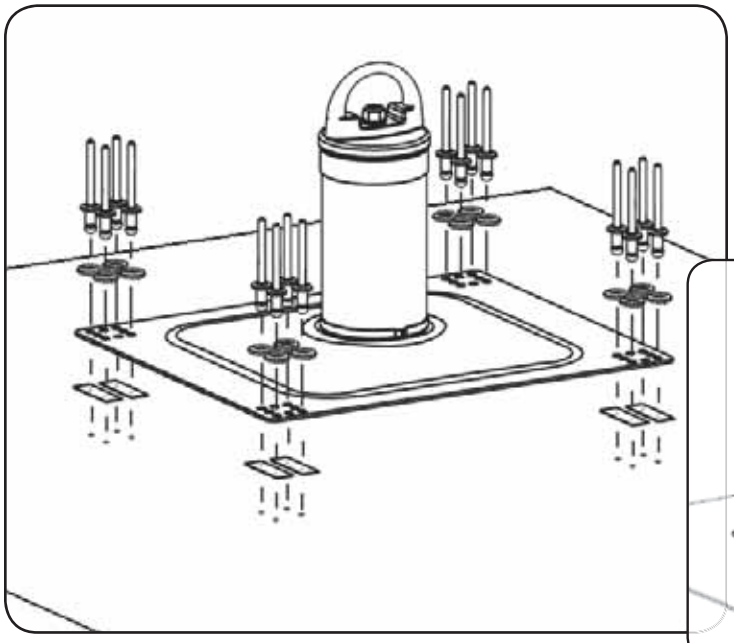
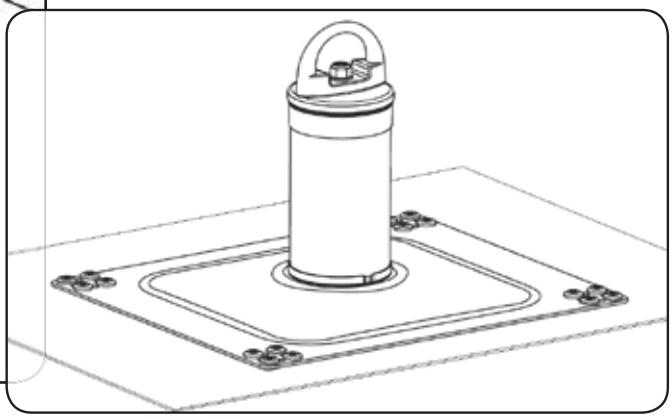


Fig. 7a

Fig. 7b - Completely Installed

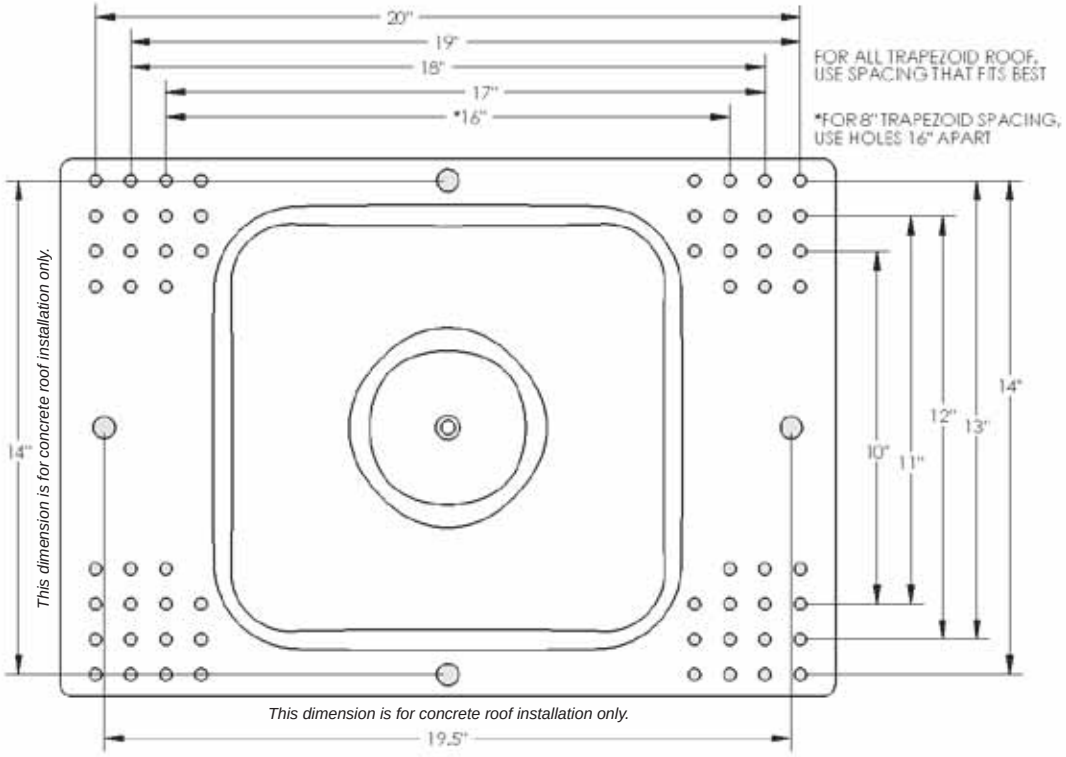


Large Base - Model X10011

1. Position the base on metal decking such that a row of 0.34in (8.64mm) diameter mounting holes aligns with decking ribs at each of the four base plate corners as shown in Fig. 8b. Refer to spacing diagram (Fig. 8a) if needed. Mounting holes must be centered on decking rib crowns. Never align mounting holes over the rib valleys or on the sloped sides of the decking ribs.
2. With the base in position, drill four 0.257in (6.53mm) to 0.261in (6.63mm) diameter pilot holes in a row through the decking ribs at each of the corner mounting locations for a total of 16 holes.
3. Remove the base and place a length of mastic tape over each set of pilot holes.
4. Reposition the base on the metal decking aligning the pilot holes with the mounting holes on the base plate. Install each of 16 rivets through a sealing washer and the corresponding base mounting hole and into the mastic tape and pilot holes in the decking ribs using an appropriate riveting tool.

WARNING: All sixteen (16) rivets with sealing washers must be used to secure the base properly.

Fig. 8a



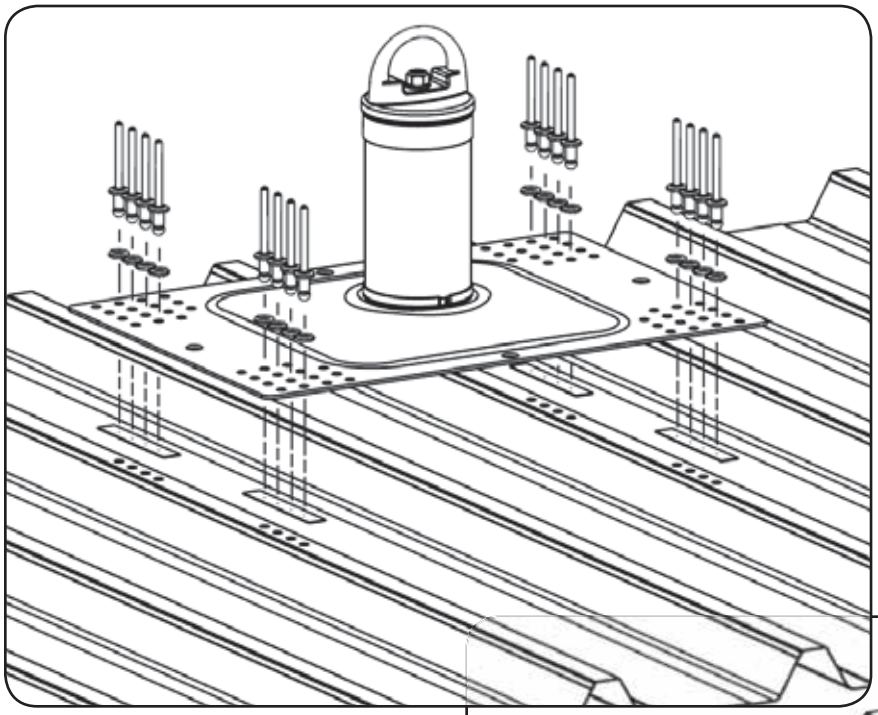
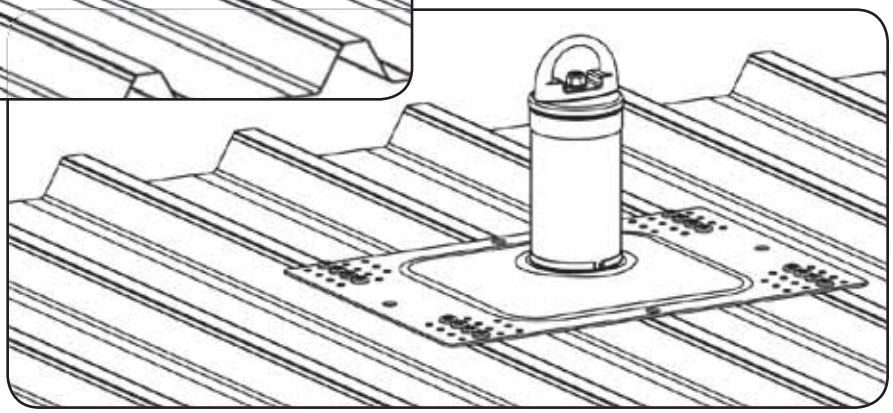


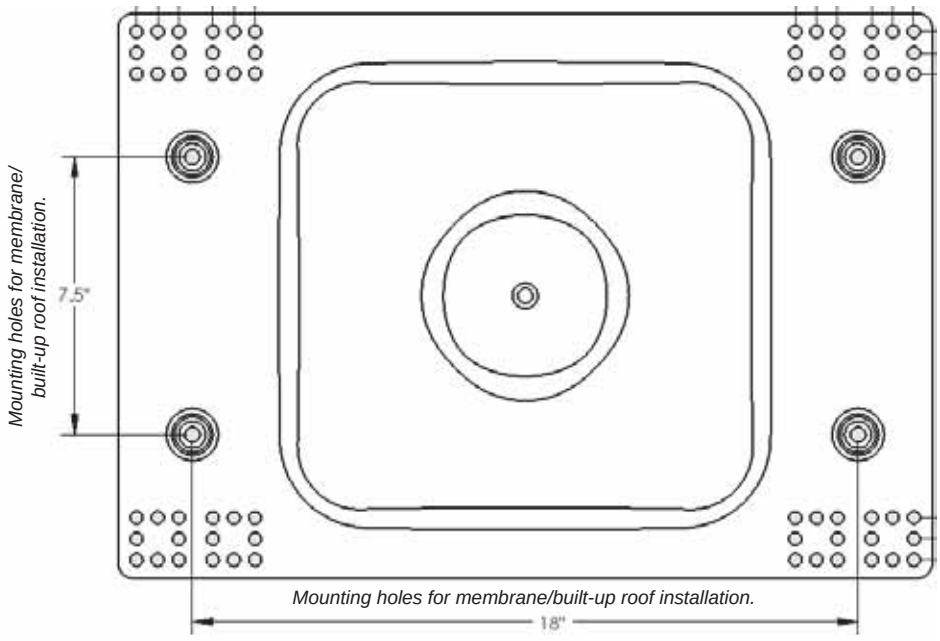
Fig. 8b

Fig. 8c -
Completely Installed



4.2.3 Installation of Base to Membrane and Built-up Roofs (Models X10030 and X10031)

Fusion Roof Anchor Models X10030 and X10031 are designed for installation to flat membrane covered or built-up roofs. Model X10030 includes a toggle bolt kit for membrane/built-up roofs with a combined thickness of up to 5.5in (140mm), while Model X10031 includes a toggle bolt kit for combined roof thicknesses between 5.5in (140mm) and 10.5in (267mm).



1. Position the base at the desired location on the roof. ***Note:*** *All four mounting holes must be located over the roof decking. Be careful that mounting holes are not located directly over a structural roof support or beam that may interfere with toggle installation. Refer to the spacing diagram (Fig. 9a) if needed. When ribbed metal decking is a component in the membrane or built-up roof, the toggle bolts must be located either on the flat crown surface or the flat valley surface, but must not be located on the sloped rib surface.*
2. With the base in position, use the base as a template to mark the four mounting hole locations.
3. Remove base and drill test holes with a long 1/4in (6.35mm) drill bit to ensure proper placement of the toggle bolts to ribbed decking. The drill will deflect if a sloped rib surface is hit; in which case, the base must be repositioned, mounting holes remarked and new test holes drilled until an approved installation location is found.
4. Once test holes are successfully drilled, set the base aside and drill four 1.25in (31.75mm) diameter holes through the membrane and into the insulation 1in (25.4mm) deep. This hole acts as a counter bore to properly seat the roof anchor.
5. Then drill four 1in (25.4mm) diameter holes in the center of each previously drilled counter bore hole through the insulation and into the roof decking.
6. Assemble toggle and nut together and place below base plate (see Fig. 9b). Insert bolt through plate and thread into nut until fully engaged (see Fig. 9c). Do not leave more than one thread exposed beyond nut as that will interfere with the toggle function. Do the same for the other three toggles.

Fig. 9b

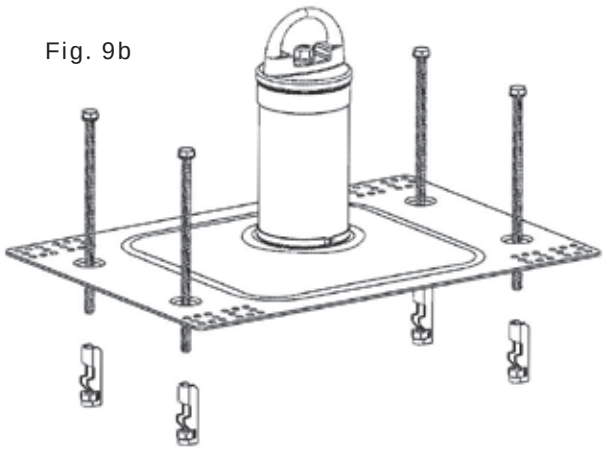
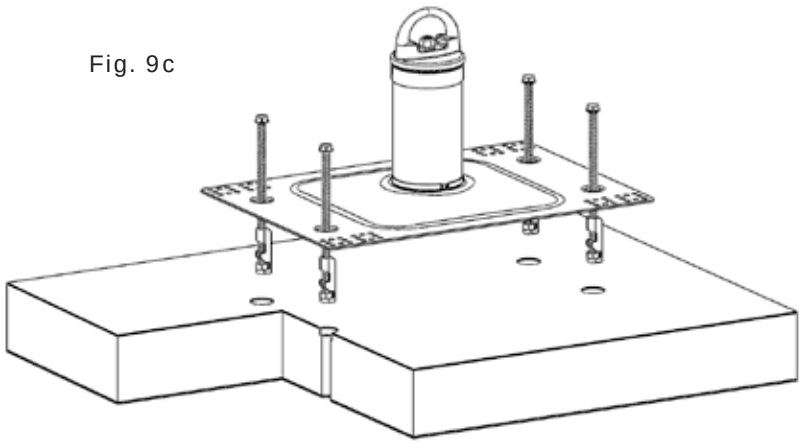


Fig. 9c



7. After toggle/nut/bolt are assembled to plate, place over predrilled holes and insert into roof (see Fig. 9d).
8. Shake toggle several times to flip into horizontal position (see Fig. 9e). Check by lifting toggle bolt assembly to make sure toggle is flipped and does not come up through holes.
9. Place magnet into 17mm socket (see Fig. 9f). Place socket over bolt and use drill/driver to lift toggle until contact is made with the bottom of the roof (see Fig. 9g).
10. Apply upward force to keep toggle stationary while tightening toggle bolt with drill/driver.

Fig. 9d

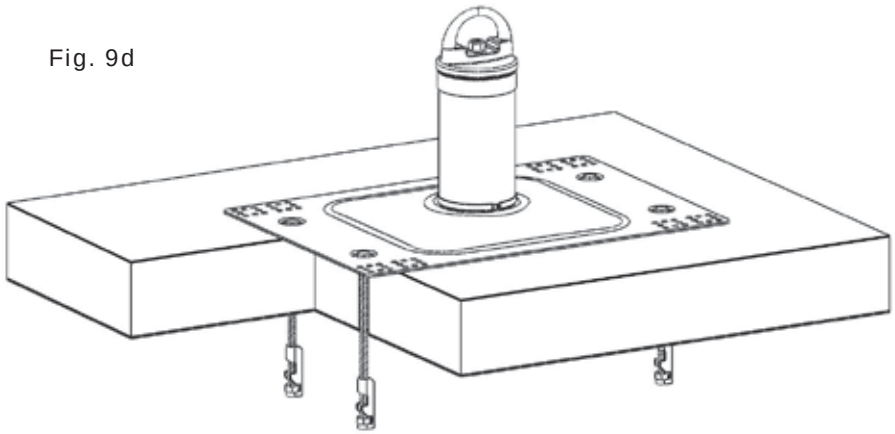


Fig. 9e

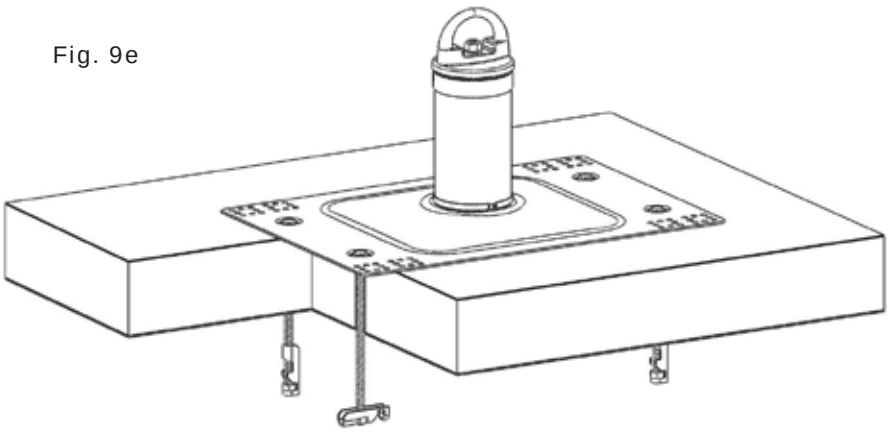


Fig. 9f

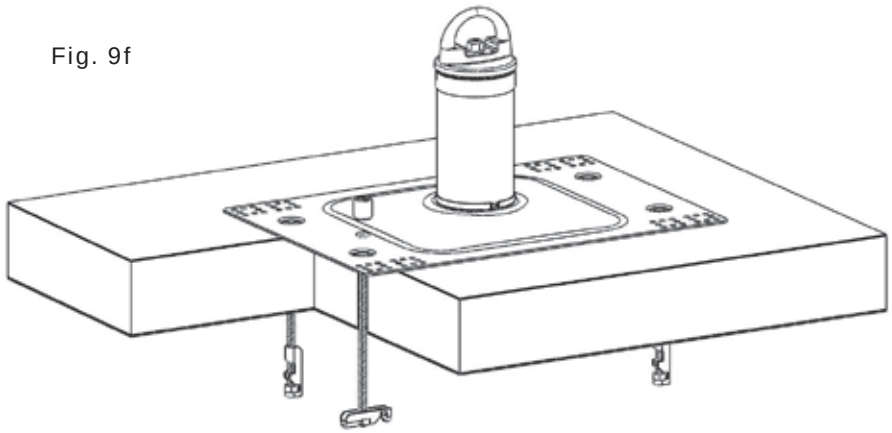
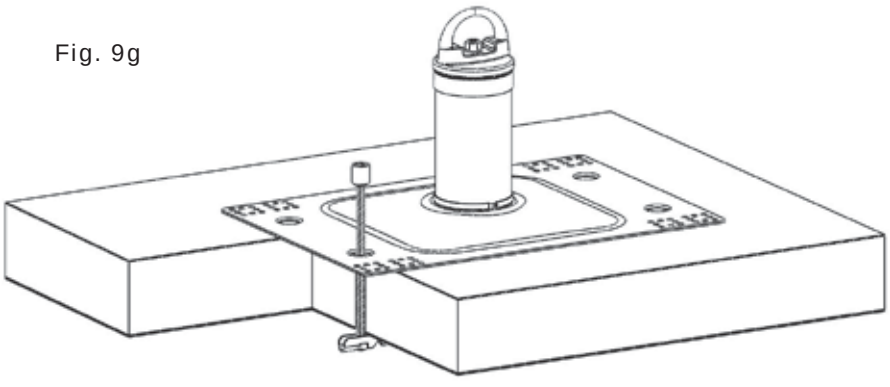


Fig. 9g



11. Once toggle is fully drawn up and seated (see Fig. 9h and 9i), torque to approximately 10-15 ft lbs. Repeat for other three toggle bolt assemblies.
12. Apply sealant around each bolt head. Fill entire open area in the counter bore of each of the four holes. Over filling is advised as it will protect against wear of the bolt into the membrane due to foot traffic.
13. Place membrane gasket around base plate and seal all edges with roof sealant.

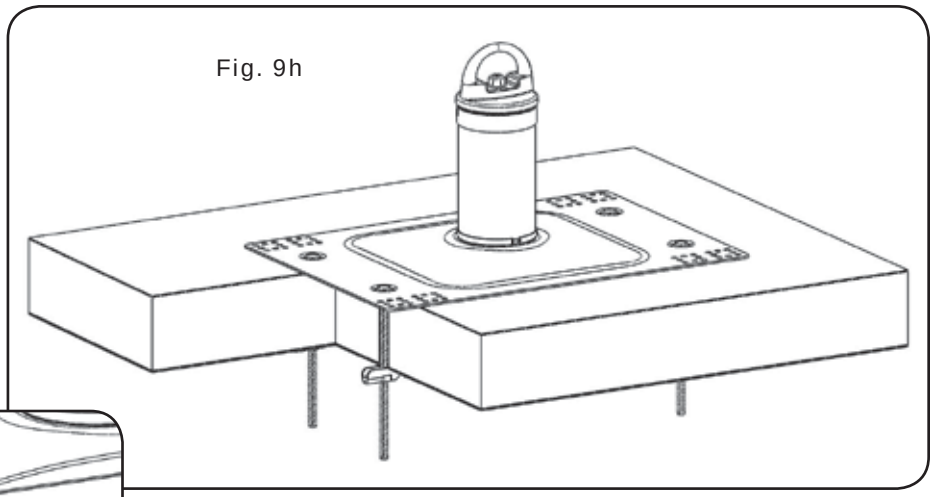


Fig. 9h

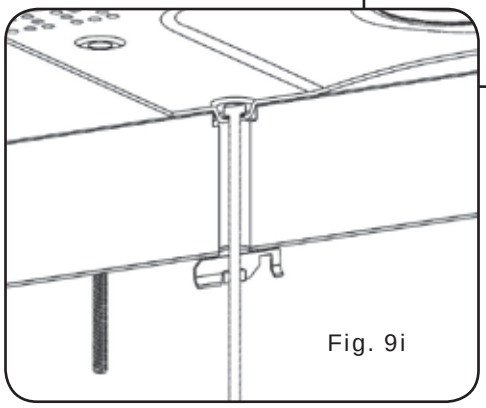


Fig. 9i

Note: A roofing contractor approved for servicing the membrane should be used to properly weatherproof the roof anchor post once installed.

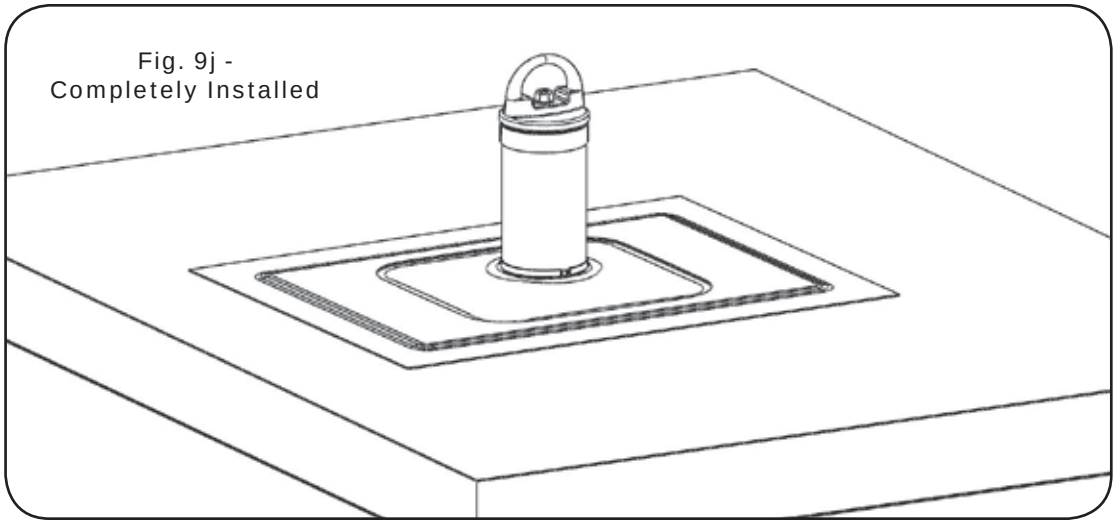


Fig. 9j - Completely Installed

4.2.4 Installation of Base to Wood Sheathing Roofs (Model X10040)

Fusion Roof Anchor Model X10040 is designed to be installed directly to the plywood roof decking and is for temporary use only. For installations where roof membrane, insulation, or other roofing materials cover the plywood decking, use Miller Fusion Roof Anchor Model X10030 or X10031.

1. Position the base at the desired location on the roof.
   Note: *All mounting holes must be located over the roof decking. Be careful that mounting holes are not located directly over a structural roof support or beam with a thickness and/or material that may interfere with lag screw installation.*
2. With the base in position, drill four 1/4in (6.35mm) diameter pilot holes through the plywood decking at each of the corner mounting locations for a total of 16 holes (see Fig. 10a). Any four mounting holes may be used for installation so long as they are not adjacent to one another.
3. Install each of 16 lag screws through the base mounting hole and into the corresponding pilot hole in the plywood decking. Tighten lag screws until snug and properly seated.

WARNING: All sixteen (16) lag screws must be used to secure the base properly. Do not over-**tighten lag screws as damage may occur to the plywood decking resulting in insufficient strength to** support potential fall arrest forces.

Fig. 10a

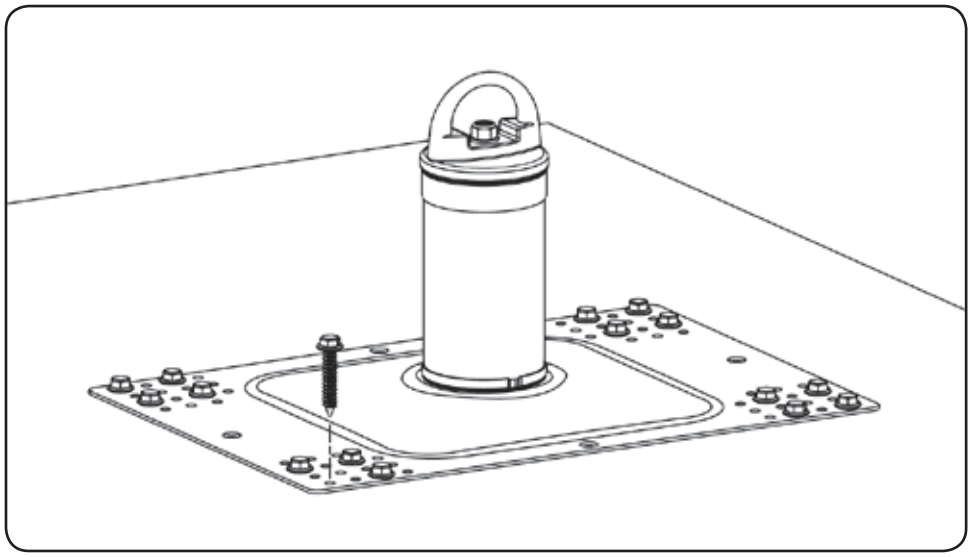
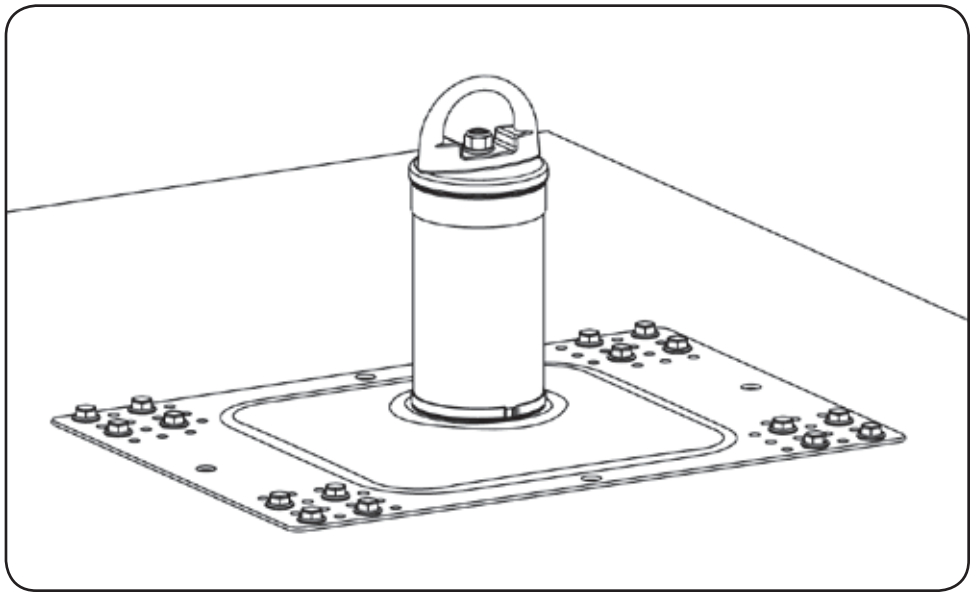


Fig. 10b - Completely Installed



4.2.5 Installation of Base to Concrete Roofs (Model X10050)

Fusion Roof Anchor Model X10050 is designed for concrete roof installation. Concrete must have a minimum compressive strength of 3000 PSI and minimum thickness of 6.5in (165mm).

1. Position the base at the desired location on the roof.
2. With the base in position, use the base as a template to mark the four mounting hole locations as shown in Fig. 11a.
3. Remove base and drill a 1/2in (12.7mm) hole to a depth of 4-3/4in (120.65mm) at each of the four mounting locations.
4. Clean all debris from each hole using a blow out bulb.
5. Reposition the base on the roof aligning the mounting holes over the drilled holes.
6. Then drive an expansion bolt through the base mounting hole and into the corresponding drilled hole at each of the four mounting locations (see Fig. 11b).
7. Make sure the underside of the expansion bolt head is flush with the base plate before tightening. Torque each bolt to between 50-60ft.lbs. using a 3/4in socket wrench.

WARNING: All four (4) expansion bolt anchors must be used to secure the base properly.

Fig. 11a

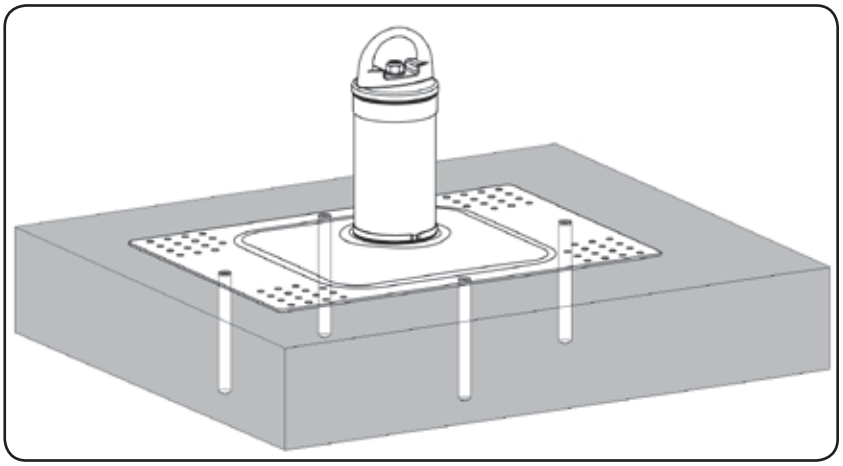
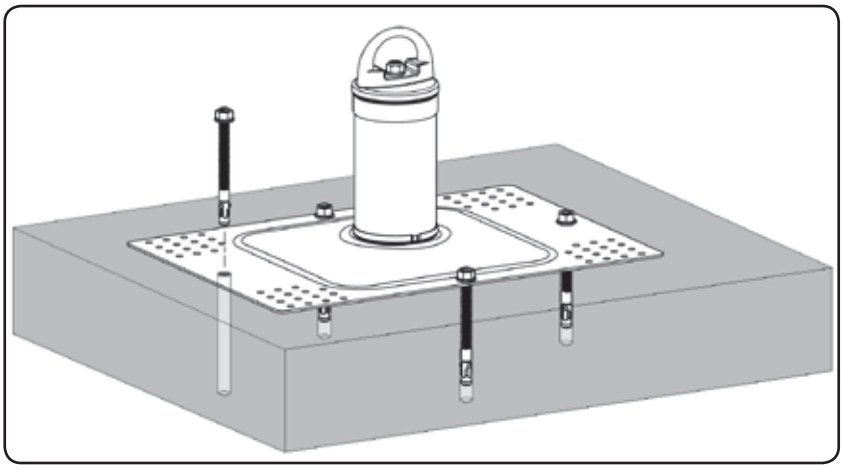


Fig. 11b



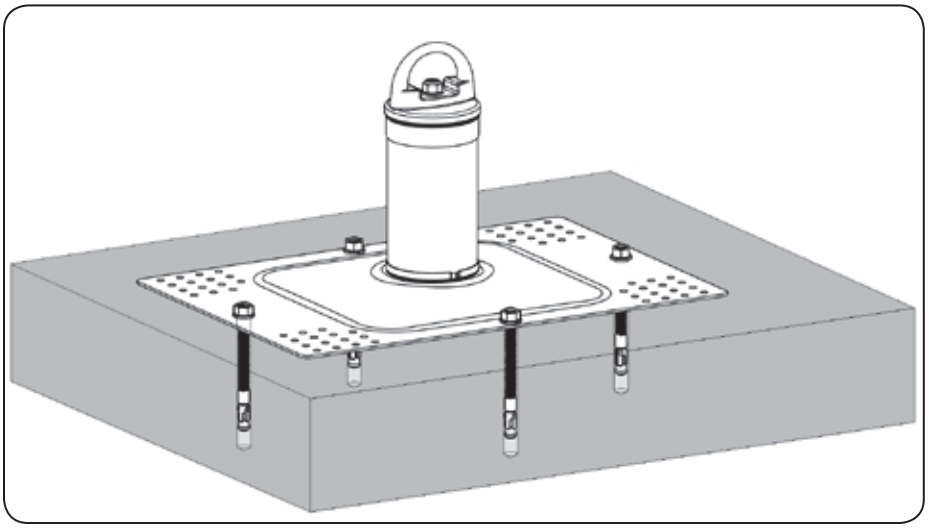


Fig. 11c - Completely Installed

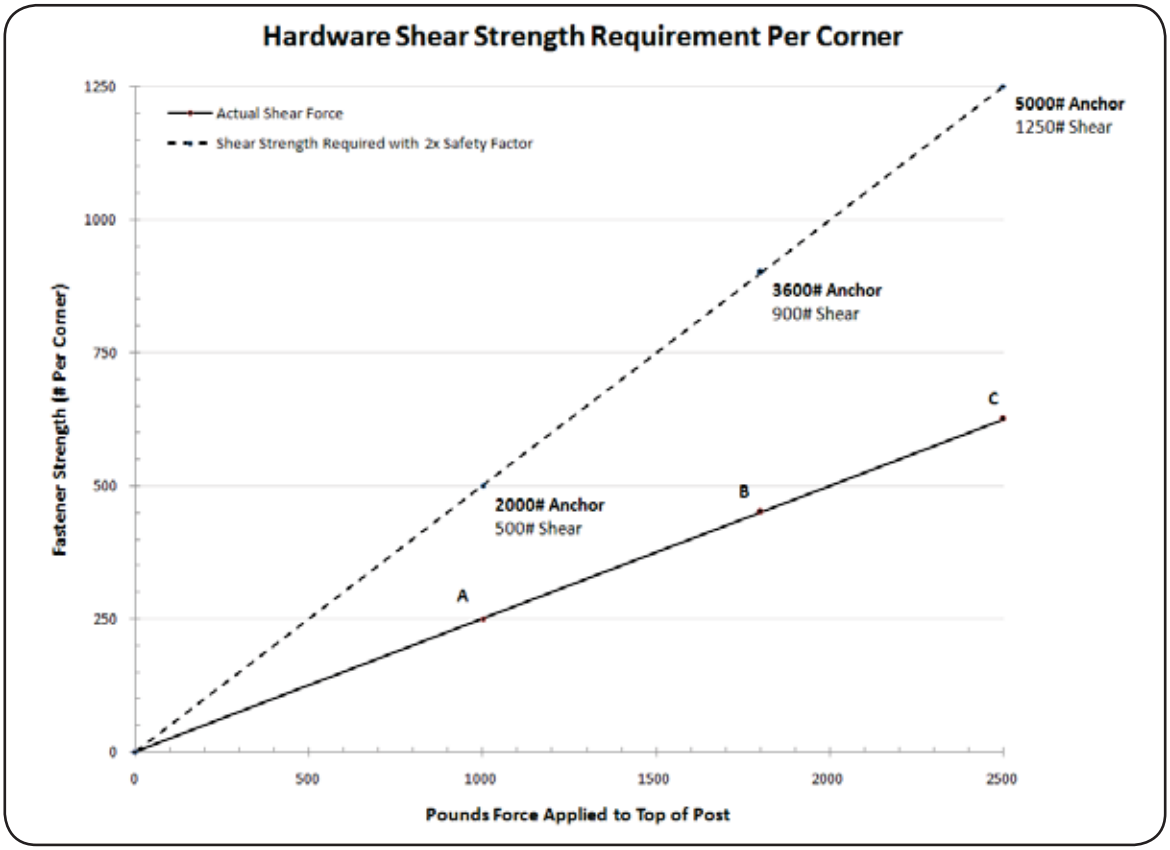
4.2.6 Installation of Base w/o Included Hardware (Model X10020)

Fusion Roof Anchor Model X10020 is designed to be installed to metal decking, wood or concrete roofs with alternative Miller approved hardware. The hardware is not included; therefore, the following graphs and drawings must be referenced to ensure that the hardware selected meets the strength requirements for the anchor application.

Notes:

- *Roof anchorage strength must be known. OSHA requires 5000lbf (22.2kN) or 2:1 safety factor in the permissable direction of loading. [For a personal fall arrest system (PFAS) with a maximum fall arrest force of 900lbf (4kN), the anchorage strength must be 1800lbf (kN) to maintain a safety factor of two; for a PFAS with a maximum fall arrest force of 1800lbf (8kN), the anchorage strength must be 3600lbf (16kN).]*
- *Shear and tensile strength requirements are per each corner of the base plate (or each side as is the case when the expansion bolt anchor mounting holes are used in concrete installation.) Figure 12a shows the shear strength required for the fasteners corresponding to the anchorage strength requirement. Figure 12b shows the tensile strength required for the fasteners corresponding to the anchorage strength requirement. Both Figures 12a and 12b must be used in selecting appropriate fasteners to ensure safe and secure installation of the Fusion Roof Anchor Post.*
- *For greater understanding, Figures 12c, 12d and 12e demonstrate how the roof anchor post reacts when exposed to fall forces. These figures are for reference only and should not be used to determine Hardware Strength Requirements.*
- *If there are any questions in regard to approved hardware and/or the following graphs and drawings, Miller Technical Service must be consulted before proceeding with installation of the Fusion Roof Anchor Model X10020.*

Fig. 12a



Calculations:

Shear Strength Requirement = 1/4 of LBF Load Applied to Top of Anchor Post

Points A, B and C represent forces applied to the post and the resulting shear forces applied to each corner through the base fasteners. Fastener strength requirements are based on a 2:1 safety factor and are represented by the dashed line. The minimum fastener shear strength per corner is 500lbf (2.22kN); however, when potential post forces exceed 1000lbf (4.45kN), the fasteners must be designed to the shear requirements shown on the dashed line at the maximum force to be applied to the post.

Fig. 12b

Calculations:

Tensile Strength Requirement = Since the tensile strength maximum of 1000lbf (4.45kN) is achieved at the minimum post tip-over load force of 1,000lbf (4.45kN), tensile strength requirement needs no calculation for anchorage strengths below 5000lbf (22.2kN). The tensile strength requirement (per corner) of 1000lbf (4.45kN) must always be used in hardware selection.

Points A, B and C represent forces applied to the post and the resulting tensile forces applied to each corner through the base fasteners.

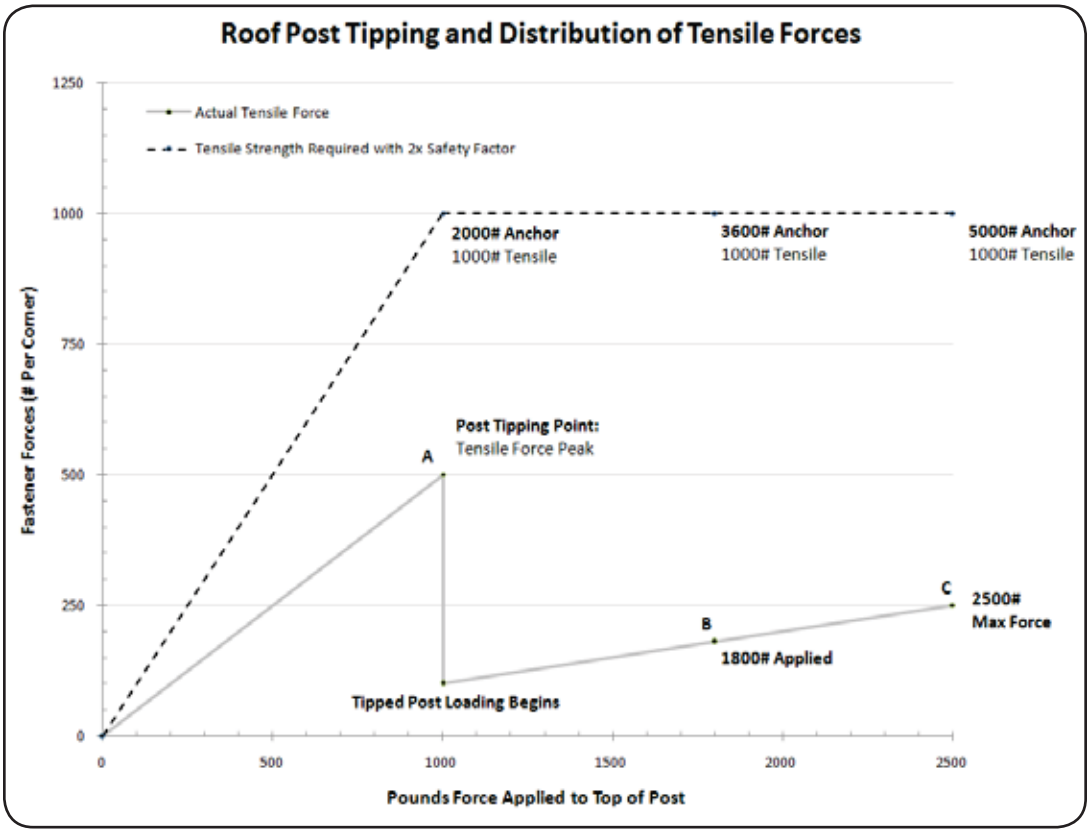


Fig. 12c

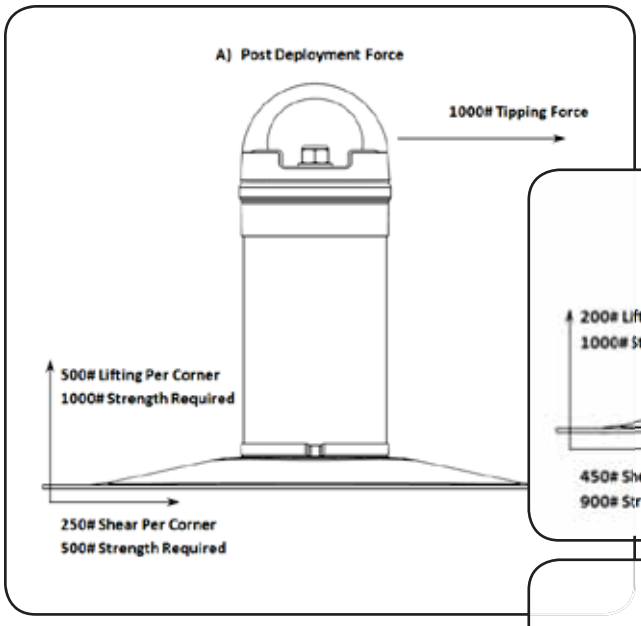


Fig. 12d

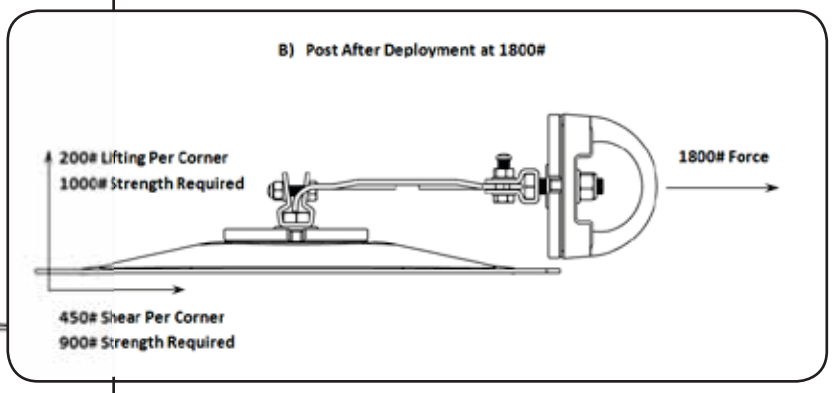
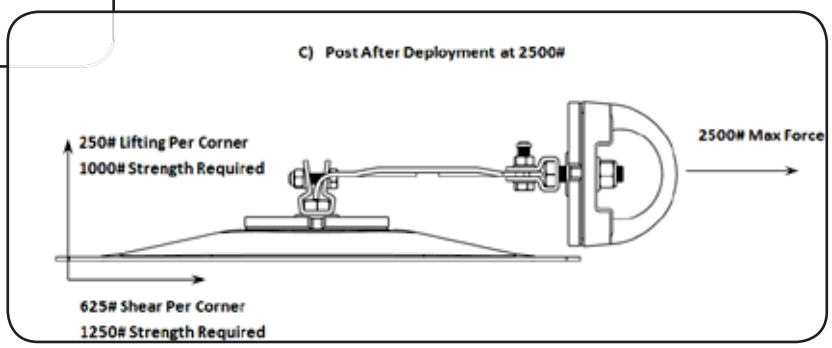


Fig. 12e



5.0 Connection to the Fusion Roof Anchor Post

- Before each use, carefully inspect the roof anchor post in addition to all components of the personal fall arrest system according to the manufacturer's instructions.
- Ensure that there is sufficient fall clearance below the work surface to avoid hitting a lower level or obstruction.
- Avoid working where the connecting device and/or lifeline may come in contact with sharp edges or abrasive surfaces.
- Ensure that all connections within the system are compatible in regards to size, shape and strength.
- Use only approved connecting devices to attach to the Fusion Roof Anchor Post.

1. Properly fit the full-body harness. Refer to the donning instructions provided with the harness.
2. Connect one end of the shock-absorbing lanyard or self-retracing lifeline/fall limiter to the back D-ring of the harness and the other to the D-ring anchor on the roof post. Refer to the instructions provided with the connecting device. Ensure that all connections are compatible and that all connectors, such as snap hooks or carabiners, are closed and locked.
   Note: If using a vertical lifeline and rope grab, refer to the instructions provided with the vertical lifeline and rope grab to ensure correct and compatible connection to the roof anchor post and the user's full-body harness. The rope grab must always be oriented on the lifeline with the arrow pointing towards the roof anchor post.
3. Once securely attached, the user may proceed to move about the roof within a recommended work zone.

Approved Connecting Devices

Miller shock-absorbing lanyards, self-retracting lifelines/fall limiters and rope grabs with vertical lifelines are approved for use with the Fusion Roof Anchor Post. A competent person must carefully assess the work area before determining the connecting device to be used, considering the distance from an edge, potential for swing fall, and the edge surface of the roof with which the connecting device may come in contact. Sharp or abrasive edges should be avoided or padded to protect the connecting device.

If a cable self-retracting lifeline is used and the lifeline has the potential to travel over the edge of a flat surface, the potential for cable shear may exist. This is due to the 90 degree bend in the lifeline, the sharp edge of a platform and fall arrest forces created by a fallen worker. In this application, the sharp edge must be padded and a Miller SofStop shock absorber pack (928LS) must be connected between the harness back D-ring and the snap hook at the end of the self-retracting lifeline. Be sure to include the deceleration distance of the shock absorber pack when calculating fall clearance. Contact Miller Technical Services to obtain Technical Brief 102 "Horizontal Use of Self-Retracting Lifelines" for more information regarding this application.

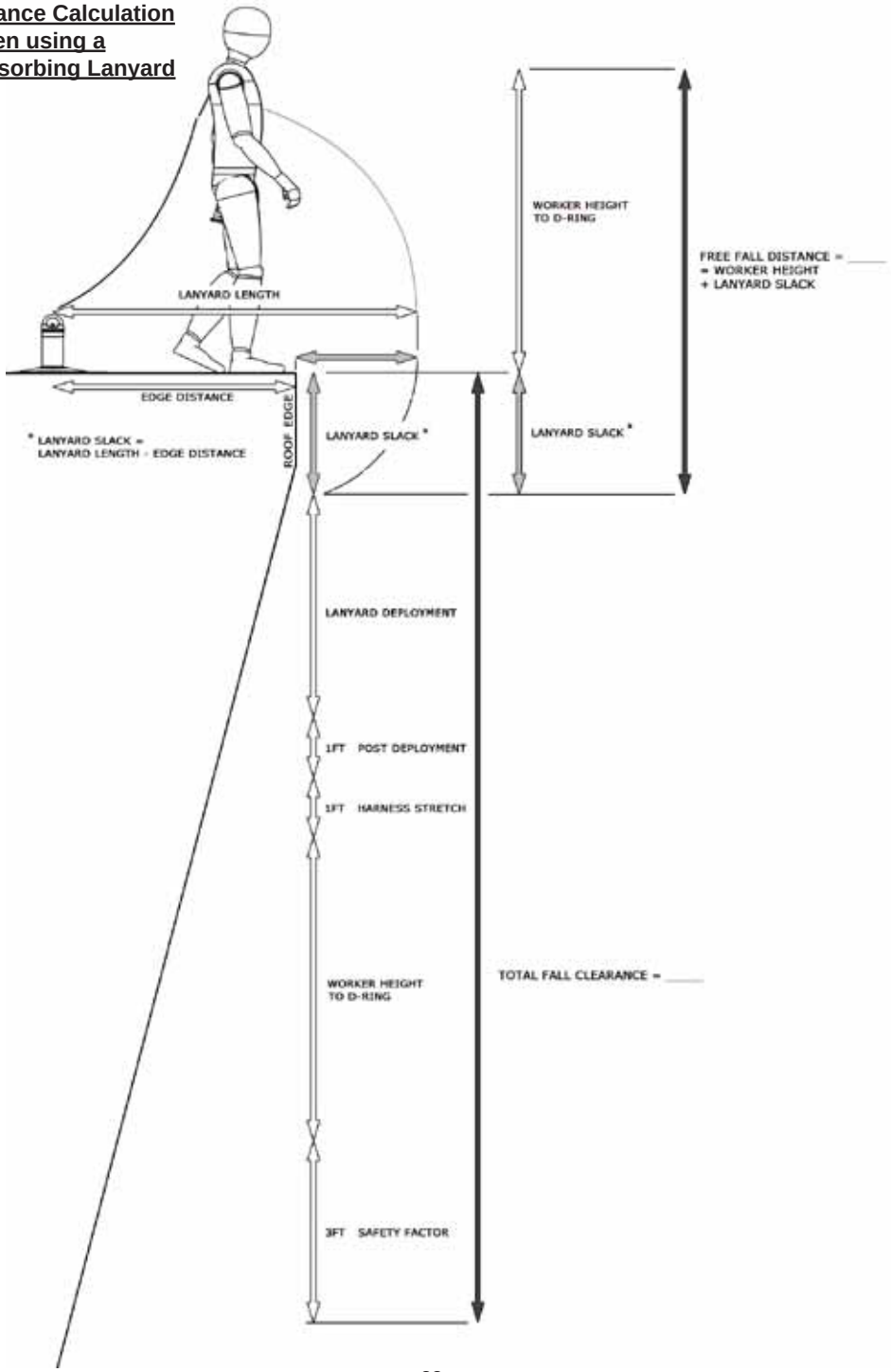
If a rope grab with vertical lifeline is used, the vertical lifeline must remain taut at all times between the user and the anchorage connection. The rope grab must always be oriented on the lifeline with the arrow pointing towards the roof anchor post.

Read and follow all instructions and warnings provided with the connecting device at the time of shipment. For application specific questions, contact Miller Technical Services.

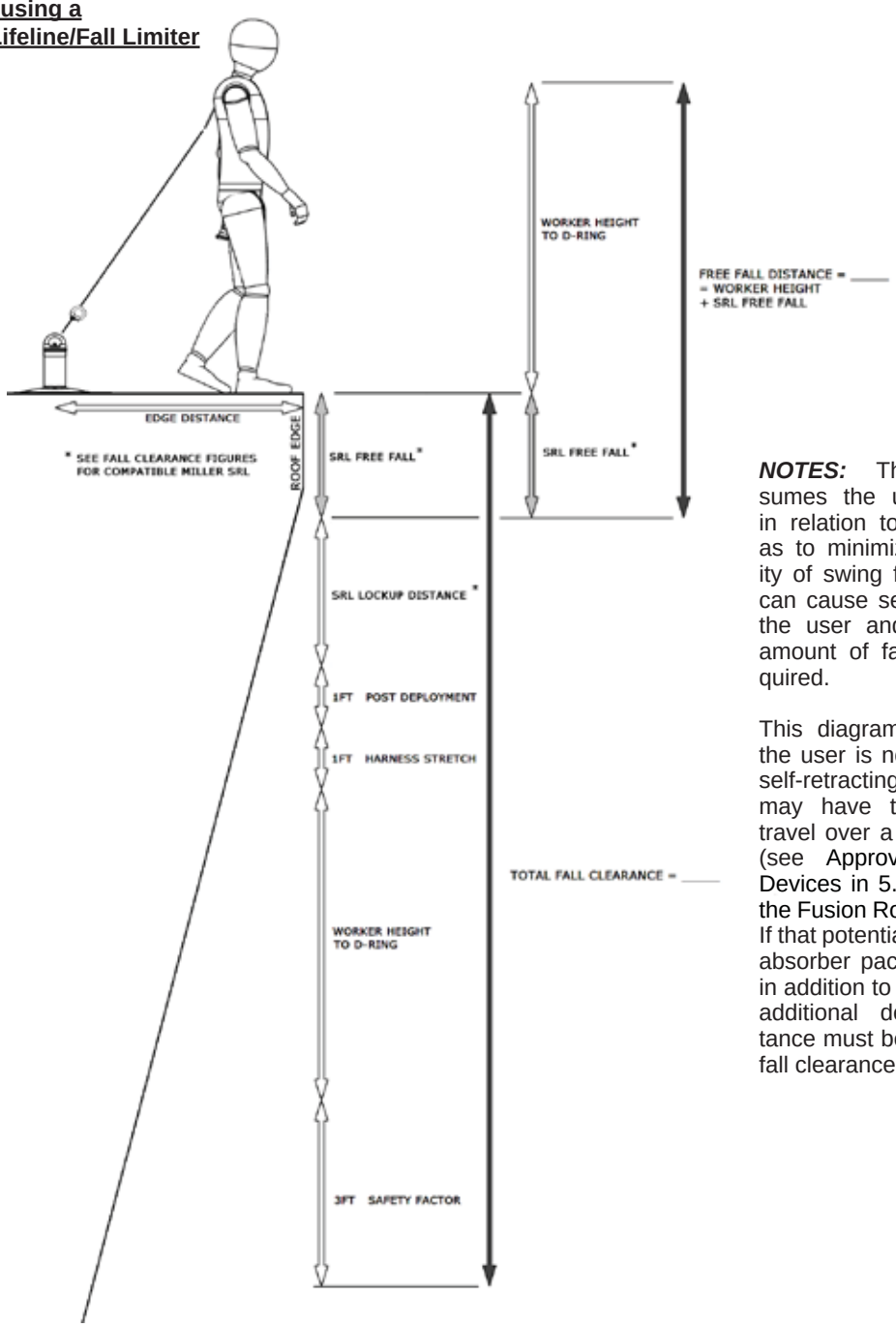
6.0 Fall Clearance

It is important to understand how to calculate potential fall clearance necessary to avoid contact with a lower level or obstruction. Refer to the following fall clearance calculation diagrams for shock-absorbing lanyards and self-retracting lifelines/fall limiters used in conjunction with the Fusion Roof Anchor Post. When using a rope grab with vertical lifeline, refer to the instructions included with the device at the time of shipment for assistance in calculating fall clearance distance. Remember that the vertical lifeline must remain taut at all times between the user and the anchorage connection when used in this application. Miller Fall Protection always recommends that a 3ft. (.9m) safety factor be included in all fall clearance calculations. If there is any question about calculating fall clearance distance, please contact Miller Technical Services at 800.873.5242 before using this device.

Fall Clearance Calculation when using a Shock-Absorbing Lanyard



Fall Clearance Calculation when using a Self-Retracting Lifeline/Fall Limiter



NOTES: This diagram assumes the user is working in relation to the anchor so as to minimize any possibility of swing fall. Swing falls can cause serious injuries to the user and increases the amount of fall clearance required.

This diagram also assumes the user is not using a cable self-retracting lifeline which may have the potential to travel over a sharp 90° edge (see Approved Connecting Devices in 5.0 Connection to the Fusion Roof Anchor Post). If that potential exists, a shock absorber pack must be used in addition to the SRL and the additional deceleration distance must be included in the fall clearance calculation.

7.0 Training

It is the responsibility of the user and the purchaser of this equipment to assure they are familiar with these instructions and are trained in the proper use, installation, operation, maintenance and limitations of this product. Training should be conducted periodically and without exposing the trainee to a fall hazard.

Training is an integral part of our Total Solution in fall protection, since no fall protection equipment – regardless of how effective – can save an employee who is not trained in its use. To meet this crucial requirement, Miller Training provides the knowledge and skills necessary to achieve a safe, more productive work environment. For more information on Miller Training, contact a representative today: 800.873.5242.

8.0 Inspection and Maintenance

Inspection

Miller Anchorage Connectors are designed for today's rugged work environments. To maintain their service life and high performance, all components should be inspected frequently. Anchorage connectors must be visually inspected by the user before each use and inspected by a Competent Person on a regular basis. ***Replace equipment if any of the defective conditions explained in this manual are found.***

- Inspect entire product for any of the following: bent, cracked, distorted, worn, malfunctioning or damaged parts; loose fasteners or missing parts/components; deterioration; deformation; corrosion; signs that indicate the product has been subjected to a fall arrest; or any other indications of damage/problems that may affect the integrity and operation of the product. If in doubt, contact the manufacturer.
- Check D-ring anchor to ensure that it is securely attached to the roof anchor post (see 4.1 Roof Anchor Post Assembly) and does not show any signs of damage as listed above.
- Check all fasteners and corresponding torque values to ensure that the roof anchor post is securely attached to the roof structure (see 4.2 Base Installation). Inspect the condition of the roof to ensure that it still meets all anchorage requirements.
- Inspect the components of the personal fall arrest system according to the manufacturer's instructions.
- The Fusion Roof Anchor Post should always be in the upright position. If the anchor has been subjected to fall arrest forces the post will be tipped over in the direction of loading.

Devices that do not pass inspection
or have been subjected to fall arresting forces
must be removed from service.

Cleaning and Storage

Basic care of all Miller Fall Protection equipment will prolong the life of the unit and will contribute toward the performance of its vital safety function. Periodically clean the device with a cloth dampened with water and mild soap or detergent to remove any dirt, paint, corrosives, contaminants, or other materials that may have accumulated.

Servicing

Servicing of Miller Fall Protection equipment must only be carried out by Miller Fall Protection or persons or entities authorized in writing by Miller Fall Protection. A record log of all servicing and inspection dates for this device must be maintained. Only original Miller replacement parts are approved for use in this device. Non-repairable devices that do not pass inspection must be disposed of in a manner to prevent inadvertent further use. Contact Miller Technical Services at 800.873.5242 if you have any questions.

Labels

MILLER Fusion™

Roof Anchor Post

⚠ WARNING

The Fusion Roof Anchor Post is designed to be used as a single anchorage point for a personal fall arrest system or as an intermediate anchorage post for approved Miller horizontal lifeline systems. Do not use the Fusion Post as an end or corner anchorage in a horizontal lifeline application unless approved by Miller Fall Protection.

Manufacturer's instructions supplied with this product at the time of shipment must be followed for installation, proper use, inspection and maintenance. Failure to do so could result in serious injury or death. Only trained personnel are permitted to use this equipment. Contact Miller Fall Protection if instruction manual is needed.

- Inspect before each use according to the manufacturer's instructions. If the device is subjected to fall arrest forces or if inspection reveals an unsafe or defective condition, it must be taken out of service.
- Personal fall protection--a full-body harness and shock-absorbing lanyard or self-retracting lifeline--must be used with this device. Ensure that all connections are compatible.
- Ensure that there is adequate fall clearance. Refer to instructions.
- A rescue plan, and the means to implement it, must be in place when using this equipment.
- Product must not be altered in any way.
- Refer to instructions for information on permissable direction of loading.
- Use caution when working in or near hazardous environments. Equipment must not be exposed to chemical, electrical or thermal sources which may affect the integrity of the product. Avoid contact with sharp edges and abrasive surfaces.

MILLER® by Honeywell

⚠ ADVERTISSEMENT / ACHTUNG / ADVERTENCIA

Le poteau d'ancrage de toiture Fusion est conçu pour être utilisé comme simple point d'ancrage pour un système individuel d'arrêt de chute ou comme poteau d'ancrage intermédiaire pour des systèmes de filins horizontaux approuvés de Miller. Ne pas utiliser le poteau Fusion comme ancrage d'extrémité ou de coin pour une application de filin horizontal à moins d'approbation de Miller Fall Protection.

Les instructions du fabricant fournies avec ce produit lors de l'expédition doivent être observées pour l'installation, l'usage adéquat, l'inspection et l'entretien, sans quoi il y a risque de blessures graves ou mortelles. Seul le personnel dûment formé peut se servir de cet équipement. Pour se procurer un manuel d'instructions, communiquer avec Miller Fall Protection.

Der Fusion Dachpfosten kann als Einzelanschlagpunkt oder als Zwischenpfosten für zertifizierte horizontale Miller Absturzsicherungs systeme genutzt werden. Der Fusion darf nicht als Endbefestigung oder Kurvenpfosten eingesetzt werden. Ausser die Nutzung wurde von Miller Fall Protection für den Einzelfall freigegeben.

Die vom Hersteller zur Verfügung gestellte Anleitung ist für die Installation, die Nutzung, die Überprüfung und Wartung massgebend. Nichbeachtung kann zu ernsthaften Verletzungen oder zum Tod führen. Nur geschulten Personen ist die Nutzung gestattet. Sollten Sie eine Anleitung benötigen nehmen Sie bitte Kontakt zu Miller Fall Protection auf.

El poste de anclaje para techos Fusion está diseñado para usarse como punto de anclaje único para un sistema personal de detención de caídas o como poste de anclaje intermedio para sistemas de cuerda salvavidas horizontales Miller aprobados. No use el poste Fusion como punto de anclaje extremo o esquinero en una aplicación de cuerda salvavidas horizontal a menos lo apruebe Miller Fall Protection.

Es preciso seguir las instrucciones del fabricante suministradas con el producto al momento del embarque en relación con la instalación, uso correcto, inspección y mantenimiento. No hacerlo podría tener como consecuencia lesiones graves o mortales. Solamente personal entrenado está autorizado a utilizar este equipo. Si necesita el manual de instrucciones comuníquese con Miller Fall Protection.

Insert Variable Label

LB1137 Rev. A

PRRF20251279

Inspection and Maintenance Log

Registre D'inspection et D'entretien

Registro de Inspección y Mantenimiento

DATE OF MANUFACTURE:____________________________________
DATE DE FABRICATION / FECHA DE FABRICACIÓN

MODEL NUMBER:____________________________________
NUMÉRO DE MODÈLE / NÚM. DE MODELO

DATE PURCHASED:____________________________________
DATE D'ACHAT / FECHA DE COMPRA

INSPECTION DATE DATE D'INSPECTION FECHA DE INSPECCIÓN	INSPECTION ITEMS NOTED POINTS NOTÉS LORS DE L'INSPECTION PUNTOS DE INSPECCIÓN RELEVANTES	CORRECTIVE ACTION ACTION CORRECTIVE MEDIDA CORRECTIVA	MAINTENANCE PERFORMED ENTRETIEN EFFECTUÉ MANTENIMIENTO REALIZADO
 Approved by: Approuvé par: Aprobado por:			
 Approved by: Approuvé par: Aprobado por:			
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 Approved by: Approuvé par: Aprobado por:			

MILLER® FALL PROTECTION PRODUCTS

TOTAL SATISFACTION ASSURANCE

At Miller Fall Protection, we have been providing quality Miller brand fall protection equipment to millions of workers worldwide since 1945.

LIMITED LIFETIME WARRANTY

BACKED BY OVER 65 YEARS IN THE FALL PROTECTION BUSINESS

We sincerely believe that our fall protection equipment is the best in the world.
Our products endure rigorous tests to ensure that the fall protection equipment you trust is manufactured to the highest standards. Miller fall protection products are tested to withstand normal wear and tear, but are not indestructible and can be damaged by misuse.
Our Limited Lifetime Warranty does not apply to normal wear and tear or abusive treatment of the product.

In the unlikely event that you should discover defects in either workmanship or materials, under our Limited Lifetime Warranty, we will repair or replace the product at our expense.
If a replacement is necessary and your product is no longer available, a comparable product will be substituted.
Should a product issue surface, contact us at 800.873.5242.

Manufacturing specifications are subject to change without notice.

PRODUITS MILLER® FALL PROTECTION

ASSURANCE DE SATISFACTION TOTALE

Chez Miller Fall Protection, nous fournissons des équipements de protection contre les chutes de marque Miller de qualité à des millions de travailleurs dans le monde entier depuis 1945.

GARANTIE LIMITÉE À VIE

ASSURÉE GRÂCE À PLUS DE 65 ANS PASSÉS DANS LE DOMAINE DE LA PROTECTION CONTRE LES CHUTES

Nous croyons sincèrement que notre équipement de protection contre les chutes est le meilleur au monde. Nos produits sont soumis à des tests rigoureux, afin d'assurer que les équipements de protection contre les chutes dans lesquels vous avez confiance sont fabriqués selon les normes les plus exigeantes.
Les produits de protection contre les chutes Miller sont soumis à des essais pour vérifier qu'ils résistent à une usure normale; ils ne sont cependant pas indestructibles et peuvent s'endommager en cas de mauvaise utilisation. Notre garantie limitée à vie ne s'applique pas à l'usure normale ou à un usage abusif du produit.

Dans le cas peu probable où vous découvririez des défauts, soit de fabrication, soit de matériau, dans le cadre de notre garantie à vie, nous réparerons ou remplacerons le produit à nos frais.
En cas de remplacement, si votre produit n'est plus offert, vous recevrez un produit comparable.
En cas de problème sur un produit, nous contacter au 800-873-5242.

Les caractéristiques de fabrication peuvent être modifiées sans préavis.

PRODUCTOS ANTICAÍDAS MILLER®

GARANTÍA DE SATISFACCIÓN TOTAL

En Miller Fall Protection, venimos suministrando desde 1945 los equipos de protección anticaídas con la calidad Miller a millones de trabajadores en todo el mundo.

GARANTÍA LIMITADA DE POR VIDA

NOS RESPALDAN MÁS DE 65 AÑOS EN LA FABRICACIÓN DE EQUIPO ANTICAÍDAS

Sinceramente creemos que su equipo de protección contra caídas es el mejor del mundo. Nuestros productos resisten rigurosas pruebas para garantizar que el equipo de protección contra caídas en el que usted confía está fabricado de conformidad con las normas más elevadas. Los productos anticaídas Miller son sometidos a pruebas para que resistan el desgaste normal, pero no son indestructibles y su incorrecta utilización puede dañarlos.
Nuestra Garantía limitada de por vida no se aplica al desgaste normal ni al maltrato del producto.

En el poco probable caso de que usted descubriera defectos de mano de obra o materiales, por nuestra Garantía limitada de por vida, repararemos o sustituiremos el producto por cuenta nuestra. Si un reemplazo es necesario y nuestro producto ya no está disponible, se lo sustituiremos por otro comparable.
En caso de que surja un problema con el producto, contáctenos al 800.873.5242.

Las especificaciones de fabricación están sujetas a modificaciones sin previo aviso.

PRRF20251279

Toll Free: 800.873.5242
Fax: 800.892.4078

Download this manual at: www.millerfallprotection.com
Téléchargez ce manuel à l'adresse: www.millerfallprotection.com
Puede bajar por Internet este manual en: www.millerfallprotection.com

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Honeywell Safety Products
P.O. Box 271, 1345 15th Street
Franklin, PA 16323 USA

Metal panels for substrate at skylight areas.

TAYLOR METAL PRODUCTS

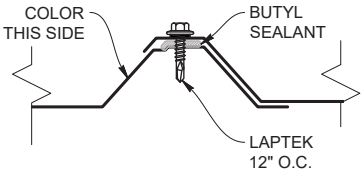
PBR™ Roof & Wall Panel Technical Data Resource

ICC EVALUATION SERVICE®

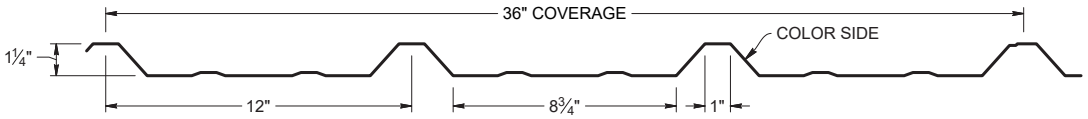
ICC-ES EVALUATION REPORT #5045 AND #5046 with CBC-CRC Supplement

PRRF20251279

LAP DETAIL



ROOF & WALL PROFILE



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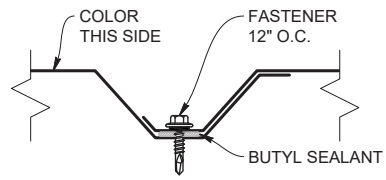
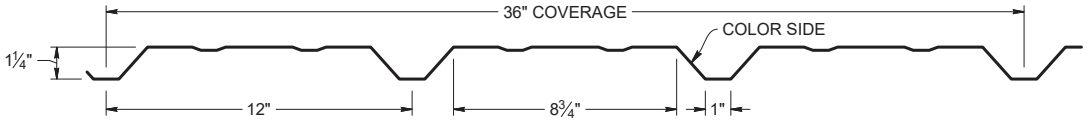


OPTIONAL WALL PROFILE



KEY FEATURES

- 26, 24 and 22 Tru-Gauge™ and .032" Aluminum
- 1:12 minimum pitch recommended when installed with butyl sealant
- Custom lengths 1' to 45' (*For longer length panels, please inquire*)
- Long length flashings available up to 20' 11"
- Standard trim, custom trim and accessory packages available
- Color matched neoprene washered screws
- Roof and Vertical or Horizontal Wall application
- Perforated options available (*please inquire*)
- Fiberglass & Polycarbonate panels available to match profile
- Manufactured in Salem OR, Riverside CA and Sacramento CA
- OverEZee™ retro-fit systems available

TESTING

- ICC-ESR #5045 & #5046 with CBC-CRC Supplement
- Code compliance UL Evaluation Report UL ER #25913-01. Construction No. 30,54,79,104,112,161, 167,184,542
- UL 580 Class 90 - Wind Uplift
- UL 790 Class A (ASTM E108) - Fire rated
- UL 2218 Class 4 - Impact (hail) rated
- ASTM E1680 - Air infiltration (roof)
- ASTM E1646 - Water infiltration (roof)
- ASTM E1592 - Negative structural uniform static air pressure
- ASTM E330 - Positive structural uniform static air pressure
- ASTM E331 - Water infiltration (wall)
- ASTM E283 - Air infiltration (wall)
- ASTM A653/A924 - G90 Galvanized
- ASTM A792 - Zincalume/Galvalume AZ-50/55
- ASTM B209 - Aluminum Substrate
- ASTM E455-19 - Shear and Diaphragm. *(For engineering data, please inquire)*

WEIGHT CHART

PBR	WIDTH	26 GA STEEL	24 GA STEEL	22 GA STEEL	.032 ALUM	.040 ALUM
THICKNESS		0.019"	0.0236"	0.0285"	0.032"	0.040"
WEIGHT/LINFT	36"	2.777 LBS	3.473 LBS	4.194 LBS	1.646 LBS	2.043 LBS
WEIGHT/LSQFT	36"	0.926 LBS	1.158 LBS	1.398 LBS	0.549 LBS	0.721 LBS

ASTM E 1680/E283 Air Penetration	ASTM E 1646/E331 Water Penetration
25 PSF<0.01 CFM/ft²-PASS	50 PSF - Pass
Intertek Test Result M3027.01-901-44	
Intertek Test Result M3027.01-901-44	
STRUCTURAL TESTING ASTM E1592 AND E330	
Intertek Test Result M2748.03-301-44 R1	

TAYLOR METAL PRODUCTS

PRRF20251279

NEGATIVE LOAD CHART WITH 3 SCREWS

				SECTION PROPERTIES						ALLOWABLE UNIFORM LOADS, psf For various clip spacings (i.e. span values)											
				Top in Compression			Bottom in Compression			Inward Load (Negative)						Outward Load (Positive)					
Gauge	Width, in.	Yield ksi	Weight psf	I_{xx} $in^4/ft.$	$I_{xx\ (eff)}$ $in^4/ft.$	S_{xx} in^3/ft	I_{xx} $in^4/ft.$	$I_{xx\ (eff)}$ $in^4/ft.$	S_{xx} in^3/ft	3'	4'	5'	6'	7'	8'	3'	4'	5'	6'	7'	8'
26	36	80	0.85	0.0453	0.0399	0.0448	0.0267	0.0321	0.0391	130.3	73.3	46.9	32.6	23.9	18.3	149.3	84.0	53.8	37.3	27.4	21.0
24	36	50	1.19	0.0633	0.0555	0.0639	0.0363	0.0441	0.0553	153.6	86.4	55.3	38.4	28.2	21.6	177.5	99.8	63.9	44.4	32.6	25.0
22	36	50	1.51	0.0867	0.0761	0.0989	0.0500	0.0606	0.0751	208.6	117.3	75.1	52.2	38.3	29.3	274.7	154.5	98.9	68.7	50.5	38.6

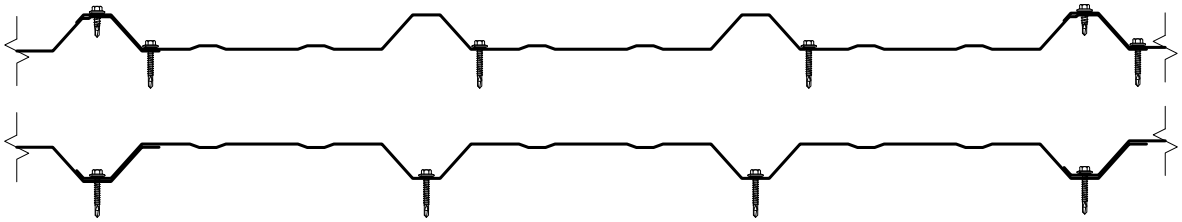
1. Theoretical section properties for still panels have been calculated per AISI S100 Specifications for Design of Cold-Formed Steel Structural Members. Intertek M7269.01-301-44 R0
2. Charted Load/Span values are based on ASTM E1592-05, divided by a 2.00 Factor-of-Safety.
3. Minimum recommended substrate (structure) recommendations:
   A. Open-Framing (i.e. purlins)-16ga (design thickness 0.0566")
   B. Plywood/OSB-15/32" or thicker is recommended to assure an effective degree of fastener thread engagement.
   C. METAL DECK - 22ga (design thickness 0.0283")

POSITIVE LOAD CHART WITH 3 SCREWS

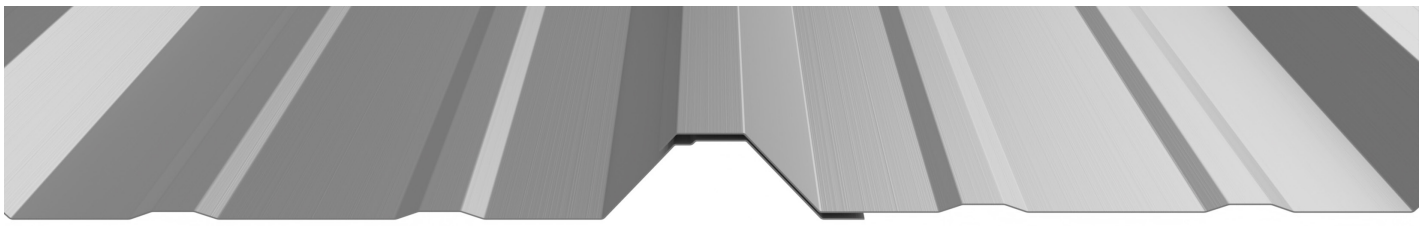
				SECTION PROPERTIES						ALLOWABLE UNIFORM LOADS, psf For various clip spacings (i.e. span values)									
				Top in Compression			Bottom in Compression			Positive Load									
Width, in.	Gauge	Yield ksi	Weight psf	I_{xx} $in^4/ft.$	$I_{xx\ (eff)}$ $in^4/ft.$	S_{xx} in^3/ft	I_{xx} $in^4/ft.$	$I_{xx\ (eff)}$ $in^4/ft.$	S_{xx} in^3/ft	2'	2.5'	3'	3.5	4'	4.5'	5'	5.5'	6'	8'
36	26	80	0.85	0.0453	0.0399	0.0448	0.0267	0.0321	0.0391	192.3	153.8	128.2	109.9	96.1	77.2	62.6	51.7	43.4	24.4
36	24	50	1.19	0.0633	0.0555	0.0639	0.0363	0.0441	0.0553	191.4	153.1	127.6	109.4	86.4	68.3	55.3	45.7	38.4	21.6
36	22	50	1.51	0.0867	0.0761	0.0989	0.0500	0.0606	0.0751	306.4	245.1	204.2	153.3	117.3	92.7	75.1	62.1	52.2	29.3
36	0.032"	19	0.52	0.0967	0.0967	0.0990	0.0967	0.0967	0.3023	40.4	32.3	26.9	23.1	20.2	17.9	16.2	14.7	13.5	10.1

1. Theoretical section properties for Steel panel shave been calculated per 2020 AISI S100 North America Specifications for the Design of Cold-Formed Steel Structural Member.
2. Allowable loads for Steel panels are calculated in accordance with 2020 AISI S100 specifications considering bending , shear, combined bending and shear and deflection. Allowable load considers a 3 or more equal span condition.
3. When panels are installed over solid or closely fitted sheathing, the capacity is limited to the capacity of the underlying sheathing.

FASTENER DIAGRAM (NOT TESTED)



PANEL ATTACHMENT



Fastener Notes:

- When possible, lap panels away from prevailing wind direction.
- 15/32" OSB: #14 GP Neoprene Washered fastener. Screws should be long enough to penetrate through the bottom of the plywood by 3/8".
- 15/32" Plywood: #14 GP Neoprene Washered fastener. Screws should be long enough to penetrate through the bottom of the plywood by 3/8".
- Dimensional lumber: #10 GP. Screws should penetrate the lumber 1".
- 16GA (or less) steel furring: #12 Fastener with DP-1
- Sidelaps fasten with #14 LapTek screws.
- All trim screws used for roof or wall applications should have EPDM sealing washers.
- Fastener spacing is based on project specific structural requirements. Consulant a licensed engineer.

TAYLOR METAL PRODUCTS

NEGATIVE LOAD CHART WITH 6 SCREWS

PRRF20251279

				SECTION PROPERTIES						ALLOWABLE UNIFORM LOADS, psf For various clip spacings (i.e. span values)						
				Top in Compression			Bottom in Compression			Negative Load						
Width, in.	Gauge	Yield ksi	Weight psf	I_{xx} $in^4/ft.$	$I_{xx\ (eff)}$ $in^4/ft.$	S_{xx} in^3/ft	I_{xx} $in^4/ft.$	$I_{xx\ (eff)}$ $in^4/ft.$	S_{xx} in^3/ft	2'	2.5'	3'	3.5	4'	4.5'	5'
36	26	80	0.85	0.0453	0.0399	0.0448	0.0267	0.0321	0.0391	100.0	92.5	85.0	77.5	70.0	62.5	55.0
36	24	50	1.19	0.0633	0.0555	0.0639	0.0363	0.0441	0.0553	175.0	156.7	138.3	120.0	101.7	83.3	65.0
36	22	50	1.51	0.0867	0.0761	0.0989	0.0500	0.0606	0.0751	200.0	178.3	156.7	135.0	113.3	91.7	70.0
36	0.032"	19	0.52	0.0967	0.0967	0.0990	0.0967	0.0967	0.3023	187.5	165.5	143.3	121.3	99.2	77.1	55.0

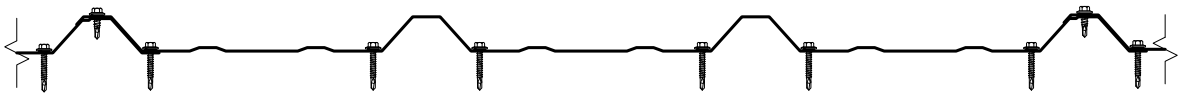
1. Theoretical section properties for still panels have been calculated per AISI S100 Specifications for Design of Cold-Formed Steel Structural Members. Intertek M7269.01-301-44 R0
2. Charted Load/Span values are based on ASTM E1592-05, divided by a 2.00 Factor-of-Safety.
3. Minimum recommended substrate (structure) recommendations:
   A. Open-Framing (i.e. purlins)-16ga (design thickness 0.0566”)
   B. Plywood/OSB-15/32” or thicker is recommended to assure an effective degree of fastener thread engagement.
   C. METAL DECK - 22ga (design thickness 0.0283”)

POSITIVE LOAD CHART WITH 6 SCREWS

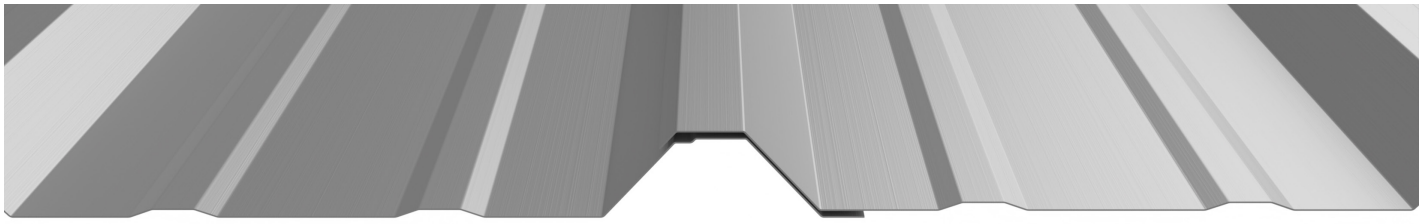
				SECTION PROPERTIES						ALLOWABLE UNIFORM LOADS, psf For various clip spacings (i.e. span values)									
				Top in Compression			Bottom in Compression			Positive Load									
Width, in.	Gauge	Yield ksi	Weight psf	I_{xx} $in^4/ft.$	$I_{xx\ (eff)}$ $in^4/ft.$	S_{xx} in^3/ft	I_{xx} $in^4/ft.$	$I_{xx\ (eff)}$ $in^4/ft.$	S_{xx} in^3/ft	2'	2.5'	3'	3.5	4'	4.5'	5'	5.5'	6'	8'
36	26	80	0.85	0.0453	0.0399	0.0448	0.0267	0.0321	0.0391	192.3	153.8	128.2	109.9	96.1	77.2	62.6	51.7	43.4	24.4
36	24	50	1.19	0.0633	0.0555	0.0639	0.0363	0.0441	0.0553	191.4	153.1	127.6	109.4	86.4	68.3	55.3	45.7	38.4	21.6
36	22	50	1.51	0.0867	0.0761	0.0989	0.0500	0.0606	0.0751	306.4	245.1	204.2	153.3	117.3	92.7	75.1	62.1	52.2	29.3
36	0.032"	19	0.52	0.0967	0.0967	0.0990	0.0967	0.0967	0.3023	40.4	32.3	26.9	23.1	20.2	17.9	16.2	14.7	13.5	10.1

1. Theoretical section properties for Steel panel shave been calculated per 2020 AISI S100 North America Specifications for the Design of Cold-Formed Steel Structural Member.
2. Allowable loads for Steel panels are calculated in accordance with 2020 AISI S100 specifications considering bending , shear, combined bending and shear and deflection. Allowable load considers a 3 or more equal span condition.
3. When panels are installed over solid or closely fitted sheathing, the capacity is limited to the capacity of the underlying sheathing.

FASTENER DIAGRAM (TESTED)



PANEL ATTACHMENT



Fastener Notes:

- When possible, lap panels away from prevailing wind direction.
- 15/32” OSB: #14 GP Neoprene Washered fastener. Screws should be long enough to penetrate through the bottom of the plywood by 3/8”.
- 15/32” Plywood: #14 GP Neoprene Washered fastener. Screws should be long enough to penetrate through the bottom of the plywood by 3/8”.
- Dimensional lumber: #10 GP. Screws should penetrate the lumber 1”.
- 16GA (or less) steel furring: #12 Fastener with DP-1
- Sidelaps fasten with #14 LapTek screws.
- All trim screws used for roof or wall applications should have EPDM sealing washers.
- Fastener spacing is based on project specific structural requirements. Consulant a licensed engineer.

TAYLOR METAL PRODUCTS

SHEAR LOAD AND STIFFNESS CHART

PRRF20251279

Shear load test results for PBR panels at support spacing of 5’ 0”

Test No.	Ga.	Span (ft)	L (ft)	b (ft)	$0.4P_{max}$ (lb)	Shear Deflection Δ_n (in)	Max. Shear Load P_u (lb)	Ultimate Shear S_u (lb/ft)	Shear Stiffness G' (lb/in)
1	26	5' 0"	15.0	15.0	3145	0.155	7863	524.2	20292
2			15.0	15.0	3200	0.166	8000	533.3	19277
Average							7932	528.8	19784

Notes:

P_u = Maximum applied load in the cantilever beam test (lb)
P = $0.4P_u$ in the cantilever beam test (lb)
Δn = Net shear deflection of diaphragm (in) at $0.4P_u$ load
G’ = Shear stiffness of the diaphragm as determined from test measurements
L = Length of diaphragm test frame = 15 ft
b = Depth of diaphragm test frame = 15 ft

Rev. Date 09-24