Insulfoam

To:

Job:

Insulfoam, a Carlisle Company, submits for approval on Expanded Polystyrene being used in a Carlisle Syntec system, being used as a Taper or Cricket to match existing drawings. This change to Expanded polystyrene for the taper and crickets will not affect the following.

1. Warranty (NDL or other)
2. Wind uplift (Factory Mutual Global, ASCE7, IBC or ANSI/SPRI WD-1)
3. UL Class A assembly

System spec,

Class A, mechanically fastened, Combustible Deck or Non-Combustible Deck, min R20, R24, R30, 38 or R40

Single Ply

Sure-Weld TPO

Cover Board,

¼" min Dens Deck or Securock / ½" min Secure Shield HD or HD plus

Insulation1

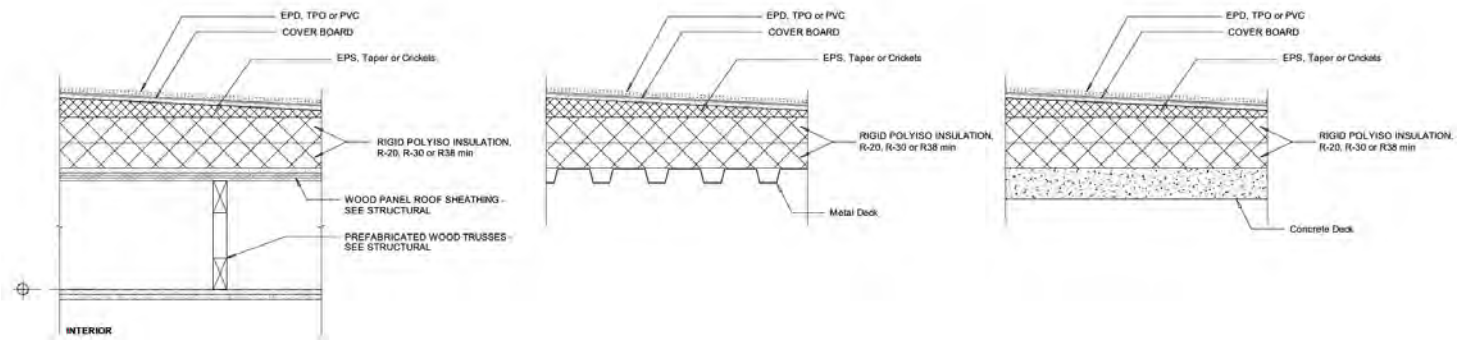
InsulFoam I 10 psi, Taper or Cricket insulation. Suggested, but InsulFoam VIII 13 psi, InsulFoam II 15 psi, InsulFoam IX 25 psi, InsulFoam XIV 40 psi and InsulFoam XV 60 psi are available in 1/8",3/16",1/4",3/8", ½",5/8",3/4" and 1". Other custom slopes are available.

Insulation 2

Polyisocyanurate, per spec R24, R30 or R38 done in 2 or 3 layers

Deck,

(Combustible) Wood C15/32 min, (Non-Combustible) Concrete or Metal



For addition verification please contact

Carlisle Rep group, Harper Winn		
Charlie Soffel	Charlie@harperwinn.com	206-619-0163
Steve Silcock	Steve@harperwinn.com	425-220-1190
Paul Amos	Paul@harperwinn.com	503-481-5867
George Pfeiffer	George@harperwinn.com	206-696-0042
InsulFoam a Carlisle company, Tech Center		
Tom Savoy	Tom.savoy@insulfoam.com	612-850-4974

Also please read the following attachments

1. Substitution
2. InsulFoam a Carlisle company, InsulFoam I Brochure
3. InsulFoam a Carlisle company, Taper submittal brochure
4. InsulFoam a Carlisle company, Roof insulation Systems
5. Carlisle Syntec, Sure-Weld TPO written spec showing EPS.

If there is any additional information needed, please contact me, thank you for your time.

Sincerely,

David Haug
Cell 206-730-4959
InsulFoam
A division of Carlisle Construction Materials Incorporated
206-730-4959
David.Haug@insulfoam.com

SUBSTITUTION REQUEST

(During the Bidding/Negotiating Stage)

Project: _____ Substitution Request Number: _____

From: InsulFoam a Carlisle Company

To: _____ Date: _____

A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: Polyisocyanurate Description: Taper Rigid insulation

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: InsulFoam I, Taper or Crickets

Manufacturer: Insulfoam Address: 19727 57th Ave E Puyallup, WA 98375 Phone: 253-271-3230

Trade Name: Insulfoam a Carlisle Company Model No.: Type I, EPS

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

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

The Undersigned certifies:

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

Submitted by: David Haug

Signed by: same as above

Firm: Insulfoam a Carlisle Company

Address: 19727 57th Ave E

Puyallup, WA 98375

Telephone: 253-271-3230

A/E's REVIEW AND ACTION

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

Signed by: Date:

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

Form Version: January 2013
CSI Form 1.5C

InsulFoam®

Description

InsulFoam is a versatile product consisting of a superior closed-cell, lightweight and resilient expanded polystyrene (EPS). InsulFoam meets or exceeds the requirements of ASTM C578, *Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation*. InsulFoam can be manufactured in a wide range of block and panel sizes, and in a wide assortment of shapes and densities. In addition, InsulFoam offers a long-term, stable R-Value and has excellent dimensional stability, compressive strength and water resistant properties. InsulFoam is an Energy Star® qualified insulation and qualifies for LEED points.

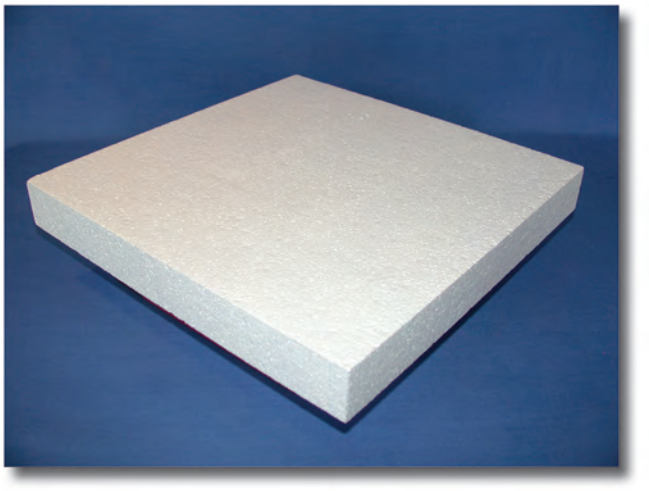
Uses

InsulFoam is successfully used in numerous commercial, industrial and residential applications. The following are examples of the many InsulFoam uses.

- Commercial Roofing Insulation
- Packaging
- Architectural Shapes
- Below Grade Insulation
- Metal Roof Flute-Fill
- Docks & Piers
- Void Fill
- Ramps & Bridge Approaches
- Pre-cast/Pre-stressed Concrete Panels
- Road Base
- Foundations
- Retaining Walls
- Sheathing
- Interior Wall Insulation
- Exterior Insulation Finishing Systems (EIFS)

Advantages

- *Environmentally Friendly.* InsulFoam contains no dyes, formaldehyde or ozone-depleting HCFCs, may contain recycled material and is 100% recyclable.
- *Insect and Mold Resistant.* InsulFoam can be manufactured with an inert additive that deters termites and carpenter ants. InsulFoam does not sustain mold and mildew growth.
- *Stable R-Value.* InsulFoam has no thermal drift. Designers are well served knowing InsulFoam's thermal properties will remain stable over its entire service life. InsulFoam is eligible for an Insulfoam 20-year Thermal Performance Warranty – a warranty that's not prorated or limited to a percentage of the published R-Value.
- *Proven Performance.* The same fundamental EPS chemistry has been in use since the mid-1950s, so the actual performance of the product is well known.
- *Water-Resistant.* InsulFoam does not readily absorb moisture from the environment.



- *Cost-Effective.* InsulFoam is typically less expensive than comparable insulation products.
- *Code Approvals.* InsulFoam is recognized by the International Code Council Evaluation Service (ICC-ES), for numerous applications. Please contact your local Insulfoam representative for details.

Sizes

InsulFoam is offered in an assortment of sizes and shapes and is readily available in custom lengths, widths and densities with little to no impact on lead time.

Installation Recommendations

Please refer to the appropriate InsulFoam application sheets for recommended installation procedures.

Typical Physical Properties of InsulFoam*							
Property	**Type I**	**Type VIII**	**Type II**	**Type IX**	**Type XIV**	**Type XV**	**Test Method**
Nominal Density (pcf)	1.0	1.25	1.5	2.0	2.50	3.0	ASTM C303
C-Value (Conductance) BTU/(hr•ft²•°F) @ 25° F (per inch) @ 40° F @ 75° F	 .230 .240 .260	 .220 .235 .255	 .210 .220 .240	 .200 .210 .230	 0.198 0.206 0.222	 0.196 0.198 0.217	 ASTM C518 or ASTM C177
R-Value (Thermal Resistance) (hr•ft²•°F)/BTU @ 25° F (per inch) @ 40° F @ 75° F	 4.35 4.17 3.85	 4.55 4.25 3.92	 4.76 4.55 4.17	 5.00 4.76 4.35	 5.05 4.85 4.50	 5.10 5.05 4.60	 ASTM C518 or ASTM C177
Compressive Strength (psi, 10% deformation)	10 - 14	13 - 18	15 - 21	25 - 33	40	60	ASTM D1621
Flexural Strength (min. psi)	25	30	35	50	60	75	ASTM C203
Dimensional Stability (maximum %)	2%	2%	2%	2%	2.0	2.0	ASTM D2126
Water Vapor Permeance (max. perm., 1 inch)	5.0	3.5	3.5	2.0	2.5	2.5	ASTM E96
Water Absorption (max. % vol.)	4.0	3.0	3.0	2.0	2.0	2.0	ASTM C272
Capillarity	none	none	none	none	none	none	–
Flame Spread	< 20	< 20	< 20	< 20	< 20	< 20	ASTM E84
Smoke Developed	150 - 300	150 - 300	150 - 300	150 - 300	150-300	150-300	ASTM E84

***Properties are based on data provided by resin manufacturers, independent test agencies and Insulfoam.**

INSULFOAM®
ROOF INSULATION SYSTEMS

PREDICTABLY **CONSISTENT** VALUE.

Roof Insulation Systems & Substitutions

Proven and tested insulation.
Most R-Value per dollar.

Insulation Need	Insulfoam Production	Savings
Recover applications requiring a separator board	R-Tech FF Fanfold Insulation	Up to $25 per square vs. other cover boards
Recover applications requiring a 1" separator board	1" R-Tech Insulation	Up to $10 per square vs. 1" Iso
High R-Value Insulation Systems	1.5" InsulFoam SP & InsulFoam I	Up to $40 per square vs. Iso
Tapered Insulation Systems	InsulFoam EPS tapered or hybrid tapered ISO systems using EPS fill	Up to 30% savings vs. Tapered Iso
Metal Roof Recover	InsulFoam FL (Flute Fill)	Up to 25% savings vs. Iso Flute Fill
High Traffic Areas	InsulFoam HD Composite (High-density Polyiso with EPS base)	Up to 25% savings vs. Other Composites
Inverted Roof Membrane Assemblies (IRMA)	InsulFoam High-Density Products	Up to 15% savings vs. XPS
Garden Roofs	InsulFoam EPS	Up to 40% savings vs. XPS

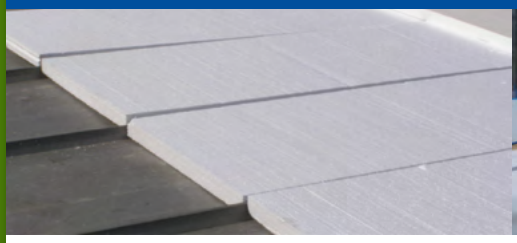
Why Insulfoam EPS?

With a broad range of insulation types available, it's easier than ever for contractors to construct an energy-efficient roof system. Insulfoam EPS (expanded polystyrene) rigid foam insulation has been used for decades by industry professionals looking to achieve high thermal properties for a cost-effective price. The benefit of lightweight EPS goes far beyond price, as it also helps to decrease material and labor expenses. Additionally, unlike other rigid insulations, EPS R-values remain stable, without drifting or fading over time. Backed with a 20-year thermal performance warranty, you can be confident that Insulfoam's EPS products are the best option for your project.

INSULATION ENGINEERED TO MAKE A DIFFERENCE.

INSULATION ENGINEERED TO MAKE A DIFFERENCE.

Proven Performance: The same Insulfoam EPS chemistry has been used since the mid-1950's, so the actual performance is well documented.



Insulfoam Roofing Insulation Products: New & Re-roofing Applica-

Products	Overview	Specifications
InsulFoam EPS: Flat & Tapered	High-performing, superior, closed-cell, lightweight EPS insulation is available flat or factory tapered to easily increase slope and economically meet drainage needs.	Density: 1.0 - 3.0 pcf Compressive Strengths: 10-60 psi Thicknesses: ½" - 40" (tapered starts at ⅛") Sizes: Custom per job, up to 24' panels
InsulFoam SP Insulation	EPS with factory-laminated glass facer. Approved for mechanically attached single-ply roof systems, without needing a slip-sheet on non-combustible decks.	Density: 1.25 pcf Compressive Strengths: 13-18 psi Thicknesses: 1½" - 7" Sizes: 4' x 4' or 4' x 8' panels
InsulFoam HD Composite Insulation	High-density Polyiso factory bonded to EPS approved for single-ply roof and re-roof applications.	EPS Density: 1.0 - 3.0 pcf Compressive Strengths: EPS 10-60 psi/ iso 100 psi Thicknesses: 1½" - 7" Sizes: 4' x 4' or 4' x 8' panels
InsulLam Nail Base	High-performance EPS insulation factory laminated to standard cover boards (OSB, plywood, gypsum and other cover board). Available vented as InsulVent.	Compressive Strengths: EPS 10-60 psi, cover boards vary by type Thicknesses: 1½" - 7" Sizes: 4' x 4' or 4' x 8' panels
1" R-Tech Recover Roof Insulation	Lightweight EPS insulation with factory-adhered advanced polymeric facers (white facer and metallic reflective face) for added durability. Maintains existing roof system's UL rating.	Compressive Strengths: 13-60 psi Thicknesses: ⅜" - 1" Sizes: 4' x 8' panels
InsulFoam FL (FLute-Fill) Metal Roof Insulation	Recover insulation for existing metal roof profiles. Available in taper, straight or custom-cut profiles.	Compressive Strengths: 10-60 psi Thicknesses: Available in virtually any job length/width Sizes: Custom cut to fit any metal roof system
R-Tech FF Fanfold Roof Underlayment	Lightweight EPS insulation with factory-adhered advanced polymeric facers (white facer and metallic reflective face) for added durability. Maintains existing roof system's UL rating.	Compressive Strengths: 10-60 psi Thicknesses: ⅜", ½", or ¾" Sizes: 200 sq. ft. fanfold bundles
InsulFoam HB (Holey Board)	For use in lightweight concrete insulating systems, factory-applied holes enable insulation to be fully encapsulated in concrete, and usually serves as a primary insulation in a roof system.	Compressive Strengths: 10-60 psi Thicknesses: ¾" - 20" Sizes: Typically available in 2' x 4' panels

PREDICTABLY **CONSISTENT** VALUE.

A Truly Green, High-Performance, & Economical Roof Insulation

Cost-Effective

- More R-Value per dollar than any other rigid insulation
- R-Value doesn't degrade over time
- Most cost-effective insulation - typically 25-50% less than other rigid insulations
- Easy to install - reduces labor costs by more than 50%
- Complimentary 20-year thermal performance warranty available

Engineered for Versatility

- Available in ½" - 40" product thicknesses
- Available in multiple densities, compressive strengths and panel sizes
- Suitable for use under all major BUR, Mod Bit roofing membranes: TPO, PVC, EPDM, & CSPE
- Code-recognized insulation (ICC-ES, UL, Factory Mutual) at an economical price
- Meets or exceeds ASTM C578 requirements

Easy to Install

- Lightweight panels
- Highly durable, yet resilient
- Simple to cut in the field with a saw or hot wire kit
- Custom, job-specific sizes with no additional lead time

Environmentally Sustainable

- 100% recyclable, may contain up to 25% recycled content
- High long-term thermal performance (stable R-Value) conserves energy and operational costs
- Contains no dyes, formaldehyde or ozone-depleting HCFC's
- ENERGY STAR®* qualified
- Can contribute toward LEED® credit requirements
- Does not support mold or mildew growth for improved indoor air quality (IAQ)
- Naturally water resistant - does not readily absorb moisture from the environment
- Regional manufacturing throughout North America reduces transportation costs to jobsites and environmental impact

Sure-Weld®
Mechanically Fastened – Induction Welding
Form-Spec

July 2020

Note to the User: Some text has been colored and underlined so the specifier can customize a specification for a specific project. This information must be edited by the specifier to create a final draft of the project specification. Page breaks should also be checked to maximize page usage once specific project information has been added by the specifier.

PART 1 GENERAL

1.01 DESCRIPTION

A. The _Project Name_ is located at _Address_ in _City and State_. _Name of Project Manager_, Project Manager/Coordinator, is the Owner's Representative and may be contacted regarding any questions or for a pre-bid job site inspection, phone _Phone Number_.

B. The project consists of installing Carlisle SynTec's Sure-Weld TPO Mechanically-Fastened Roofing System as outlined below: :

choose the appropriate paragraph and delete remainder

Apply the Sure-Weld Mechanically Fastened Roofing System with the RhinoBond or Isoweld TPO Welding Plate in conjunction with _Insulation Type_ over the new _Deck Type_ roof deck.

OR

Apply the Sure-Weld Mechanically Fastened Roofing System with the RhinoBond or Isoweld TPO Welding Plate in conjunction with _Insulation Type_ over the existing _Material Type_ roof.

OR

Apply the Sure-Weld Mechanically Fastened Roofing System with the RhinoBond or Isoweld TPO Welding Plate in conjunction with _Insulation Type_ after tear off of the existing _Material Type_ roof to expose the Deck Type for verification of suitable substrate as specified in this specification.

1.02 EXTENT OF WORK

A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of the Sure-Weld reinforced TPO (Thermoplastic Polyolefin) membrane Mechanically Fastened-Induction Welded Roofing System including flashings and insulation as specified herein and as indicated on the drawings in accordance with the manufacturer's most current specifications and details.

B. The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that will affect their work.

C. The roofing contractor shall confirm all given information and advise the building owner, prior to bid, of any conflicts that will affect their cost proposal.

D. Any contractor who intends to submit a bid using a roofing system other than the approved manufacturer must submit for pre-qualification in writing fourteen (14) days prior to the bid date. Any contractor who fails

to submit all information as requested will be subject to rejection. Bids stating "as per plans and specs" will be unacceptable.

1.03 SUBMITTALS

A. Prior to starting work, the roofing contractor must submit the following:

1. Shop drawings showing layout, details of construction and identification of materials.

2. Sample of the manufacturer's Membrane System Warranty.

3. Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.

4. Certification from the membrane manufacturer indicating the fasteners are capable of providing a static backout resistance of 10 inch pounds minimum is required.

5. Certification from the membrane manufacturer indicating the membrane thickness over the reinforcing scrim (top ply membrane thickness) is nominal .15-mil or thicker.

6. Certification of the manufacturer's warranty reserve.

B. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the specifier prior to the issuance of the manufacturer's warranty.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.

B. Comply with the manufacturer's written instructions for proper material storage.

1. Store Sure-Weld membrane in the original undisturbed plastic wrap in a cool, shaded area and cover with light-colored, breathable, waterproof tarpaulins. Sure-Weld membrane that has been exposed to the elements for approximately 7 days must be prepared with Carlisle Weathered Membrane Cleaner prior to hot air welding.

2. Store curable materials (adhesives and sealants) between 60°F and 80°F in dry areas protected from water and direct sunlight. If exposed to lower temperature, restore to 60°F minimum temperature before using.

3. Store materials containing solvents in dry, well ventilated spaces with proper fire and safety precautions. Keep lids on tight. Use before expiration of their shelf life.

C. Insulation must be on pallets, off the ground and tightly covered with waterproof materials.

D. Any materials which are found to be damaged shall be removed and replaced at the applicator's expense.

1.05 WORK SEQUENCE

A. Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide protection for the interior of the building and to ensure water does not flow beneath any completed sections of the membrane system.

B. Do not disrupt activities in occupied spaces.

1.06 USE OF THE PREMISES

A. Before beginning work, the roofing contractor must secure approval from the building owner's representative for the following:

1. Areas permitted for personnel parking.

2. Access to the site.

3. Areas permitted for storage of materials and debris.

4. Areas permitted for the location of cranes, hoists and chutes for loading and unloading materials to and from the roof.

B. Interior stairs or elevators may not be used for removing debris or delivering materials, except as authorized by the building superintendent.

1.07 EXISTING CONDITIONS

If discrepancies are discovered between the existing conditions and those noted on the drawings, immediately notify the owner's representative by phone and solicit the manufacturer's approval prior to commencing with the work. Necessary steps shall be taken to make the building watertight until the discrepancies are resolved.

1.08 PRE-CONSTRUCTION CONFERENCE

A. A pre-bid meeting will be held at the job site on Date at Time . Contact the owner's representative, Name and Title , at Phone Number if there are any questions.

B. Prior to bid submittal, the roofing contractor should schedule a job site inspection to observe actual conditions and verify all dimensions on the roof. The job site inspection may occur on the day of the pre-bid meeting or prior to such a meeting. Should access to the roof be necessary before or after the pre-bid meeting, the contractor must contact the owner's representative, Name and Title , at Phone Number to coordinate an appropriate time.

C. Bids must be forwarded to the following address no later than Time on Date :

Name and Address

D. Any conditions which are not shown on the shop drawings should be indicated on a copy of the shop drawing and included with bid submittal if necessary to clarify any conditions not shown.

1.09 TEMPORARY FACILITIES AND CONTROLS

A. Temporary Utilities:

1. Water, power for construction purposes and lighting are/are not available at the site and will/will not be made available to the roofing contractor.

2. Provide all hoses, valves and connections for water from source designated by the owner when made available.

3. When available, electrical power should be extended as required from the source. Provide all trailers, connections and fused disconnects.

B. Temporary Sanitary Facilities

Sanitary facilities will not be available at the job site. The roofing contractor shall be responsible for the

provision and maintenance of portable toilets or their equal.

C. Building Site:

1. The roofing contractor shall use reasonable care and responsibility to protect the building and site against damages. The contractor shall be responsible for the correction of any damage incurred as a result of the performance of the contract.

2. The roofing contractor shall remove all debris from the job site in a timely and legally acceptable manner so as to not detract from the aesthetics or the functions of the building.

D. Security:

Obey the owner's requirements for personnel identification, inspection and other security measures.

1.10 JOB SITE PROTECTION

A. The roofing contractor shall adequately protect building, paved areas, service drives, lawn, shrubs, trees, etc. from damage while performing the required work. Provide canvas, boards and sheet metal (properly secured) as necessary for protection and remove protection material at completion. The contractor shall repair or be responsible for costs to repair all property damaged during the roofing application.

B. During the roofing contractor's performance of the work, the building owner will continue to occupy the existing building. The contractor shall take precautions to prevent the spread of dust and debris, particularly where such material may sift into the building. The roofing contractor shall provide labor and materials to construct, maintain and remove necessary temporary enclosures to prevent dust or debris in the construction area(s) from entering the remainder of the building.

C. Do not overload any portion of the building, either by use of or placement of equipment, storage of debris, or storage of materials.

D. Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.

E. Take precautions to prevent drains from clogging during the roofing application. Remove debris at the completion of each day's work and clean drains, if required. At completion, test drains to ensure the system is free running and drains are watertight. Remove strainers and plug drains in areas **where work is in progress**. Install flags or other telltales on plugs. Remove plugs each night and screen drain.

F. Store moisture susceptible materials above ground and protect with waterproof coverings.

G. Remove all traces of piled bulk materials and return the job site to its original condition upon completion of the work.

1.11 SAFETY

The roofing contractor shall be responsible for all means and methods as they relate to safety and shall comply with all applicable local, state and federal requirements that are safety related. **Safety shall be the responsibility of the roofing contractor.** All related personnel shall be instructed daily to be mindful of the full time requirement to maintain a safe environment for the facility's occupants including staff, visitors, customers and the occurrence of the general public on or near the site.

1.12 WORKMANSHIP

A. Applicators installing new roof, flashing and related work shall be factory trained and approved by the manufacturer they are representing.

B. All work shall be of highest quality and in strict accordance with the manufacturer's published specifications and to the building owner's satisfaction.

C. There shall be a supervisor on the job site at all times while work is in progress.

1.13 QUALITY ASSURANCE

A. The Sure-Weld Roofing System must achieve a UL Class A, B or C.

B. (choose the appropriate paragraph and delete remainder)

The specified roofing assembly must have been successfully tested by a qualified testing agency to resist the design uplift pressures calculated according to

ANSI/SPRI WD-1 "Wind Design Standard Practice for Roofing Assemblies"
American Society of Civil Engineers (ASCE 7)
International Building Code (IBC)

and after multiplying the results with a safety factor of (determined by designing professional).

OR

(To be used on FM Global Insured Buildings Only)

The specified roofing assembly must be rated by FM Global (FMG) to meet or exceed the factored uplift pressures outlined in FMG Property Loss Prevention Data Sheet 1-28, and complies with FMG Property Loss Prevention Data Sheet 1-29 for enhancements at the perimeter and corners.

C. The membrane must be manufactured by the material supplier. Manufacturer's supplying membrane made by others are not acceptable.

D. Unless otherwise noted in this specification, the roofing contractor must strictly comply with the manufacturer's current specifications and details.

E. The roofing system must be installed by an applicator authorized and trained by the manufacturer in compliance with shop drawings as approved by the manufacturer. The roofing applicator shall be thoroughly experienced and upon request be able to provide evidence of having at least five (5) years successful experience installing single-ply TPO roofing systems and having installed at least one (1) roofing application or several similar systems of equal or greater size within one year.

F. Provide adequate number of experienced workmen regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Provide at least one thoroughly trained and experienced superintendent on the job at all times roofing work is in progress.

G. There shall be no deviations made from this specification or the approved shop drawings without the prior written approval of the specifier. Any deviation from the manufacturer's installation procedures must be supported by a written certification on the manufacturer's letterhead and presented for the specifier's consideration.

H. The Sure-Weld TPO White membrane meets CRRC (Cool Roof Rating Council) for reflectance and emittance. When tested in accordance with ASTM C1549, the Sure-Weld White material has an initial solar reflectance of 0.79 and a 3-year aged reflectance of 0.70. The material has also been tested for emittance in accordance with ASTM C1371; an initial emittance of 0.90 and a 3-year aged emittance of 0.86 were achieved.

I. The Sure-Weld White TPO membrane meets the emittance requirements set forth by the USGBC (U. S. Green Building Council) for their LEED (Leadership in Energy and Environmental Design) Program. The Sure-Weld White TPO material has an emittance of 0.90 (when tested in accordance with ASTM E408) and an SRI (solar reflectance index) of 99 (calculated using ASTM E 1980).

J. The Sure-Weld TPO Tan membrane meets CRRC (Cool Roof Rating Council) for reflectance and emittance. When tested in accordance with ASTM C1549, the Sure-Weld Tan material has an initial solar reflectance of 0.71. The material has also been tested for emittance in accordance with ASTM C1371; an initial emittance of 0.86 was achieved.

K. The Sure-Weld Tan TPO membrane meets the emittance requirements set forth by the USGBC (U. S. Green Building Council) for their LEED (Leadership in Energy and Environmental Design) Program. The Sure-Weld Tan TPO material has an emittance of 0.86 (when tested in accordance with ASTM E408) and an SRI (solar reflectance index) of 86 (calculated using ASTM E 1980).

L. Upon completion of the installation, the applicator shall arrange for an inspection to be made by a non-sales technical representative of the membrane manufacturer in order to determine whether or not corrective work will be required before the warranty will be issued. Notify the building owner seventy-two (72) hours prior to the manufacturer's final inspection.

1.14 JOB CONDITIONS, CAUTIONS AND WARNINGS

Refer to Carlisle's Sure-Weld Roofing System specification for General Job Site Considerations.

A. Safety Data Sheets (SDS) must be on location at all times during the transportation, storage and application of materials.

B. When positioning membrane sheets, exercise care to locate all field splices away from low spots and out of drain sumps. All field splices should be shingled to prevent bucking of water.

C. When loading materials onto the roof, the Carlisle Authorized Roofing Applicator must comply with the requirements of the building owner to prevent overloading and possible disturbance to the building structure.

D. Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.

E. Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.

F. Provide protection, such as 3/4 inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.

G. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.

H. New roofing shall be complete and weathertight at the end of the work day.

I. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

1.15 WARRANTY

A. Provide manufacturer's 10 year, 15 year, or 20 year Total System Warranty covering both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of 55 mph measured at 10 meters above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage.

Note: Sure-Weld 80-mil TPO in Special Colors are limited to Warranties Up to 20 Year.

Note:

Warranty Length	Minimum Membrane Thickness
10 or 15 year	45-mil Sure-Weld
20 year	Minimum 60-mil Sure-Weld

B. Warranty shall also cover leaks caused by accidental punctures: 16 man-hours per year for 80-mil Sure-Weld

C. When white Sure-Weld membrane is specified, a Reflectivity Warranty Amendment is available indicating the membrane will meet the Energy Star program reflectivity guidelines for both new and aged membrane for a period of 10 years.

D. Pro-rated System Warranties shall not be accepted.

E. Evidence of the manufacturer's warranty reserve shall be included as part of the project submittals for the specifier's approval.

PART 2 PRODUCTS

2.01 GENERAL

A. All components of the specified roofing system shall be products of Carlisle SynTec or accepted by Carlisle SynTec as compatible.

B. All products (including insulation, fasteners, fastening plates, prefabricated accessories and edgings) must be **manufactured and/or supplied** by the roofing system manufacturer and covered by the warranty.

2.02 MEMBRANE

(**Note:** When selecting APEEL Protective Film, Sheet thickness is only available in white, 60- or 80-mil without special order. Also available in Gray, Tan with 2-3 week lead time and a minimum order of 200 squares.)

(Note: Special Color TPO **(**Medium Bronze, Rock Brown, Terra Cotta, Slate Gray and Patina Green) is available in 60-mil sheets in 5’ or 10’ wide x 100’ long membrane and 80-mil sheets in 10’ wide x 100’ long ONLY. Special Color TPO is available by special order and a lead time will be required.)

Furnish Sure-Weld 45-mil, 60-mil or 80-mil thick white, gray, tan or Special Color TPO (Medium Bronze, Rock Brown, Terra Cotta, Slate Gray and Patina Green) reinforced TPO (Thermoplastic Polyolefin) membrane with APEEL Protective Film as needed to complete the roofing system. Membrane thickness over the reinforcing scrim (top-ply thickness) shall be nominal 15-mil or thicker. Membrane sheets in rolls 12', 10' or 8' wide by 100' long. Sure-Weld 60-mil or 80-mil thick, white, tan or gray membrane with APEEL Protective Film sheets are available in rolls 12’, 10’, 8’, 6’ and 4’ wide by 100’ long.

2.03 INSULATION/UNDERLAYMENT

A. When applicable, insulation shall be installed in multiple layers. The first and second layer of insulation shall be mechanically fastened to the substrate in accordance with the manufacturer's published specifications.

B. Insulation shall be Type of Insulation as supplied by Carlisle SynTec. Minimum R-value required is Note R-Value .

(when using InsulFoam insulation, utilize a coverboard for protection from welding)

1. **Carlisle Insulbase Polyisocyanurate** – A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289-06, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available.

2. **Carlisle SecurShield Polyisocyanurate–** A foam core insulation board covered on both sides with a coasted glass fiber mat facer meeting ASTM C 1289-06, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available.

3. **Carlisle InsulBase NH Polyisocyanurate –** A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289-06, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available. This product contains zero halogenated flame retardants and is Living Building Challenge (LBC) "Red List Free".

4. **Carlisle SecurShield HD Composite** – Composite insulation panel comprised of ½-inch high-density Polyiso cover board (100 psi) laminated during the manufacturing process to SecurShield rigid Polyiso roof insulation meeting ASTM C1289 Type II, Class2, Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4' x 8' boards with thickness from 2" to 4.5". 4' x 4' panels are also available.

5. **Carlisle Stormbase Polyiso Composite (OSB)** – Polyiso insulation bonded on the bottom side with a medium weight fiber-reinforced felt facer and laminated with a top surface of 7/16" or 5/8" thick Oriented Strand Board (OSB) meeting ASTM C1289, Type V, Class 1 Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4' x 8' boards with thickness from 1-1/2" to 4".

6. **Carlisle SecurShield HD Cover Board–** a rigid insulation panel composed of a high-density, closed-cell polyisocyanurate foam core laminated to moisture resistant coated-glass fiber-mat facer for use as a cover board or recover board meeting ASTM 1289-06, Type II, Class 2 (100 psi). Available 1/2" thick 4' x 8' panel weight 11 lbs with an R-value of 2.5.

7. **SecurShield HD Plus** - a rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to premium-performance coated-glass fiber-mat facer for use as a cover board or recover board. Available 1/2" thick 4' x 8' panel weight 11 lbs with an R-value of 2.5. Meets an FM 1-90 using only 8 fasteners per 4' x 8' board.

8. **Insulbase HD** – a closed-cell polyisocyanurate foam core insulation board covered on both sides with glass-reinforced felt (GRF) facer meeting ASTM C 1289, Type II, Class 1, Grade 3. The product is available in 4' x 4' and 4' x 8' standard sizes with a thickness of one half inch.

9. **InsulFoam SP –** A closed-cell lightweight expanded polystyrene (EPS) with a factory-laminated fiber glass facer. Nominal density of 1.25 lbs/cubic ft (pcf), and meets ASTM C578, Type VIII. Designed for low-sloped roof applications that employ mechanically fastened or ballasted membranes.

10. **InsulFoam I (EPS: Expanded Polystyrene) –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type I. Nominal density of 1.0 lbs/cubic ft (pcf) available in 4' x 4' or 4' x 8' sizes with thickness from ¼" to 40". Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, Dens-Deck Prime or Securock.

11. **InsulFoam VIII (EPS: Expanded Polystyrene) –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type VIII. Nominal density of 1.25 lbs/cubic ft (pcf) available in 4' x 4' or 4' x 8' sizes with thickness from ¼" to 40". Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, Dens-Deck Prime or Securock.

12. **InsulFoam II (EPS: Expanded Polystyrene) –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type II. Nominal density of 1.5 lbs/cubic ft (pcf) available in 4' x 4' or 4' x 8' sizes with thickness from ¼" to 40". Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, Dens-Deck Prime or Securock.

13. **InsulFoam IX (EPS: Expanded Polystyrene) –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type IX. Nominal density of 2.0 lbs/cubic ft (pcf) available in 4' x 4' or 4' x 8' sizes with thickness from ¼" to 40". Custom lengths, widths and tapered boards are

available. May be specified beneath Sure-Seal HP Recovery Board, Dens-Deck Prime or Securock.

14. **InsulFoam HD Composite –** InsulFoam expanded polystyrene (EPS) insulation laminated with a top surface of 1/2" thick SecurShield HD. Available in 4' x 8' boards with thickness from 1-1/2" to 7".

15. **InsulLam –** InsulFoam expanded polystyrene (EPS) insulation laminated with a top surface of 1/2" Dens Deck Prime, 1/2" Securock, or 1/2" HP Recovery Board. Available in 4' x 8' boards with thickness from 1-1/2" to 7".

16. **XPS: Extruded Polystyrene –** Available through Carlisle is dimensionally stable with high thermal and low water absorption performance capability. XPS is available in varying compressive strengths thicknesses and sizes. Refer to specific product data sheets for physical properties and additional technical information. Specified beneath Sure-Seal HP Recovery Board, Dens-Deck Prime or Securock

    a. Thermapink 18 or 25 Extruded Polystyrene

    b. Foamular 400 or Durapink Extruded Polystyrene

    c. Dow Recovermate, Dow Styrofoam Deckmate, or Dow Styrofoam Deckmate Plus Extruded Polystyrene

17. **Securock Cover Board –** A uniform composition of fiber-reinforced with no facer for use as a cover board or a thermal barrier. Available in ¼" to 5/8" thick and 4' x 4' or 4' x 8' size boards. Long uninterrupted runs (>200') may require slight gapping due to thermal expansion.

18. **Sure-Seal HP Recovery Board** - A 1/2" or 1" thick high-density wood fiberboard with an asphalt coated facer for use as a cover board or recover board. Available ½" or 1" thick and 4' x 4' or 4' x 8' size boards.

19. **DensDeck Prime** –gypsum core that incorporates glass-mat facings on the top and bottom side. Available in ¼" to 5/8" and 4' x 4' or 4' x 8' size boards.

20. **DensDeck Cover Board** –gypsum core that incorporates glass-mat facings on the top and bottom side for use as a cover board. Available in ¼" to 5/8" and 4' x 4' or 4' x 8' size boards.

21. **R-Tech FanFold Recover Board –** Closed-cell lightweight expanded polystyrene (EPS) with polymeric laminated faces which meets ASTM C 578 for use as a recover board. Available in thicknesses of 3/8" to ¾" with coverage 4' x 50' (2 squares). 4' x 8' units are also available.

2.04 ADHESIVES AND CLEANERS

All products shall be furnished by Carlisle and specifically formulated for the intended purpose.

A. **Sure-Weld Bonding Adhesive:** A high-strength, synthetic rubber adhesive used for bonding Sure-Weld membrane to various surfaces. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 60 square feet per gallon per finished surface (includes coverage on both surfaces).

B. **Low VOC Bonding Adhesive for TPO:** This product meets the <250 gpl VOC (volatile organic compound) content requirements of the OTC Model Rule for Single-Ply Roofing Adhesives. A high strength, solvent-based contact adhesive that allows bonding of TPO membrane to various porous and non-porous substrates. Apply at a rate of 60 ft2 per gallon finished surface. Available in 5 gallon pails. This product does not comply with southern California counties with additional restrictions on solvents.See Carlisle's Product Data Sheet for a listing of the counties involved.

C. **Low VOC Bonding Adhesive 1168:** This product meets the <250 gpl VOC (volatile organic compound) content requirements of the OTC Model Rule for Single Ply Roofing Adhesives. A high strength, solvent-based contact adhesive the allows bonding of TPO membrane to various porous and non-porous substrates.

Apply at a rate of 60 ft2 per gallon finished surface. Available in 5-gallon cans. This product complies with southern California counties with additional restrictions on solvents. See Carlisle's Product Data Sheet for a listing of the counties involved.

D. **Aqua Base 120 Bonding Adhesive:** A semi pressure-sensitive, water based adhesive used as a two-sided contact adhesive. Coverage rate is 120 square feet per gallon finished surface (applied to membrane and substrate). Refer to Spec Supplement G-10-17 "Aqua Base 120 Bonding Adhesive" for Warranty limitations and other considerations.

E. **Cut-Edge Sealant:** A white or clear colored sealant used to seal cut edges of reinforced Sure-Weld membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8" diameter bead is applied.

F. **Water Cut-Off Mastic:** Used as a mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging (at a coverage rate of approximately 10' per tube or 100' per gallon).

G. **Universal Single-Ply Sealant:** A 100% solids, solvent free, voc free, one part polyether sealant that provides a weather tight seal to a variety of building materials. It is white in color and is used for general caulking such as above termination bars and metal counter flashings and at scuppers.

H. **Thermoplastic One-Part Pourable Sealer**: A one-part, moisture curing, elastomeric polyether sealant used to fill TPO Molded Pourable Sealant Pockets. Packaged in 4, 2-liter foil pouches inside a reusable plastic bucket. 1 pouch will fill 2 TPO Molded Pourable Sealant Pockets.

I. **Weathered Membrane Cleaner:** Used to prepare membrane for heat welding that has been exposed to the elements or to remove general construction dirt at an approximate coverage rate of 400 square feet per gallon (one surface).

J. **TPO Primer:** A solvent-based primer used to prepare the surface of Sure-Weld Membrane prior to application of Pressure-Sensitive Coverstrip and TPO Pressure-Sensitive RUSS.

K. **TPO Low VOC Primer::** A solvent-based, low solids primer used to prepare the surface of Sure-Weld Membrane prior to application of Pressure-Sensitive Coverstrip and TPO Pressure-Sensitive RUSS. This low VOC product is ideal for use in states where environmental issues are a concern.

(choose the appropriate Primer and delete remainder)

L. **CCW 702 or CCW 702-LV**: A single component, solvent based, high-tack primer used to provide maximum adhesion between Carlisle 725TR Air and Vapor Barrier and an approved substrate. Applied by spray or long nap roller with a coverage rating ranging from approximately 300 to 350 square feet per gallon on smooth finishes (i.e., concrete) to 75 square feet per gallon on porous surfaces (i.e., Dens-Deck Prime gypsum board). Available in 5-gallon containers. CCW 702LV Primer contains less than 250g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

M. **Carlisle CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: bonding Sure-Weld membrane to various surfaces, enhancing the bond between Carlisle's VapAir Seal 725TR and various substrates, priming unexposed asphalt prior to applying Flexible FAST Adhesive and for adhering Sure-Weld/Sure-Flex FleeceBACK and Sure-Weld TPO membrane to vertical walls. Coverage rate is approximately 2,000-2,500 sq. ft. per #40 cylinder and 4,000-5,000 sq. ft. per #85 cylinder as a primer, in a single-sided application and 750 sq. ft. per #40 cylinder and 1,500 sq. ft. per #85 cylinder as an adhesive for vertical walls, in a double-sided application.

2.05 FASTENERS AND PLATES

To be used for mechanical attachment of insulation and to provide additional membrane securement: delete the fastener and fastening plate types which will not be used

A. **HP-X Fasteners**: A heavy duty #15 threaded fastener with a #3 phillips drive used for membranre or insulation securement into steel, wood plank or minimum 15/32 inch thick plywood.

B. **HD 14-10 Concrete Fasteners:** A #14 threaded fastener with a #3 Philips drive used for minimum 3,000 psi concrete decks.

C. **HP Term Bar Nail-Ins**: A 1-1/4" long expansion anchor with a zinc plated steel drive pin used for fastening the Carlisle Termination Bar or Seam Fastening Plates to concrete, brick, or block walls.

D. **RhinoBond or Isoweld TPO Welding Plate:** A 3" diameter, 0.028" thick, corrosion-resistant steel plate with high solids coating on the top surface. The plate is secured with Carlise's HP-X Fastener or Purlin Fastener and the membrane is welded to the top surface using the RhinoBond or Isoweld Induction Welding Tool.

E. **Sure-Weld Pressure-Sensitive RUSS™** (Reinforced Universal Securement Strip): a 6" wide, nominal 45-mil thick reinforced TPO membrane with 3" wide Pressure Sensetive Tape laminated along one edge. The 6" wide Pressure-Sensitive RUSS is used horizontally at the base of walls, curbs, etc., in conjunction with 2" diameter Seam Fastening Plates below the TPO deck membrane for additional membrane securement.

1. **6" wide Pressure-Sensitive RUSS** is used horizontally or vertically at the base of walls, curbs, etc., in conjunction with PiranhaFastening Plates below the TPO deck membrane for additional membrane securement.

2.06 METAL EDGING AND MEMBRANE TERMINATIONS

(Choose the appropriate type of metal edging or membrane termination and delete the types which will not be used)

A. **General:** All metal edging s shall be tested and meet ANSI/SPRI ES-1 standards and comply with International Building Code.

(The products below have been grouped by suppliers and performance priority, as well as their code ratings. Make your selection and delete remainder.)

B. (Drexel Metal Supplied -Remove name after selection)

1. **SecurEdge 400:** a coping or fascia, snap-on edge system consisting of a 22 gauge galvanized metal water dam and .040" thick aluminum, Kynar 500 finish or 24 gauge steel, Kynar 500 finish. Metal fascia color shall be as designated by the Owner's Representative. ANSI/SPRI ES-1 Certified.

2. **SecurEdge 4000:** a metal fascia system with a 20 gauge steel retainer bar and .040" thick aluminum, Kynar 500 or 24 gauge steel, Kynar 500 finish fascia. Metal fascia color shall be as designated by the Owner's Representative. ANSI/SPRI ES-1 Certified.

C. (OMG Supplied -Remove name after selection)

1. **SecurEdge 300:** a coping or fascia, snap-on edge system consisting of a 24 gauge galvanized metal water dam and .050" or .063" thick Kynar 500, clear and colored anodized finish or 24 gauge steel, Kynar 500 finish. Metal fascia color shall be as designated by the Owner's Representative. ANSI/SPRI ES-1 Certified. Coping FM Approved 1-90 with 20 ga. Cleat, 1-180 with 16 ga. Cleat. Fascia FM Approved 1-225.

2. **SecurEdge 3000:** a metal fascia system with a 20 gauge steel retainer bar and .032", .040" or .050" thick aluminum or 24 gauge galvanized steel fascia. Metal fascia color shall be as designated by the Owner's Representative. ANSI/SPRI ES-1 Certified. 3000 Coping FM Approved 1-465 with .050 aluminum retainer, 1-180 with 20 ga. Steel retainer. 3000 XT Coping FM Approved 1-315.

D. (Metal Era Supplied – Remove name after selection)

1. **SecurEdge 200:** a coping or fascia, snap-on edge system consisting of a 24 gauge galvanized metal

water dam and .040", .050" or .063" thick Kynar 500, clear and colored anodized finish or 24 gauge steel, Kynar 500 finish. Metal fascia color shall be as designated by the Owner's Representative. ANSI/SPRI ES-1 Certified. Coping FM Approved 1-90. Fascia FM Approved 1-195.

2. **SecurEdge 2000**: a metal fascia system with an extruded aluminum anchor bar and .040" thick aluminum or 24 gauge galvanized steel fascia. Metal fascia color shall be as designated by the Owner's Representative. ANSI/SPRI ES-1 Certified. 2000 Fascia FM Approved 1-645. 2000 Extended Fascia FM Approved 1-270. 2000 Canted Fascia FM Approved 1-270.

E. (Metal Era Supplied – Remove name after selction)(NO FM Rating Available)

1. **SecurEdge One Fascia:** A snap-on edge system consisting of a 20 gauge retainer bar, corrosion resistant fasteners and a 24 gauge or 0.040 aluminum Kynar finished fascia cover. A spring clip holds the fascia cover in place. Available in sizes up to 8" fascia height 12' long. Metal fascia color shall be designated by the Owner's Representative. ANSI/SPRI ES-1 Certified.

2. **SecurEdge One Coping:** A snap-on coping edge system consisting of a 24 gauge retainer bar (face side only), corrosion resistant fasteners and a 24 gauge or 0.040 aluminum Kynar finished coping cover. The coping cover is secured by clipping on the retainer bar and fastened on the backside with corrosion resistant fasteners (with rubber washer). Available for wall thicknesses up to 30". Metal coping cap color shall be as designated by the Owner's Representative. ANSI/SPRI ES-1 Certified.

F. **Drip Edge**: a metal fascia/edge system with a 22 or 24 gauge continuous anchor cleat and .032 inch thick aluminum or 24 gauge steel fascia. Metal fascia color shall be as designated by the Owner's Representative.

G. **SecurEdge Coping**: incorporates a 20 gauge anchor cleat with 4 pre-slotted holes, a concealed joint cover and 10 foot continuous sections of coping cap; can accommodate minimum 5 " wide parapet walls. Metal coping cap color shall be as designated by the Owner's Representative.

H. **Termination Bar**: a 1" wide and .098" thick extruded aluminum bar pre-punched 6" on center; incorporates a sealant ledge to support Lap Sealant and provide increased stability for membrane terminations.

I. **SecurEdge Term Bar Fascia:** A 1.75" wide formed aluminum termination bar with pre-slotted fastening holes for ease of locating and installing. The decorative cover is available in 0.040" aluminum or 24-gauge galvanized steel. SecurEdge Term Bar Fascia is manufactured in 12' lengths for fewer joints/seams, fewer sections to handle and faster installation.

2.07 WALKWAYS

Protective surfacing for roof traffic shall be Sure-Weld TPO Walkway Rolls installed per manufacturer's requirements or concrete pavers loose laid over an approved slip sheet (pavers not recommended for slopes greater than 2" in 12").

2.08 OTHER PRODUCTS / TOOLS

A. **RhinoBond or Isoweld Portable Induction Welding Tool**: An induction heating tool is used to emit the magnetic field that activates the high solid coating on the top surface of the RhinoBond or Isoweld Welding Plate to fuse with the roofing membrane.

B. **Magnet**: A stand-up device that allows the weld to cool as it holds the membrane to the heated plate.

C. **Carlisle 725TR Air & Vapor Barrier / Temporary Roof:** 725TR is a 40-mil composite consisting of 35-mils of self-adhering rubberized asphalt factory laminated to a 5-mil polyethylene film with an adhesion textured surface. 725TR roll dimensions are 39" x 100' and the product is applied after priming an acceptable substrate with CCW 702, 702-LV, Cav-Grip III primer.

D. **Carlisle VapAir Seal MD Air and Vapor Barrier:** a reinforced composite aluminum foil with self-adhesive SBS backing and removable poly release film. Used for direct application over metal decks. Available in rolls 42.5" wide by 131.23" long (460 square feet).

E. Metal Flashing, if required, and miscellaneous items needed to fulfill the project requirements

PART 3 EXECUTION

3.01 GENERAL

A. Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, jobsite considerations and weather restrictions.

B. Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.

3.02 VAPOR RETARDERS

A. **General:**

The use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly should be investigated, especially on projects with high interior humidity, such as, swimming pools, breweries, pulp mills, etc.

B. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

C. On cold storage/freezer facilities, the perimeter details must be selected to provide an air seal and prevent outside air from infiltrating and condensing within the roofing assembly.

D. Consult the latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association) for specific information.

E. If insulation is to be adhered to the vapor retarder with Flexible FAST Adhesive, the 725TR vapor retarder must be compatible and shall be fully adhered to the substrate. Available products include Carlisle supplied “peel and stick” rubberized asphalt membrane with compatible film coating (Carlisle VapAir Seal 725TR Air and Vapor Barrier), and spray or roller applied butyl coatings. Installation requirements for Carlisle’s VapAir Seal 725TR Air and Vapor Barrier are identified in Carlisle published specification.

F. **VapAir Seal 725TR Installation:**

1. **Surface Preparation**: Concrete shall be in place for 7 days minimum and the substrate must be dry. The surface shall have a smooth finish and be free of voids, spalled areas, sharp protrusions, loose aggregate, latence and form release agents. In the event of rain, concrete must be allowed to dry before primer is applied.

2. **Primer**: Surfaces to receive Carlisle VapAir Seal 725TR Air and Vapor Barrier must be clean and dry. Prime with CCW 702 or 702LV or Cav-Grip III Primer. Apply Primer by spray, brush or with a long nap roller at the applicable coverage rate noted above. At 75° F allow primer to dry 1 hour minimum. Primer has a satisfactory cure when it will not transfer when touched. Prime only areas to be waterproofed the same day. Re-prime if area becomes dirty.

3. **Application**: Apply Carlisle VapAir Seal 725TR Air and Vapor Barrier from low to high point, in a shingle fashion, so that laps will shed water. Overlap all edges at lease 2-1/2". End laps shall be staggered. Place membrane carefully so as to avoid wrinkles and fishmouths. Immediately after installation, roll with a 30” wide, 150 pound weighted segmented steel roller.

4. **Insulation Installation:** Ensure surface of Carlisle VapAir Seal 725TR Air and Vapor Barrier is dry prior to installing insulation. Place insulation over the surface and mechanically fasten to the roof

deck or adhere to the vapor barrier with Flexible FAST Adhesive in accordance with this Carlisle Specification.

G. For metal decks, VapAir Seal MD Air and Vapor Barrier is specifically designed for direct application to fluted steel decks. It may also be used in conjunction with either Carlisle's CAV-GRIP III on vertical wall surfaces, such as structural concrete, gypsum, Securock, DensDeck Prime and plywood substrates.

H. **VapAir Seal MD Installation:**

1. **Surface Preparation**: The surface shall have a smooth finish and be free of voids, spalled areas, sharp protrusions, loose aggregate, laitance and form release agents. In the event of rain, concrete must be allowed to dry before primer is applied.

2. **Primer**: Surfaces to receive VapAir Seal MD Air and Vapor Barrier must be clean and dry. Prime with CCW 702 or 702LV or Cav-Grip III Primer. Apply Primer by spray, brush or with a long nap roller at the applicable coverage rate noted above. At 75° F allow primer to dry 1 hour minimum. Primer has a satisfactory cure when it will not transfer when touched. Prime only areas to be waterproofed the same day. Re-prime if area becomes dirty.

3. **Application**: Apply VapAir Seal MD Air and Vapor Barrier to the metal deck from low to high point, in a shingle fashion, so that laps will shed water. Overlap all edges at lease 2-1/2". End laps shall be staggered. Place either a 6" wide section of 24 gauge sheet metal or a 6" wide section of VapAir Seal MD directly on the metal under each end lap, perpendicular to the end lap, to ensure a solid surface to roll the end lap together. Seams and end laps must be rolled with a 2" seam roller or stand-up seam roller. Place membrane carefully so as to avoid wrinkles and fish mouths. Immediately after installation, broom the sheet to ensure proper contact to the metal.

Insulation Installation: Ensure surface of VapAir Seal MD Air and Vapor Barrier is dry prior to installing insulation. Place insulation over the surface and mechanically fasten to the roof deck accordance with this Carlisle Specification.

3.03 INSULATION PLACEMENT AND ATTACHMENT

A. Install insulation or membrane underlayment over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch. Stagger joints both horizontally and vertically if multiple layers are provided.

B. Secure insulation to the substrate with the required Carlisle fasteners and RhinoBond or Isoweld TPO Welding Plate in accordance with manufacturers specifications.

Note: Depending on building code, wind loads, or air / vapor design criteria, additional insulation attachment may be required and clarified by membrane manufacture.

3.04 RHINOBOND or ISOWELD INDUCTION TOOL CALIBRATION

Prior to proceeding with membrane attachment to the plate, the RhinoBond or Isoweld Induction Tool must be calibrated. Follow calibration process as published by manufacture with the specified insulation thickness and type and specified membrane thickness.

3.05 MEMBRANE PLACEMENT AND INDUCTION WELDING

A. After placement of insulation on substrate, secure the insulation at a rate of six HP-X Fasteners and RhinoBond or Isoweld Plates per 4' x 8' board in the designated field and eight HP-X Fasteners and RhinoBond or Isoweld Plates around the perimeter. Refer to appropriate Carlisle detail for patterns and depth of perimeter area.

Note: Avoiding fastener overdrive to prevent plate from deforming.

B. Place Sure-Weld membrane over the appropriate RhinoBond or Isoweld Plates and allow membrane to relax.

C. Place RhinoBond Induction Tool over the RhinoBond TPO Welding Plate, under the roofing membrane.

OR

Place the Isowled Induction Tool over the Isoweld TPO Welding Plate, until the acoustic search mode signals the inductor is properly positioned.

D. Activate induction welding tool and leave in place until heating cycle is complete.

E. Immediately place Magnet on the membrane over the plate and leave in place for at least 60 seconds.

F. Resume process ensuring membrane is attached to all plates.

Note: Additional securement must be provided at the perimeter of each roof level, roof section, expansion joint, curb flashing, skylight, interior wall, penthouse, etc., at any inside angle change where slope exceeds 2" in one horizontal foot, and at other penetrations in accordance with membrane manufacture's published details.

3.06 MEMBRANE HOT AIR WELDING PROCEDURES

(**Note:** When specifying TPO with APEEL Protective Film keep statement below.)

A. APEEL Protective Film should be removed from within areas that are to be heat-welded together. In areas that do not require heat welding, the APEEL Protective Film can be left in place for up to 90 days.

B. Hot air weld the Sure-Weld membrane using an Automatic Hot Air Welding Machine or Hot Air Hand Welder in accordance with the manufacturer's specifications. At all splice intersections, roll the seam with a silicone roller immediately after welder crossed the membrane step-off to ensure a continuous hot air welded seam.

Note: When using 60-mil thick or thicker membrane, all splice intersections shall be overlaid with Sure-Weld non-reinforced flashing or TPO T-Joint covers.

B. Probe all seams once the hot air welds have thoroughly cooled (approximately 30 minutes).

C. Repair all seam deficiencies the same day they are discovered.

D. Apply Cut Edge Sealant on all cut edges of reinforced membrane (where the scrim reinforcement is exposed) after seam probing is complete. Cut edge sealant is not required on vertical splices.

3.07 FLASHING

A. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using Sure-Weld reinforced membrane. Sure-Weld non-reinforced membrane can be used for flashing pipe penetrations, Sealant Pockets, scuppers, as well as inside and outside corners when the use of pre-fabricated accessories is not feasible.

B. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

C. When APEEL Protective Film is utilized on TPO, remove and discard the APEEL Protective Film after the installation of the entire TPO Roofing System is complete.

3.08 WALKWAYS

A. Install walkways at all traffic concentration points (such as roof hatches, access doors, rooftop ladders, etc.) and all locations as identified on the specifier's drawing.

B. Hot air weld walkway material to the membrane or install concrete pavers, loose laid over an approved protection sheet in accordance with the manufacturer's specifications.

Note: Pavers are not recommended when the roof slope exceeds 2" in 12"

3.09 DAILY SEAL

A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.

B. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

3.10 CLEAN UP

A. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.

B. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

END OF SPECIFICATION