VERSIWELDä ROOFING SYSTEM
Part II
Installation

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Versiweld™ Roofing System
Part II
Installation

FOR VERSICO AUTHORIZED ROOFING CONTRACTORS

The information contained herein is to serve as criteria for Versico Authorized Roofing Contractors regarding the application of the Versiweld Roofing Systems. Information pertaining to the installation of an adhered assembly is identified in "Attachment III" at the end of this section.

Versico Authorized Roofing Contractors are advised to fully familiarize themselves with the General Design and Planning, Part I, prior to performing the roofing installation. The Authorized Contractor, when assuming the role of the specifier, must comply with the requirements in Part I, General Design and Planning.

PRIOR TO THE INSTALLATION OF THIS ROOFING SYSTEM, REFER TO VERSICO'S MATERIAL SAFETY DATA SHEETS FOR SPECIFIC CAUTIONS AND WARNINGS REGARDING VERSICO PRODUCTS.

A. SUBMITTALS/WARRANTY PREREQUISITES

1. To ensure compliance with Versico's minimum warranty requirements, the following projects should be forwarded to Versico for review prior to installation, preferably prior to bid:

    a. Total System Warranty projects where a wind speed warranty coverage greater than 55 mph is specified.

    b. Projects specified with a fastener length exceeding 12 inches.

    c. Air pressurized buildings, canopies and buildings with large openings where the total wall openings exceed 10% of the total wall area on which the openings are located (such as airport hangars, warehouses and large maintenance facilities).

    d. Cold storage buildings and freezer facilities.

    e. Projects where the Versiweld membrane is expected to come in direct contact with petroleum based products or other chemicals.

2. Along with the project submittals (shop drawings and Copy A), the roofing contractor must include pullout tests when:

    a. The HPVX Fastener is used through a lightweight insulating concrete substrate into a steel deck lighter that 22 gauge.

    b. The HPVX Fastener is used in conjunction with plywood decks less than 5/8 inch thick.

    c. The HPVX Fastener is used in conjunction with oriented strand board (OSB) decks.

d. The NTB-1 and Lite Deck Fastener is used in conjunction with cementitious wood fiber and gypsum decks.

3. Shop drawings must be submitted to Versico by the Versico Authorized Roofing Contractor along with a completely executed Job Approval Request form (Copy A) for approval. Approved shop drawings are required for inspection of the roof and on projects where on-site technical assistance is requested.

   Shop drawings must include:

   a. Outline of roof and size
   b. Deck type (for multiple deck types)
   c. Location and type of **all** penetrations
   d. Perimeter and penetration details
   e. Key plan (for multiple roof areas) with roof heights indicated

   When field conditions necessitate modifications to the originally approved shop drawings, a copy of the shop drawing outlining all modifications must be submitted to Versico for revision and approval prior to inspection and warranty issuance.

4. Copy B (Page 2 of the Versico Job Approval Request form)

   After project completion, a Copy B must be submitted to Versico to schedule the necessary inspection of the project prior to issuance of the Versico Warranty.

5. **As-Built Projects** (roofing systems installed prior to project approval by Versico)

   Excluding projects identified in Paragraph A.1, the Versico Authorized Contractor may supply Versico with an As-Built drawing for a project completed prior to Versico's approval. The As-Built drawings:

   a. Must conform to Versico's most current published specifications and details applicable at the time of bid.

   b. Must be submitted along with a completely executed Copy B.

   b. Must include the items identified in Paragraph A.3 above.

B. GENERAL JOB SITE CONSIDERATIONS

Material Safety Data Sheets (MSDS) must be on location at all times during the transportation, storage and installation of materials. The contractor shall follow all safety regulations as recommended by OSHA and other agencies having jurisdiction.

1. Subject to project conditions, it is recommended to begin the application of this roofing system at the highest point of the project area and work to the lowest point to prevent water infiltration. This will include completion of all flashings, terminations and daily seals.

2. On phased roofing, temporary closures should be provided to prevent moisture infiltration.

3. When possible on multiple level roofs, begin the installation on the highest level to avoid or minimize construction traffic on completed roof sections.

4. For **existing standing seam, flat seam or corrugated metal roofs,** this roofing system can be installed. For specific installation requirements, refer to the PE Roofing System Specifications, published separately.

C. JOB SITE MATERIAL STORAGE AND HANDLING

1. Deliver materials to the job site in the original, unopened containers.

2. When loading materials onto the roof, the Versico Authorized Roofing Contractor must comply with the requirements of the specifier/owner to prevent overloading and possible disturbance to the building structure.

3. Job site storage temperatures in excess of 90° F may affect shelf life of curable materials (i.e., adhesives and sealants).

4. **When the temperature is expected to fall below 40° F**, outside storage boxes should be provided on the roof for temporary storage of liquid adhesives and sealants. Adhesive and sealant containers should be rotated to maintain their temperature above 40° F.

5. Do not store adhesive containers with opened lids due to the loss of solvent that will occur from flash-off.

6. Store Versiweld membrane in the original undisturbed plastic wrap in a cool, shaded area and cover with light-colored, breathable tarpaulins. Versiweld membrane exposed to the elements for approximately 7 days must be prepared with Versiweld Weathered Membrane Cleaner prior to hot air welding. Refer to Paragraph I.2.b, Exposed Membrane Seam Preparation, for requirements.

7. Insulation and underlayment must be stored so that it is kept dry and is protected from the elements. Store insulation on a skid and completely cover with a breathable material such as tarp or canvas. If the insulation is lightweight, it should be weighted to prevent possible wind damage.

D. SUBSTRATE PREPARATION

Defects in the substrate surface must be reported and documented to the specifier, general contractor and the building owner for assessment. The Versico Authorized Roofing Contractor shall not proceed with the installation unless the defects are corrected.

1. **On retrofit - recover projects**, cut and remove wet insulation, as identified by the specifier, and fill all voids created by such removal with new insulation so that it is relatively flush (+/- 1/4 inch) with the existing surface.

    a. **For existing PVC membranes**, if the membrane is not removed, it must be cut into

maximum 10' X 10' sections. All PVC flashings at the perimeter, roof drains and roof penetrations must be removed.

b. When installing the roofing system over an **existing gravel surfaced built-up roof, loose gravel must be removed**. Power brooming is recommended by Versico to remove the loose gravel, which may trap moisture. Any uneven areas of the substrate must be leveled to prevent insulation from bridging.

2. **For all projects** (new or retrofit), the substrate must be relatively even without noticeable high spots or depressions and accumulated water, ice or snow must be removed to prevent the absorption of moisture into the new roofing components and roofing system.

3. Prior to the placement of membrane underlayment, clear the substrate of debris and foreign material that may be harmful to the roofing system.

E. VAPOR RETARDER INSTALLATION

Follow the respective manufacturer's recommended installation procedures and the specifier's instructions for the installation of the product specified.

F. INSTALLATION OF WOOD NAILERS

1. Install wood nailers in those locations that have been designated by the specifier and as approved by Versico.

2. The wood nailer must be installed so the top of the wood nailer is relatively flush (+/- 1/4 inch) with the top surface of the insulation/underlayment and the width of the wood nailer exceeds the width of the metal flange (where applicable at edgings, scuppers, insulated collars, etc.) as shown on the appropriate Versico detail.

3. Follow the specifier's guidelines for securement of wood nailers.

G. INSULATION PLACEMENT AND ATTACHMENT

1. Do not install more insulation/underlayment than can be covered by membrane in the same day.

2. All insulation boards must be butted together with no gaps greater than 1/4 inch. Gaps greater than 1/4 inch is not acceptable.

3. When multiple layers of insulation are specified, staggering of joints between layers is recommended.

4. Versico **Insulation** must be mechanically attached to the roof deck with Versico Fasteners and Seam Fastening Plates or Insulation Plates. Refer to VWC-27 Details for fastening density requirements.

5. When gypsum board is specified as the membrane underlayment to meet certain fire ratings, it must be fastened at the same rate as Recovery Board. Refer to Detail VWC-27A.

6. **Insulations by others** must be mechanically attached to the roof deck in accordance with the insulation manufacturer's recommendations. Insulations shall be attached with no less than **1 insulation fastener and plate per every 4 square feet unless otherwise specified by the manufacturer.** If a lesser fastening density is specified, the respective manufacturer must verify in writing their recommendations concerning fastening density requirements and acceptable fasteners.

H. MEMBRANE PLACEMENT AND ATTACHMENT

1. **Ensure** that water does not flow beneath any completed sections of the membrane system by completing all flashings, terminations and daily seals by the end of each workday.

2. **Sweep** all loose debris from the substrate.

3. The type of Versico Fastener and Fastening Plate used for membrane attachment is dependent on the deck type. Refer to Attachment I, Membrane Attachment Criteria, at the end of this section for specific fastener and plate requirements.

4. The number of perimeter sheets, their fastening density and field membrane attachment requirements, must comply with the membrane fastening chart included on "Attachment I" at the end of this section.

   Note: If Factory Mutual approvals are specified, refer to Versico's Versiweld Code Approval Guide for membrane attachment requirements.

5. **Position** Versiweld perimeter membrane sheets along perimeter of the roof over the acceptable insulation/underlayment. When using 10-foot wide field sheets, 5-foot wide perimeter sheets shall be used. When 8-foot wide field sheets are to be utilized, perimeter sheets shall be 4 foot wide. The roof perimeter is defined as all edges of each roof section.

   Where multi-level roofs meet at a common wall, the adjacent edge of the upper roof is treated as a roof perimeter if the difference in height is greater than 3 feet (perimeter sheets are not required at the base of the wall at the lower level). Refer to Detail VWMA-2 at the end of this section for further information.

   Note: Expansion joints, control joints, and fire walls in the field of the roof or roof ridges with slopes less than 3 inches to the horizontal foot shall not be considered as part of the roof perimeter.

6. **Secure the membrane** at the approved fastening density with the required Versico Fastener and Fastening Plates.

7. **Position** adjoining field membrane sheets (10 or 8 feet wide) to allow an approximate overlap of 5-1/2 to 6 inches at those locations where Fastening Plates are located (along the length of the membrane); at the same time overlap end roll sections (the width of the membrane) a minimum of 2 inches.

8. For installation of membrane with fullness, tighten the sheet between fasteners as follows:

a. Unroll sheets and position.

b. Place a fastener and plate in one end of the sheet on the appropriate fastener mark. Go to the opposite end of the sheet, pull it tight and place a fastener and plate at the appropriate mark. Place the remaining fasteners into the sheet.

c. Proceed to weld the sheet in place and continue across the roof.

9. Prevention of membrane distortion during windy conditions:

a. Unroll sheet approximately 5 feet and position edge of membrane with overlap line on adjacent sheet.

b. Install fasteners along the 5-foot exposed edge.

c. While the 5 feet of exposed membrane is being fastened, begin welding the overlapped edge using the Automatic Hot Air Welder.

d. As sheet is being welded and fastened concurrently, unroll membrane. Unroll only enough membrane to stay a few feet ahead of the welding and fastening process. This reduces the amount of unsecured membrane to be distorted by the wind.

e. Continue this process for each adjoining sheet.

I. HOT AIR WELDING PROCEDURES

1. General

a. Hot air welds the Versiweld membrane sheets using the Automatic Hot Air Welding Machine or Hot Air Hand Welder and silicone roller. For description of **heat welding equipment** and generator/electrical requirements, **refer to "Attachment II"** at the end of this section.

b. It is recommended that membrane sheets be installed in-groups of 3 in order to routinely examine the hot air welded seams as work progresses across the roof deck during each day.

c. When roof slope exceeds 5 inches per horizontal foot, use of the Automatic Hot Air Welding Machine may become more difficult; use of the Hand Held Hot Air Welder is recommended.

2. **Check the surfaces** of the Versiweld membrane to be hot air welded to ensure they are properly prepared as outlined below:

a. **Membrane Cleaning** - The surfaces to be hot air welded must be clean. Membrane overlaps which become contaminated with field dirt must be cleaned with warm soapy (non-abrasive soap) water, rinsed with clean water and wiped on with a clean natural fiber rag.

Versiweld Weathered Membrane Cleaner can also be used for cleaning membrane surfaces. Versiweld Weathered Membrane Cleaner should be wiped dry with a clean natural fiber rag prior to welding. No residual dirt or contaminants should be evident.

b. **Exposed Membrane Seam Preparation** - Surface oxidation of Versiweld membrane will occur upon exposure to heat and sunlight. **After approximately 7 days exposure** to the elements, membrane must be cleaned with Versiweld Weathered Membrane Cleaner prior to hot air welding as follows:

1) Apply Versiweld Weathered Membrane Cleaner to the surface of the membrane which has been exposed using a clean natural fiber rag and wipe along the direction of the seam.

Natural fiber rags must be white to prevent fabric dye from discoloring the membrane.

Prior to hot air welding, wipe the surface where Versiweld Weathered Membrane Cleaner has been applied with a clean, dry white rag to remove cleaner residue.

2) Versiweld Weathered Membrane Cleaner will achieve approximately 600 linear feet (one surface) of coverage per gallon for a standard hot air welded seam area.

c. The membrane can typically be repaired up to 6 months to a year with the standard cleaning method referenced above. In cases where the standard cleaning method is not sufficient, additional scrubbing and cleaning will be required. Refer to Paragraph J.2.

3. **Operating Automatic Hot Air Welding Machine**

a. Temperature Settings

When making a Versiweld seam, no one temperature setting or speed can be used to describe the temperature setting or speed to set the robot. The seam must be tested to determine the quality of the seam.

Consult the respective heat welding machine manufacturer for recommendations concerning proper temperature setting and speed control of their equipment.

Typically, the colder the ambient temperature (and likewise the membrane temperature) the slower the Automatic Hot Air Welding Machine speed control must be adjusted to produce proper seams.

As a general guide, Versiweld membrane will weld at a lower temperature (1000° F) and faster speed (10 feet to 15 feet per minute) than most other heat welded membrane materials.

With the Leister Varimat Automatic Welder, the suggested heat setting is 1000° F at 10 to 13 feet (3 to 4 m) per minute. With any other brand of robot welder, the

temperature should be set at the manufacturer's recommended temperature to obtain the correct seam results.

The following is a list of items to be checked to determine the temperature setting and the speed at which a seam should be completed:

1) Early morning welder speed settings should be set slower than midday heat welder speeds due to typically colder temperatures in the morning.

2) As the membrane surface temperature increases, the welder speed may also be increased.

3) When the membrane is in direct sunlight, the temperature or robot speed may have to be adjusted when moving into a shaded area, check the seam results.

   Remember the membrane surface in a shaded area will be cooler than a membrane surface that is in sunlight.

   Darker colored membrane (such as gray) will be warmer than white and will affect the welder speed.

4) Dampness on the membrane from dew, a passing rain shower or misting condition will reduce heat from the seam due to evaporating moisture from the membrane surface. The heat welding temperature (increased) or the robot speed (slower) will have to be adjusted to produce a good seam. Water must be wiped from the welding surface prior to welding the seam.

5) Wind has a cooling affect as it blows over the surface. It will also affect the airflow in the seam reducing the effectiveness of the hot air gun. This will require the operator to increase heat from the hot air gun or reduce the welder speed.

6) Substrates make a big difference in the amount of heat required to produce a proper heat welded seam. The robot will have to be adjusted accordingly:

   Plywood and Concrete act as heat sinks and will take a higher temperature or slower speed setting than insulation.

   Cool damp substrates will take a higher temperature or slower speed setting than dry substrates.

7) Membrane "bleed-out" from between sheets will not occur with Versiweld membrane if properly welded. If bleed-out is occurring (the dark underside of the membrane begins to melt and flow), the welder speed should be increased to reduce welding temperature.

b. **Equipment Set-Up**

Equipment set up is the responsibility of the Authorized Contractor. When poor welding is occurring check the following:

1) If the membrane is overheated on one side or the other, check the nozzle to be sure it is distributing the heat evenly between the two sheets.

2) If the heat is bypassing the edge of the sheet producing a cold weld along the edge of the seam, be sure the nozzle is completely under the sheet and the air dam is in place and functional.

3) If the probed seam is tight at the edge but a cold weld is present in the center of the seam (the heat is melting the edges but does not melt the center of the seam), check to be sure that the robot is not running too fast.

4) Ensure the silicone pressure wheel is intact with no voids in the silicone. If voids are present, incomplete welding will result.

5) Be sure all wheels on the air dam are not binding. Binding wheels will cause sheet movement and distortion during the welding process.

6) The Automatic Heat Welder nozzle should be adjusted as close to the pressure wheel as possible. If the nozzle is too far away from the pressure wheel, distortion of the membrane may occur due to heat expansion.

7) Overheating the membrane will cause poor welds. It is recommended that the automatic welder be run not less than 10 feet (3 m) a minute on average temperature days. Only on very cold days would the welder be run below this speed. The temperature and welder speeds must be determined based on test welds prior to actual sheet welding.

8) Clean screen of dirt and debris on air inlet of heat gun every day. Accumulation of contaminants on screen will reduce airflow and heat output of welder.

c. **Membrane Welding**

1) Prepare the Automatic Hot Air Welding Machine and allow it to warm for approximately 5 to 10 minutes to reach operating temperature.

2) Position the Automatic Hot Air Welding Machine properly prior to seaming with the guide handle pointing in the same direction the machine will move along the seam.

3) Lift the overlapping membrane sheet and insert the blower nozzle of the Automatic Hot Air Welding Machine between the overlap. Immediately begin moving the machine along the seam to prevent burning the membrane.

4) Proceed along the seam ensuring that the small guide wheel in front of the machine aligns with the edge of the top membrane sheet. Guide the machine

from the front only.

CAUTION: Ensure the power cord has plenty of slack to prevent dragging the machine off course (which could result from a tightly stretched cord).

5) At all seam intersections; roll the seam with a silicone roller to ensure a continuous hot air welded seam (the membrane should be creased into any membrane step-off with the edge of the silicone roller). A false weld may result due to surface irregularities created by multiple thicknesses of Versiweld membrane sheets.

Note: When using .060 inch (1.5 mm) thick Versiweld Membrane, a "T" Patch of Versiweld Unsupported Flashing must be applied over all seam intersections, refer to Detail VW-2D.

6) To remove the Automatic Hot Air Welding Machine from the finished seam, stop the movement of the machine and immediately remove the nozzle from the seam area.

7) Mark the end of the hot air welded seam with a water-soluble marker for easy identification (center of compression wheel). A Hand Held Welder will be necessary to complete the weld in the area between where the Automatic Hot Air Welding Machine is stopped and restarted.

8) **Perform a test cut** at least at the start of work each morning and afternoon. Test cuts should be taken if any changes in substrate or weather conditions occur.

9) **Recommendation to Prevent Membrane Creeping and Movement**

a) The operator of the robot must apply foot pressure to the membrane, kicking and sliding the membrane under the robot to keep the membrane tight. Always have the operator stand on the unfastened sheet of membrane to prevent sheet movement.

b) Do not release foot pressure from the membrane until the pressure wheel rolls over the membrane in front of the foot that is holding the membrane in place.

c) **Use of Welding Tracks**

Set welding tracks lengthwise along the seam, close to the robot air dam wheels to reduce membrane movement caused by the robot welding process. The operator must continue to apply foot pressure to the welding tracks to help hold the membrane seam in place. Welding tracks are moved as welder progresses along seam.

Welding tracks can be:

- Sheet metal, 22 gauge – 12" wide by 10' long (with rounded

corners).
- Aluminum or steel plates – 1/4" x 3", 4' to 6' long (with rounded corners).
- Flat tubing filled with sand – 4' to 6' long.
- Wood planks – 2" x 12" X 4' to 6' long.
- Heavy plywood – 3/4" x 24" x 8' long.

d. Test Cuts

1) Perform a test cut at least at the start of work each morning and afternoon along the first seam to be hot air welded.

2) The test cut should be approximately 1 inch wide and longer than the width of the seam (cut across the hot air welded seam).

3) Peel the test sample apart after it has thoroughly cooled (approximately 30 minutes) and examine for a consistent 1-1/2 inch wide minimum weld. Delamination of the membrane from the scrim-reinforcement is an indication of a properly welded seam.

4) Repair the test seam area by using an overlay of Versiweld reinforced membrane (with rounded corners) and hand weld around the entire repair area. Identify the following seam problems to assure seam quality:

Discolored or melted membrane – Increase speed or decrease temperature setting if membrane discolors or exhibits melting (membrane begins to flow).

Voids and wrinkles - A proper hot air welded seam has no voids or wrinkles and must be at least 1-1/2 inches (4 cm) wide. Refer to Seam Probing procedures outlined below for proper inspection of seam deficiencies.

4. Hand Held Welder Settings

a. Temperature setting for hand held welders when used for flashing should be approximately "6" (on a scale from 1 to 10).

b. Temperature settings for hand held welders when used for membrane should be approximately "8" (on a scale from 1 to 10).

c. Exact settings will vary based on ambient temperatures, substrate and type of welder.

d. Silicone roller should always be placed flat against membrane to be welded. **Do not turn roller on edge to weld membrane or flashings.**

5. Seam Probing

A cotter pin puller is recommended to be used to probe all hot air welded seams. Probing seams must be done once hot air welds have thoroughly cooled. Hot air welded seams must

be probed throughout the day to check seam quality and to make proper adjustments to hot air welding equipment. **The repair of deficiencies must be done routinely throughout the day but no later than the end of each workday.**

a. Allow hot air welded seams to cool thoroughly for approximately 30 minutes. Premature probing can damage warm seams.

b. Draw the probing tool tip along the edge of the hot air welded seam. Apply firm pressure to probe the seam junction, but not into the bottom membrane sheet. The tool will not penetrate into the lap area of a properly welded seam.

c. If the seam-probing tool penetrates into the lap area, mark the seam using a water-soluble marker at the beginning and the end of voids or wrinkles in the seam edge.

d. Repair seam deficiencies as soon as possible using the hand held welder. Versico recommends that repairs be made the same day they are discovered.

e. Probe **repaired seams** after they have cooled completely. If the repair is acceptable, wipe off the water soluble marker lines; if not acceptable, repair the seam using the procedures for repair of hot air welded seams as outlined in Repair Procedures for Aged Versiweld Membrane.

Note: All laps must be probed each day soon after they have cooled to verify the welder set-up is effective. Particular attention must be given to all membrane intersections and hot air welded seams at insulation joints. In addition, there should be periodic checks (including at the start of each day) to verify good peel strength.

f. **Apply Cut-Edge Sealant** on all cut edges of the reinforced membrane (where the scrim reinforcement is exposed) **after seam probing** is completed. Cut-Edge Sealant is not required on vertical seams. When a 1/8-inch (3 mm) diameter bead of Cut-Edge Sealant is applied, approximately 225 – 275 linear feet of coverage per squeeze bottle can be achieved.

J. WELDING PROBLEMS/REPAIRS

1. A Hand Held Hot Air Welder and a 2-inch wide silicone roller must be used when repairing the Versiweld membrane. When the **entire** hot air welded **seam** is to be **overlaid**, an **Automatic Hot Air Welding Machine** may be used.

2. Prior to proceeding with any repair procedure, the area to be repaired must be cleaned and any material which has been exposed approximately 7 days must be prepared with Versiweld Weathered Membrane Cleaner as outlined in Paragraph I.2.b, Exposed Membrane Seam Preparation. The membrane can typically be repaired up to 6 months to a year with a standard cleaning method. In cases where the standard cleaning method is not sufficient, the following procedures must be used.

   a. Thoroughly clean the area to be welded with soap and water.

   b. Rinse the cleaned area with water to eliminate all soap residue.

c. Dry the cleaned area to eliminate all moisture.

d. Scrub the area to be welded with a “Scotch Brite” pad and Versiweld Weathered Membrane Cleaner. The cleaner will become discolored with dissolved membrane during this procedure.

e. Clean all residue from the area to be welded with a clean white rag.

f. Weld the new membrane to the cleaned area using standard welding procedures.

3. Voids in welded seams can be repaired using a Hand Held Hot Air Welder and a silicone roller.

4. Position the hand held welder facing into void so hot air is forced between overlapping membranes. Roll the top membrane surface using positive pressure toward the outer edge until the heated membrane surfaces are fused.

5. Exposed scrim-reinforcement (resulting from scorching surface of membrane) and test cut areas must be repaired by overlaying the damaged area with a separate piece of Versiweld reinforced membrane with rounded corners. The overlay must extend a minimum of 2 inches past the area to be repaired.

6. **Probe** all edges of the overlay once cooled to ensure a proper weld has been achieved.

7. **Seal** all cut edges of Versiweld reinforced membrane with Cut-Edge Sealant.

Note: The same overlay repair procedures may be used for punctures in the Versiweld membrane.

K. ADDITIONAL MEMBRANE SECUREMENT

Securement must be provided at the perimeter of each roof level, roof section, expansion joint, curb, skylight, interior wall, penthouse, etc., at any inside angle change where slope exceeds 2 inches to one horizontal foot, and at all penetrations as identified on the Versico details.

1. The same Versico Fastener and Fastening Plate required for membrane attachment must also be used for additional membrane securement.

2. Securement of the membrane shall be a maximum of 12 inches on center. Fasteners shall be positioned 6 inches minimum to 9 inches maximum from the inside or outside corner.

3. Refer to the "Fastener Criteria" chart in "Attachment I" at the end of this section for the required Versico Fastener/Plate with the corresponding deck type.

4. After securing the membrane, flash in accordance with the appropriate detail.

L. FLASHING

1. General Flashing Conditions

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

When possible, all reinforced membrane seams are hot air welded with the Automatic Hot Air Welding Machine. The Hand Held Hot Air Welder should be utilized in hard to reach areas, smaller curbs, vertical seams and when using non-reinforced membrane.

a. All existing **loose** flashing must be removed prior to application of Versiweld membrane especially when the new Versiweld Flashing is to be adhered. The new Versiweld membrane must totally conceal all existing intact flashing, but must not conceal weep holes or cover existing through wall counterflashing.

b. Install surface mounted reglets and compression bar terminations directly to the wall surface.

c. **Application of Versiweld Bonding Adhesive**

On vertical surfaces such as walls, curbs and pipes, **Bonding Adhesive is not required** when the **flashing height is 12 inches** or less and the membrane is **terminated under metal counterflashing** (nailed). When a **coping or termination bar** is used for the vertical termination, the **Bonding Adhesive may be eliminated when the flashing height is 18 inches or less.**

1) When required as noted on Versico's installation details, membrane shall be adhered to vertical surfaces with Versiweld Bonding Adhesive. The Bonding Adhesive shall be applied continuously, without globs or puddles, with a plastic core medium nap paint roller. A 9-inch roller will easily fit into the 5-gallon containers.

2) The Bonding Adhesive must be applied to both the membrane and the surface to which it is being bonded to achieve a coverage rate of approximately 120 square feet per gallon per one surface (membrane or substrate) or approximately 60 square feet per gallon per finished surface (includes coverage on both membrane and substrate).

3) After the Bonding Adhesive has dried to the point that it is tacky but does not string or stick to a dry finger touch, roll the membrane into the adhesive.

d. Care must be taken when setting the flashing to avoid bridging greater than 3/4 inch at angle changes (i.e., where a parapet or roof penetration meets the roof deck). This can be accomplished by applying heat to the Versiweld membrane and creasing the membrane into the angle change.

e. Terminate the edges of the installed membrane in accordance with Versico's applicable VWC-9 Termination Details.

f. In areas where metal counterflashing or surface mounted reglets are used as the vertical termination, the counterflashing must be sealed with a rubber grade caulking to prevent moisture migration behind the new wall flashing.

g. On Total System Warranty projects, Versico's Termination Bar in conjunction with Water Cut-Off Mastic must be installed under counterflashings and surface mounted reglets used for vertical wall terminations.

2. **Walls, Parapets, Curbs, Skylights, etc. (VWC-5 and VWC-12 Details)**

The flashing height must be calculated so that the Versiweld membrane flashing includes a minimum 1-1/2 inch hot air weld beyond the Fastening Plates.

a. Fasten at angle change as identified in Paragraph K, Additional Membrane Securement, with the required Versico Fastener and Plate.

b. Flash the fasteners/plates with a separate piece of Versiweld reinforced membrane; apply heat and crease the flashing into the angle change before attaching it to the vertical surface.

3. **Metal Edge Terminations (VWC-1 Details)**

The metal edge must be secured to the wood nailer as specified by the manufacturer. Refer to the appropriate VWC-1 Detail for flashing options and requirements.

4. **Roof Drains (VWC-6 Details)**

a. Versiweld membrane may extend into the drain sump when the slope of the sump is less than 3 inches to one horizontal foot. Refer to the Detail VWC-6.1.

When the drain sump is greater than 3 inches to one horizontal foot, additional membrane securement must be installed. Refer to Detail VWC-6.2.

b. Only drain strainers which have been approved by the specifier in accordance with all applicable codes may be used.

5. **Other Penetrations**

Regardless of size, all vent pipes and Penetration Pockets require mechanical securement. Membrane securement must be provided utilizing approved Versico Fasteners/Plates spaced a maximum of 12 inches away from the penetration, fastened a maximum of 12 inches on center and flashed with sections of Versiweld membrane as shown on the applicable detail.

a. **Pipes, Round Supports, etc.**

1) Flash pipes with Molded Pipe Flashings where their installation is possible. Molded pipe flashings cannot be cut and patched; deck flanges cannot be overlapped or installed over angle changes.

2) Where Molded Pipe Flashings cannot be installed, APPLY FIELD FABRICATED PIPE FLASHING using Versiweld unsupported flashing. Refer to Detail VWC-8.2.

b. **Flexible Penetrations** (braided cables, conduits, wires, etc.) must be enclosed in a stable "goose neck". Apply a field fabricated pipe flashing using Versiweld unsupported flashing to flash the gooseneck.

c. **Hot pipes**, which exceed 120° F, must utilize an insulated metal collar and rain hood, flashed with a field fabricated pipe flashing. Refer to Detail VWC-8.3.

d. For **pipe clusters** or unusually shaped penetrations, a Penetration Pocket must be utilized. Refer to Detail VWC-16.

6. **Existing Roof Tie-Ins** (VWC-13 Details)

Depending on the type of the existing roofing system, the tie-in method will vary. Total isolation between the two roofing systems or weep holes may be required to address moisture migration from one roofing system to another.

Versigard uncured EPDM Flashing must be used at the tie-in between systems. Refer to the applicable VWC-13 Details for installation requirements.

M. ROOF WALKWAYS

1. Install walkways in those locations as designated by the specifier in accordance with General Design and Planning, Part I of this specification.

2. Versiweld Heat Weldable Walkway Rolls

a. If Versiweld membrane or Walkway Roll has been exposed for over 7 days, use Versiweld Weathered Membrane Cleaner to prepare the area to be welded to the walkway material.

If the membrane has been exposed for an extended period of time or is heavily contaminated by dirt, a Scotch Brite pad may be used with the Versiweld Weathered Membrane Cleaner to expose a weldable surface. All residue should be removed by wiping with a clean dry white rag.

b. Position the walkway material and cut the Walkway Rolls into maximum 10-foot lengths and position with a minimum 1-inch gap between adjacent pieces to allow for water drainage. Cut the walkway so a 4-inch minimum gap is created over any field seams. (Since the attachment of the walkway to the membrane is permanent, this will allow access to the field seams).

c. Using an automated welder, weld all edges of the walkway material to the membrane. (Typically the same speed and temperature settings will be used for this procedure as for welding membrane to membrane. A test weld is always recommended prior to performing welds to the installed membrane). A hand held welder may be utilized,

however, productivity will be decreased.

3. **Concrete Paver Blocks**

   Install a slip-sheet of Versiweld reinforced membrane or two layers of MP Safeguard Mat under all concrete pavers for the protection of the deck membrane. The protective layer must extend a minimum of 2 inches on each side of the walkway.

4. **Versigard Interlocking™ Rubber Pavers**

   Rubber Pavers can be loose laid directly over the membrane. Installation instruction sheets are available from Versico.

   Note: Pavers are not recommended for walkways when slopes exceed 2 inches per horizontal foot.

N. DAILY SEAL

1. On phased roofing, when the completion of flashings and terminations is not possible by the end of each workday, provisions must be taken to temporarily close the membrane to prevent water infiltration.

2. Temporarily seal any loose membrane edge down slope using asphaltic based roof cement, hot asphalt; spray urethane foam or a similar product so that the membrane edges will not buck water. Caution must be exercised to ensure that the membrane is not temporarily sealed near drains in such a way as to promote water migration below the membrane.

3. On existing built-up roofs, remove the gravel. The surface must be clean and dry.

4. After embedding the membrane in daily seal material, CHECK FOR CONTINUOUS CONTACT. Provide continuous pressure over the length of the temporary seal.

   Note: The use of rigid wood nailers is not recommended due to warping and because constant compression cannot be achieved on an uneven substrate.

5. When work is resumed, pull the Versiweld membrane free; trim and remove membrane where the daily seal material was previously applied before continuing installation of adjoining sections.

O. CLEAN UP

If required by the specifier to ensure the aesthetics of the surface of the Versiweld membrane, hand prints, footprints, general traffic grime, industrial pollutants and environmental dirt may be cleaned from the surface of the Versiweld membrane by scrubbing with soapy (non-abrasive soap) water and rinsing the area completely with clean water. Weathered Membrane Cleaner can also be used to clean the surface of the Versiweld membrane.

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VERSIWELD™ MECHANICALLY-ATTACHED ROOFING SYSTEM

"Attachment I"
Membrane Attachment Criteria

A. The following chart indicates the appropriate Versiweld Fasteners and Plates for membrane securement with the referenced roof deck and includes minimum penetration requirements and pilot hole criteria.

Deck/Parapet Type	Versico Fasteners and Required Membrane Fastening Plates	Minimum Penetration	Pilot Hole Depth	Pilot Hole Diameter
Steel, 22 gauge (.75 mm) or heavier or Lightweight Insulating Concrete over Steel	HPVX Fasteners/Plates	3/4"	N/A	N/A
Structural Concrete, rated 3,000 psi or greater	CD-10 Concrete Spikes/MPVX Plates	1-1/4"	(1)	1/4"
Wood Plank or minimum 15/32" (12 mm) thick Plywood	HPVX Fasteners/ Plates	Min. 1" (2)	N/A	N/A
Minimum 7/16" (11 mm) thick Oriented Strand Board (OSB)	MP Fastener/HPVX Plates (8)	1-1/2"	N/A	N/A
Cementitious Wood Fiber	Lightweight Deck Fasteners/Plates (4)	1-1/2"	(5)	N/A
Gypsum or Lightweight Insulating Concrete	Versico Lite-Deck Fasteners/Plates (4)	1-1/2"	(1)	3/8" or 7/16" (6)
Masonry (block, brick or concrete)	Versico Termination Bar Zinc Nail-In Anchors (7)	3/4"	(1)	1/4"

Notes:

1. The pilot hole must be predrilled to a sufficient depth to prevent contact between the fastener point and any accumulated dust in the predrilled hole. This will help prevent bottoming out of the fastener during installation.
2. For wood planks only, fastener penetration shall not exceed 1-1/2 inches.
3. The Lite Deck Fastener and the 2-inch diameter fastening plate (provided as a complete fastening assembly) must be used for membrane securement. Either the 2-inch diameter or 3 inch diameter fastening plate (provided for use with the Lightweight Deck Fastener) may be used for attachment of insulation.
4. Most cementitious wood fiber decks do not require predrilling; however, Versico should be contacted prior to installation for verification of specific types that may require a pilot hole to be predrilled.
5. Pilot hole size may be varied to maximize pullout resistance.
6. Used for the securement of compression bar terminations or Seam Fastening Plates (used for additional membrane securement into vertical masonry surfaces). **Do not use for insulation or primary membrane securement.**
7. On OSB decks 5/8 inch or greater, Versico MPVX Fasteners may be used if a minimum pullout value of 360 pounds can be achieved.

N/A = Not Applicable

B. **The field membrane width and fastening requirements** are **dependent** upon the project **wind zone**, **building height and deck type** as outlined on the following chart.

Notes: For designation of wind zones listed on the following chart, refer to the Basic Wind Speed Map at the end of this Attachment.

If Factory Mutual approvals are specified, refer to Versico's Versiweld Code Approval Guide for fastener/plate options and additional membrane securement requirements. If a wind speed than 55 mph is desired, Versico must be contacted for specific requirements.

Wind Zone	Deck Type	Building Height	Field Membrane Width	Fastening Density (Field & Perimeter Sheets)
Zone 1 79 MPH or Less	All approved decks **except** Gypsum and Cementitious Wood Fiber	Max. 75'	10'	12" O.C.
	Gypsum and Cementitious Wood Fiber	Max. 75'	10'	9" O.C.
			8'	12" O.C.
Zone 2 80 - 89 MPH	Steel, Lightweight Insulating Concrete Over Steel and Wood Decks	Max. 50'	10'	12" O.C.
	Structural Concrete	Max. 75'	10'	12" O.C.
	Gypsum and Cementitious Wood Fiber	Max. 50'	10'	9" O.C.
			8'	12" O.C.
Zone 3 90-99 MPH (2)	Steel or Lightweight Insulating Concrete over Steel	Max. 75'	10'	9" O.C.
			8'	12" O.C.
	Structural Concrete	Max. 50'	10'	12" O.C.
	Plywood, Wood Planks (1), Oriented Strand Board, Gypsum and Cementitious Wood Fiber	Max. 50'	8'	9" O.C.
Zone 4 100 MPH or Greater	Steel or Lightweight Insulating Concrete over Steel	Max. 75'	10'	6" O.C.
			8'	9" O.C.
	Structural Concrete	Max 50'	8'	12" O.C.
	Plywood, Wood Planks, Oriented Strand Board, Gypsum or Cementitious Wood Fiber	**N O T A C C E P T A B L E (2)**		

Notes:

(1) On plywood or wood plank decks, if pullout tests exceed 425 pounds per fastener, the membrane securement requirements for steel decks may be followed providing the pullout tests are submitted to Versico for approval.

(2) Those areas located between wind zone contours of 90-100 MPH within 20 miles of the coastline shall be considered as a Zone 4 Wind Zone.

C. **Perimeter sheets are required along the roof perimeter**, which is defined as all edges of each roof section. Where multi-level roofs meet at a common wall, the adjacent edge of the upper roof is treated as a roof perimeter if the difference in height is greater than 3 feet (perimeter sheets are not required at the base of the wall at the lower level). Refer to Detail VWMA-2.

The number of perimeter sheets required is dependant on project wind zone and building height as identified in the chart below. **At roof ridges** (when slopes exceed 3 inches to the horizontal foot), one perimeter membrane sheet, centered approximately over the roof ridge is required.

a. **When using 10-foot wide field sheets, 5-foot wide perimeter sheets** are utilized along roof edges.

b. **When using 8-foot wide field sheets, 4-foot wide perimeter sheets** are utilized along roof edges.

Wind Zone	**Building Height**	**# of Perimeter Sheets Required** (Note 1)
Less than 80 mph (Zones 1)	Up to 50 feet	1
	51 to 75 feet	2
80 to 99 mph or Greater (Zones 2 & 3)	Up to 75 feet	2 (Note 2)
100 mph or Greater (Zone 4)	Up to 75 feet	4

Notes:
1. Fastener spacing for perimeter membrane sheets is equivalent to the fastener spacing for field sheets as identified in the preceding chart.
2. Gypsum and cementitious wood fiber decks in Zone 3 require three (3) perimeter sheets.

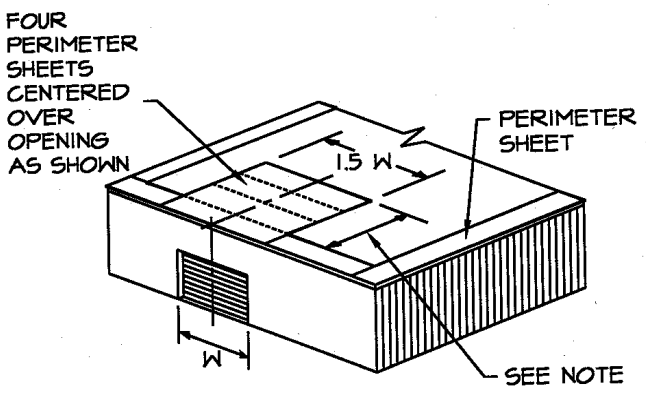
D. Buildings With Large Openings and Overhangs

When any wall contains major openings with a combined area, which exceeds 10% of the total wall area on which the openings are located, four (4) perimeter sheets (centered over the opening) must be specified as shown.

1. When using 10-foot wide field membrane sheets, 5-foot wide perimeter sheets are utilized. When using 8-foot wide field sheets, 4-foot wide perimeter sheets are utilized.

2. As an option to the above perimeter securement, an adhered membrane section may be used in lieu of the mechanically attached membrane at large openings in accordance with the Versico Specification for Versiweld Fully Adhered Roofing Systems.

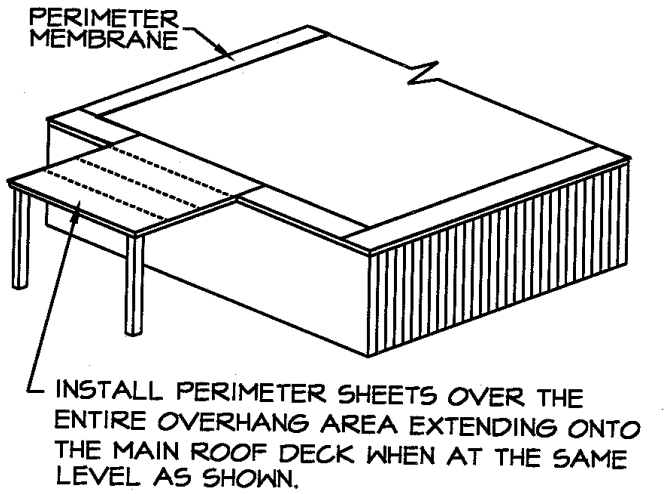
Large Openings



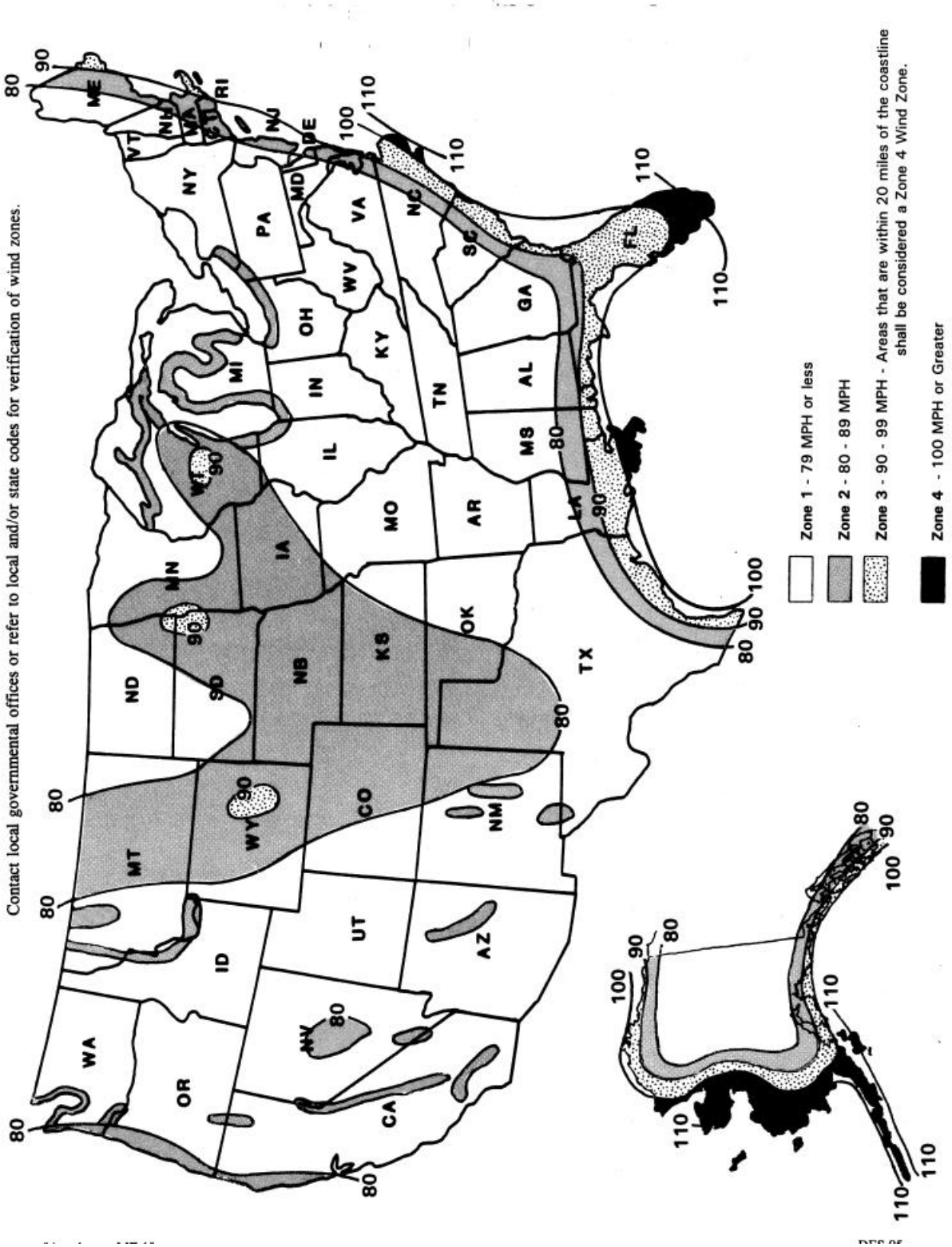
Note: Fastening plates are required at the end laps of the perimeter membrane sheets on both sides of the opened area.

Overhangs

The membrane must be specified with perimeter sheets installed over the entire overhang area extending onto the main roof deck when at the same level.



Versiweld™ Mechanically-Attached Roofing System
Basic Wind Speed Map



Versiweld Mechanically Attached Roofing System
"Attachment II"
Heat Welding Equipment

1. **Automatic Hot Air Welding Machine**

   An electrically powered, self-propelled device that utilizes an electrical resistance heating element or heater and fan-forced super heated air to weld Versiweld membrane seams.

   a. Welding speed: The speed of the welding machine must be no faster than necessary to produce a good hot air weld, and will vary according to environmental conditions.

   b. Temperature recommendations: Operating temperature is approximately 1000° F (#8 temperature setting). Versiweld TPO Membrane will not "bleed out" (membrane begins to flow out from edge).

2. **Hot Air Hand Welder**

   An electrically powered, hand-held device that utilizes an electrical resistance heating element or heater and fan-forced super heated air to hot air weld Versiweld membrane and flashing. A hand-held **silicone** rubber roller is used in conjunction with the welder to apply the pressure that fuses the heated membrane surfaces to each other.

   The hand-held welder is typically used to repair seams, or when the use of the automatic hot air welding machine is inappropriate (such as flashing penetrations and on high sloped surfaces).

3. **Electrical Cords:** For generator requirements and maximum length of electrical cords, refer to Generator/Electrical Requirements below.

4. **Seam Prober:** The probing of hot air welded seams is an important step in the application of a Versiweld Roofing System. Versico recommends the use of a cotter pin puller to probe all hot air welded seams. All seams must be probed (**after the seam has thoroughly cooled**) with the appropriate seam-probing tool and all deficiencies must be repaired accordingly with a hand held hot air welder no later than the end of each workday.

5. **Silicone Rubber Roller**: A 2-inch wide rubber roller used for rolling hot air welded seams.

6. **Generator/Electrical Requirements**

   Building power supplies do not typically provide the proper amount of power necessary for consistent hot air welding. The use of a portable generator conforming to the following guidelines is strongly advised.

   a. A **minimum 6500-watt generator** with a minimum output of 210 volts is required **for one Automatic Hot Air Welding Machine**. Reduced power availability will result if additional equipment is connected to the generator and may result in faulty hot air welded seams. GFI (Ground Fault Interrupter) protection is recommended. Additional generators will be required for operating other power tools and hand held hot air welders.

Electrical cords (3 conductor) of the maximum length indicated must be used with the corresponding wire as listed below:

Maximum Length	Wire Size
50 foot	#12
100 foot	#10
300 foot	#8

b. **A minimum 3,000-watt generator** may be used to power a maximum of **two hand held welders** as long as no other equipment is connected. This generator should service a minimum of 110 volts and be GFI (Ground Fault Interrupter) protected.

Electrical cords (3 conductor) of the maximum length indicated must be used with the corresponding wire as listed below:

Maximum Length	Wire Size
50 foot	#14
100 foot	#12

For extension cords longer than 100 feet, consult an electrician or electrical contractor to ensure proper size of generator and wire.

7. **Hot Air Welding Precautions**

a. Check the welding machine set-up to ensure proper alignment of the heating nozzle, airdam, pressure wheels, or moving parts to see they move properly or are free spinning. Test run the welding machine to ensure it moves forward following a straight line. If the alignment is off, make necessary adjustments.

b. Make sure air intake is open. Clean out air intake screen for the blower unit at each start up.

c. Check the machine for worn or broken parts, which need to be replaced. Exercise care to protect the pressure wheel from notches or cuts to prevent incomplete sealing of the welded seam.

d. Before the machine is connected to the power source, make sure it is switched off to prevent a power surge that could damage the unit. Turn the unit on and allow the blower/heater unit to warm up for approximately 5 to 10 minutes to reach operating temperature.

e. Clean the heat nozzle with a wire brush to remove any build-up of membrane, as needed.

f. To extend the life of the heating element of the Hot Air Welding Equipment, always turn the temperature adjustment down so the welder can cool prior to switching the machine off.

g. Follow all care and maintenance instructions recommended by the respective manufacturer.

h. It is recommended that two Automatic Hot Air Welding Machines and two generators be available at the project site in the event of mechanical failure.

VERSIWELD™ FULLY ADHERED MEMBRANE ASSEMBLY OPTION "Attachment III"

When the Versiweld membrane is specified to be fully adhered to an approved Versico insulation, in addition to the requirements identified in the Mechanically-Attached Roofing System Specification for substrate preparation, hot air welding, fastening procedures, etc., the following criteria is also applicable.

A. Insulation Fastening

1. Approved Insulation is typically mechanically attached to the roof deck with Versico Fasteners and 3 inch diameter Insulation Plates, at the minimum rate of 1 every 2 square feet. For **structural concrete, minimum 22-gauge steel or minimum 15/32-inch thick plywood decks** or minimum 3/4-inch thick wood planks, a reduced fastening density may be utilized as identified below.

   a. When a single or top layer of **minimum 1-1/2 inch thick Versico Polyisocyanurate** Insulation is specified, the Versico Insulation may be mechanically attached at the minimum rate of 1 every **3.2 square feet** (10 fasteners per 4' x 8' board)**.**

   b. When a single or top layer of **minimum 2 inch thick Versico Polyisocyanurate** Insulation is specified, the Versico Insulation may be mechanically attached at the minimum rate of 1 every **4 square feet** (8 fasteners per 4' x 8' board)**.**

   c. On reroof/no tearoff projects with a maximum roof height of 40' **any approved Insulation** (i.e., Recovery Board, Polyisocyanurate Insulation less than 1-1/2" thick) may be secured at the minimum rate of **11 fasteners per 4' x 8' board (5 fasteners per 4' x 4' board)**. This option is **not applicable for 15 year Total System Warranty projects** or projects where extended wind speed coverage (greater than 55 mph) is desired.

2. When an approved oriented strand board (OSB) is specified as the membrane underlayment, it must be mechanically attached to the roof deck in accordance with Versico Detail VWA-27.4.

3. Alternate Insulation Attachment Methods

a. When the building owner or specifier has selected an alternate insulation attachment method which incorporates a **solid mopping of insulation with hot asphalt,** refer to "Attachment A-2" in Versico's Adhered Roofing System Specifications for requirements or contact Versico.

b. When adhesive marketed by others is specified, contact the respective manufacturer regarding specific installation requirements and available warranty coverage. Versico warranties exclude products not supplied or marketed through Versico.

c. Versico's Versigrip Insulation Adhesive is required on Total System Warranties

B. Membrane Placement and Bonding

1. **Ensure** that water does not flow beneath any completed sections of the membrane system by completing all flashings, terminations and daily seals by the end of each workday.

2. **Sweep** all loose debris from the substrate.

3. **Position** Versiweld membrane over the acceptable substrate.

4. **Fold** membrane sheets back so half the underside is exposed.

5. **Stir Versiweld** Bonding Adhesive thoroughly scraping the sides and the bottom of the can (minimum 5 minutes stirring is recommended). Bonding surfaces must be dry and clean.

6. **Apply Versiweld** Bonding Adhesive to the exposed underside of the membrane and the corresponding substrate area. Do not apply Bonding Adhesive along the seam edge of the membrane to be hot air welded over adjoining sheet.

   Apply adhesive evenly, without globs or puddles with a plastic core medium nap paint roller to achieve continuous coating of both surfaces at a coverage rate of approximately 120 square feet per gallon per one surface (membrane or substrate) or approximately 60 square feet per gallon per finished surface (includes coverage on both membrane and substrate). A 9-inch roller will easily fit into the 5-gallon containers.

   A mechanical roller dispenser can be used to apply Bonding Adhesive when the continuous coating and coverage rate noted above are maintained.

   CAUTION: Due to solvent flash-off, condensation may form on freshly applied Bonding Adhesive when the ambient temperature is near the dew point. If condensation develops, possible surface contamination may occur and the application of Bonding Adhesive must be discontinued. Allow the surface to dry and apply a thin freshener coat at the coverage rate which is approximately half the coverage rate stated above to the previously coated surface when conditions allow for continuing.

7. **Allow** adhesive to dry until it is tacky but will not string or stick to a dry finger touch.

8. **Roll** the coated membrane into the coated substrate while avoiding wrinkles.

9. **Brush** down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.

10. **Fold** back the unbonded half of the sheet and repeat the bonding procedures. **Apply** Bonding Adhesive to the remaining exposed underside of the membrane and adjacent substrate and complete this section as described above.

11. Install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches to provide for a minimum 1-1/2 inch hot air weld. It is recommended that all seams be shingled to avoid bucking of water.

CAUTION: If aesthetics are of concern, protect completed sections of the roof so Bonding Adhesive will not discolor the membrane surface. Do not place Bonding Adhesive containers or their lids directly on the surface of the Versiweld membrane.

C. Additional membrane securement is required at the perimeter of each roof level, roof section, curb, skylight, interior wall, penthouse, etc., at any inside angle change where slope exceeds 2 inches in one horizontal foot.

Securement shall be achieved using Versico Fasteners and 2 inch diameter standard Seam Fastening Plates installed horizontally or vertically at the base of the walls, curbs, etc., spaced a maximum of 12 inches on center and flashed as shown on the applicable Versico Detail. If standard Seam Fastening Plates are not available, HPVX Fasteners and Plates may be used (steel/wood decks) or CD-10 Concrete Spikes or MP Fasteners (structural concrete decks).

Note: Additional membrane securement at pipes and Penetration Pockets, as required on Mechanically-Attached Roofing Systems, is not required on the Adhered Roofing System unless the diameter of pipes exceeds 18 inches or the diameter of Penetration Pockets exceeds 12 inches.

D. When specified, the Versiweld membrane may be **adhered directly to a new approved cellular or perlite lightweight insulating concrete** with a **minimum compressive strength of 225 psi**.

The Authorized Contractor must provide Versico with a copy of a certification letter from the lightweight insulating concrete manufacturer which references the project name and location and contains the manufacturer's brand name, minimum compressive strength, average wet and air dry densities.

The substrate must be free of any debris, fins, loose and foreign materials. Fill any gaps in the substrate greater than 1/4 inch with an appropriate material.

Application Cautions

1. Do not proceed with membrane installation until the lightweight insulating concrete has cured a minimum of 48 hours. If necessary, consult with the lightweight insulating concrete manufacturer concerning additional drying time.

2. After rain or other precipitation, follow the manufacturer's requirements concerning proper visual inspection and additional drying time prior to adhering the membrane.

3. Prior to membrane installation, darker areas, especially along hairline cracks in the concrete, may serve as an indication of moisture entrapment and possible standing water beneath the surface. If this condition is found, consult with the lightweight insulating concrete manufacturer for proper corrective measures.

4. Except when lightweight insulating concrete is poured over slotted steel decks, the roofing contractor must conduct core cuts at the minimum rate of 1 every 2,000 square feet. The

core cuts should be located around hairline cracks (if present) where darker areas are visible. After core cuts have been taken, the substrate must be examined for evidence of moisture above the structural deck and, if found, a wet/dry vacuum system, as recommended by the lightweight insulating concrete manufacturer, must be utilized to remove standing water from beneath the surface of the concrete.

a. To ensure the efficient operation of the vacuum system, a tight seal must be provided between the nozzle of the vacuum and the lightweight concrete substrate.

b. A one-way pressure relief vent, approved by Versico, must be installed over each core cut. Contact Versico for approved pressure relief vents.

E. Additional details for Adhered Systems pertaining to membrane seaming, flashing at roof drains with a sump greater than 3 inches in 12 inches, one-way air pressure relief vents (for systems directly over lightweight insulating concrete) and insulation fastening densities are included at the end of the Mechanically-Attached Details. All other details used with the Mechanically-Attached Roofing System are also utilized with the Fully Adhered assemblies.

Metrics

Length

1/8 inch = 3 mm
1/4 inch = 6 mm
15/32 inch = 12 mm or 1.2 cm
1/2 inch = 13 mm or 1.3 cm
5/8 inch = 16 mm or 1.6 cm
3/4 inch = 19 mm or 1.9 cm
1 inch = 2.5 cm
1-1/4 inches =3.8 cm
1-1/2 inches = 4 cm
2 inches = 5 cm
3 inches = 8 cm
4 inches = 10.5 cm
5 inches = 12.7 cm
5-1/2 inches = 14 cm
6 inches = 16.5 cm
9 inches = 23 cm
12 inches = 31 cm
18 inches = 46 cm
24 inches = 61 cm
3 feet = .9 m
3 feet, 6 inches = 1.1 m
4 feet = 1.2 m
4 feet, 6 inches = 1.4 m
5 feet = 1.5 m
8 feet = 2.4 m
10 feet = 3 m
50 feet = 15.2 m
75 feet = 22.9 m
100 feet = 30 m
250 feet = 76.2 m

10 feet per minute = 3 m per minute
15 feet per minute = 4.6 m per minute

.045 inch = 1.1 mm
.060 inch = 1.5 mm

Length (continued)

2 inches in 12 inches = 16 cm/m
3 inches in 1 horizontal foot = 25 cm/m
5 inches in 12 inches = 41 cm/m
18 inches in 12 inches = 150 cm/m

1 per 2 square feet = 1 per 1.86 m^2
1 per 4 square feet = 1 per 3.72 m^2
1 per 5.3 square feet = 1 per 4.93 m^2
1 per 6.4 square feet = 1 per 5.95 m^2

Weight

80 pounds = 36 kg
300 pounds = 136 kg
360 pounds = 163 kg
500 pounds = 227 kg
800 pounds = 363 kg

Miles Per Hour

55 mph = 88 km per hour
72 mph = 115 km per hour
79 mph = 126 km per hour
80-89 mph = 128 – 142 km per hour
90-99 mph = 128 – 158 km per hour
100 mph = 160 km per hour

Fahrenheit/Celsius

40° Fahrenheit = 4.5° Celsius
90° Fahrenheit = 32° Celsius
120° Fahrenheit = 49° Celsius