DURO-ROOF® SYSTEM

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SECTION 1 - - - GENERAL

INTRODUCTION

The Duro-Roof® System is similar to the other mechanically-fastened systems that Duro-Last® offers except that it utilizes wider fastening tabs that are sealed during installation. This system allows wider fastening tab spacing and increased fastener spacing along the tabs when compared to other mechanically fastened systems. The system can be ordered with 57-inch (1.45 m), 87-inch (2.21 m) or 120-inch (3.05 m) fastening tab spacing. The pullout resistance of the fastener determines the spacing of fasteners along the tabs.

The majority of the detail drawings found in the "Mechanically Fastened" Section of the Duro-Last Specification Manual are applicable. To avoid duplication, only detail drawings specific to the Duro-Roof System are included within this specification.

REQUIREMENTS

1. The Duro-Roof System requires the use of 6-inch (152 mm) wide fastening tabs.
2. Either the Duro-Last 3-inch (76 mm) square metal plate or Duro-Last Cleat Plate may be used for membrane securement.
3. Fastening tabs must be sealed using Duro-Last Tab Sealer 4725.
4. This is the only Duro-Last system that can take advantage of the pull tests greater than 450 lbs.
5. Typically, for buildings 40-feet (12 m) or taller and/or located within high wind zones (greater than 110 mph [177 km/h]) or special wind regions the following applies:
   a. The Duro-Last Engineering Services Department should be involved in determining the fastening requirements. Typically, the ASCE 7 Specification will be used to determine the fastening requirements. When appropriate, specifications set forth by entities such as FM Global, SPRI or State/Local Agencies will be utilized.
   b. Fastening tab spacing may not exceed 60-inch (1.5 m) on center unless approved, in writing, by the Duro-Last Engineering Services Department.
6. If the Duro-Roof System is installed using 120-inch (3.05 m) tab spacing, additional perimeter fastening is always required as described in Section 3 of this specification.
7. The Duro-Last roofing system must be installed by an authorized Duro-Last contractor.
8. A Duro-Last Technical Representative must inspect the Duro-Last roofing system for compliance with the Duro-Last specifications before a commercial/industrial warranty is issued. Note: Duro-Last does not perform destructive testing unless visual inspection necessitates a need for further investigation.
9. All materials used in the installation of the Duro-Last roofing system must be products of Duro-Last, Inc. or accepted products as defined and described in the specification. Other materials must be accepted in writing by the Duro-Last Engineering Services department prior to being used in the Duro-Last roofing system.
10. The Duro-Last contractor is responsible for following all applicable building, plumbing, and electrical codes.
11. It is the contractor's responsibility to verify the accuracy of information provided to Duro-Last, including but not limited to pull test results, building height, and roof dimensions. Measurements used during the quotation phase of a project must be checked for accuracy by the installing contractor.

TOOLS

The authorized Duro-Last contractor should have the following tools, which are necessary for the efficient and proper installation of the Duro-Last roofing system.

• Safety Equipment (such as fall protection)	• Equipment necessary to raise materials to the rooftop
• Hand welders (hot-air) with a spare heating element (Optional: Automatic welder)	• Silicone hand roller
• Extension cords - cord length of 100' (30 m), #12/3 wire w/ground	• Ground fault interrupter
• Variable speed power screw driver with reverse	• P-3 screwdriver tips for screws

• Electric hammer drill w/depth gauge	• R-3 square drive tips for concrete screws
• Metal snips, hacksaw, keyhole saw, hammers, scissors, utility knives with retractable blades	• Measuring tapes (100' and 25') (30 and 7.5 m), chalk line, markers, lumber crayon
• 2-inch (50 mm) flat chisels, pry bar	• Vise clamps, nail aprons, caulk gun, screw drivers
• Tack claw	• Ladders
• Tarps	• Gripull
• Core cutter	• Pull tester
• Detergent-based cleaning fluid and rags	• Panduit bander

MEMBRANE DESCRIPTION

The Duro-Last membrane is a polyvinyl chloride polymer blend, which is reinforced with a high-strength weft-inserted polyester scrim that has a thread pattern of 18 x 14 threads per inch. Refer to the Spec Data Sheets in the "Product Data Sheets" section for a listing of all of the test results and physical properties of the membrane.

1. The 40 mil (1 mm) thick membrane has a system weight of approximately 0.25 lb/ft^2 (1.22 kg/m^2). The prefabricated roof cover is supplied in sections that are either folded or rolled. Individual sections may be as large as 2,500 ft^2 (232 m^2), with no single dimension exceeding 100-ft (30 m). Deck sheets can be fabricated up to 3,000 ft^2 (279 m^2) when using 10-ft (3.05 m) laps, 30'-6" (9.3 m) wide with a full reverse, not to exceed 100-ft (30.5 m) long.
2. The 50 mil (1.27 mm) thick membrane has a system weight of approximately 0.32 lb/ft^2 (1.56 kg/m^2). The prefabricated roof cover is supplied in sections that are either folded or rolled. Individual sections may be as large as 2,000 ft^2 (186 m^2), with no single dimension exceeding 80-ft (24 m). Deck sheets can be fabricated up to 2,500 ft^2 (232 m^2) when using 10-ft (3.05 m) laps, 30'-6" (9.3 m) wide with a full reverse, not to exceed 80-ft (24.4 m) long.
3. The 60 mil (1.52 mm) thick membrane has a system weight of approximately 0.39 lb/ft^2 (1.9 kg/m^2). The prefabricated roof cover is supplied in sections that are either folded or rolled. Individual sections may be as large as 1,500 ft^2 (139 m^2), with no single dimension exceeding 60-ft (18.28 m).

APPLICABILITY

The Duro-Last roofing system consists of the Duro-Last membrane, fasteners, prefabricated corners, parapet flashings, stack flashings, curb flashings, two-way vents, and other related Duro-Last approved products. The Duro-Last roofing system consists of products manufactured by Duro-Last, Inc., or accepted products as defined and described in the specifications. Alternate materials must be pre-approved in writing by the Duro-Last Engineering Services Department prior to their use with the Duro-Last roofing system.

DRAINAGE/SLOPE

Duro-Last has found no adverse effects on its membrane because of a lack of positive drainage, however, good roofing practices incorporate the use of positive drainage for the safety of the structure. The installing contractor is responsible to make sure roof drainage meets local building code requirements.

WEATHER CONSIDERATIONS

The Duro-Last membrane is designed to perform in all types of weather. The Duro-Last membrane is regularly subjected to DSET, EMMAQUA Exposure and low temperature cracking (ASTM D-2136) testing. Installation of the Duro-Last membrane is limited only by the exposure limitations of the installers. It is Duro-Last's recommendation that installation be performed within the temperature range of 40 to 115 ºF (5 to 46 ºC).

DELIVERY

A complete Duro-Last roofing system and related materials will be delivered to the location designated by the Duro-Last contractor in the original packaging and with shipping labels intact. Containers will be labeled with manufacturer/supplier name, product name, and identification. Each shipment should be checked for damages and/or shortages at the time of delivery. The freight agent must note damaged materials and/or shortages on the freight bill. Concealed damage must be reported to the freight agent immediately. Materials damaged in shipping, handling, or storage cannot be used.

HANDLING

Once the Duro-Last roofing system is delivered, the contractor is responsible for all handling and installation of the roofing system. Adequate personnel and equipment should be available to safely lift and place the Duro-Last roofing system onto the rooftop. Folded or rolled prefabricated sections of membrane must be placed on the roof near load-bearing members, and in a manner convenient to final placement.

STORAGE

Duro-Last materials should be kept clean and dry. Materials should be stored on pallets and covered with tarps. Care should be taken to place materials away from areas where water may pond or areas that water falls onto from higher elevations. All sealants must be stored at temperatures above 40 °F (5 °C). Keep combustible materials away from heat, sparks, and open flames. Follow precautions outlined on the containers or supplied by the material manufacturer.

SUBSTRATE SEPARATION

The Duro-Last membrane is defect-free when it leaves the factory. Certain substrates are not compatible with the Duro-Last membrane and may cause premature failure of the membrane. Over the substrates listed below, install a minimum 3 mil polyethylene or polypropylene slip sheet prior to the installation of the Duro-Last membrane.

Acrylic Coatings	Extruded Polystyrene	Modified Bitumen	Shingles
Aluminum Coated Asphalt	Granulated Cap Sheet	Old Duro-Last Roofs	TPO (Thermoplastic Polyolefin)
Coated or Smooth Asphalt	Hypalon (CSPE)	Polyurethane	Sprayed Urethane Foam
Expanded Polystyrene	Mineral Surfaced Cap	Coal Tar Pitch	PVC/CPA Membranes

The Duro-Last membrane is compatible with the following substrates, and no separation is required.

CPE Roofing	GP DensDeck® and DensDeck Prime®	Glass Fiber Board
Cellular Glass Boards	Polyisocyanurate Insulation Boards	USG SECUROCK® Roof Board
EPDM (clean)	Lightweight\Structural Concrete Decks (Smooth)	Wood Decks
Gypsum	Pre-stressed Concrete Decks	

CHEMICAL RESISTANCE

Duro-Last membrane is resistant to the chemicals listed below. If any other chemicals are present on a particular roof, please contact the Engineering Services Department.

Acrylic Paint	Linseed Oil	Copper Sulfate	Lard (Animal Fats)
Latex Paint	Masonry Cleaner	Ferric Chloride	Phosphoric Acid
Fertilizer Solution	Muriatic Acid	Fiberglass Mat	Polypropylene
Fruit Juice	Oleic Acid	Furnace Residue	Zinc Chloride
Hydrogen Peroxide	Sodium Hydroxide	Detergent Solution	Bleach

PAINT APPLICATION

The Duro-Last membrane may be painted, but not the vinyl edging. See the Chemical Resistance section for approved paint types for the membrane. If prohibited painting does occur and cause damage to the edgings, Duro-Last Roofing, Inc. will not be held responsible for repair or replacement under the warranty. Should you have any questions, please contact the Duro-Last Quality Assurance Department.

VAPOR BARRIERS

Duro-Last recommends the use of vapor barriers, however it is the responsibility of the Duro-Last contractor of record to ensure that all applicable specifications, building codes, regulations and ordinances are complied with and followed. A roofing professional, such as a consultant or architect, should be utilized for correct roof system design prior to installing any roof system.

SECTION 2 - - - QUALITY ASSURANCE

PRE-JOB INSPECTION

When re-covering an existing roofing system, the authorized Duro-Last contractor is responsible to conduct an inspection of the proposed job site roof conditions to determine the fastener type and length, evaluate the moisture content of the existing roofing system, and to note damaged areas to be repaired prior to installation of the Duro-Last roofing system.

CORE CUTS

1. The Duro-Last contractor is responsible for performing a series of core cuts to determine and verify the above information. The Duro-Last contractor and/or building owner is responsible for the repair of all core cuts.
2. Duro-Last, Inc. does not approve the practice of roofing over existing roofing systems that contain excess water. Excess water is defined as water observed within a core cut or moisture squeezed from the core sample taken.
3. Duro-Last's post-installation warranty inspection does not check the moisture content of the substrate.

PULL TESTS

1. Fastener pullout tests must be conducted on the roof deck with approved fasteners to verify the integrity of the deck and to establish fastening patterns that meet the requirements of Duro-Last specifications. Contact the Duro-Last Engineering Services Department with any questions.
2. It is the responsibility of the Duro-Last contractor to make sure pullout tests are performed and values verified prior to installation. The tests can be performed by either the fastener manufacturer or the authorized Duro-Last contractor. The sections of decking where integrity is in question should be the locations for the tests. The pullout tests must be documented on a roof drawing showing the location and pullout value of each test. In situations where new construction prevents on-site pullout tests, a pre-assembled deck representing the proposed deck type should be constructed and tested.
3. The number of pullout tests required will be as follows: perform a minimum of 10 tests for up to 50,000 ft^2 (4,645 m^2) and five additional pull tests for each additional 50,000 ft^2 or portion thereof, on each project. Areas of low pullout results will require additional pullout tests.

FASTENER SELECTION AND DECK TYPES

The fasteners used to attach insulation, cover board and Duro-Last membrane must be supplied by Duro-Last, Inc. The following tables summarize the appropriate fasteners to use for different deck types and system components. If a fastener type is needed that is not listed below, the Duro-Last Engineering Services Department must approve its use, in writing, prior to installation.

PLATE SELECTION

When determining which plates to use and where to use them, refer to this table.

	2-inch (50 mm) Poly-Plate	2.4-inch (61 mm) Cleat Metal Plate	3-inch (76 mm) Square Metal Plate	Insulation Plate
Membrane Fastening				
Fastening Tabs	No	Yes	Yes	No
Parapet Flashings	Yes	Yes	Yes	No
Base of Walls/Penetrations	Yes	Yes	Yes	No
Insulation Boards	Yes	Yes	Yes	Yes
Cover Boards	Yes	Yes	Yes	No

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FASTENER SELECTION BASED ON DECK TYPE

When determining which fastener type to use for a specific deck type, refer to this table. Note that pullout tests must be performed on each deck and that fastener spacing must be determined based on the "Fastener Spacing Tables" on the following page. If the minimum pullout values required cannot be achieved contact the Duro-Last Engineering Services Department for assistance.

Deck Type	Fastener Type	Notes
Steel	Duro-Last HD Screws Duro-Last XHD Screws	Must penetrate a minimum of 1-inch (25 mm) from the top surface of deck.
Wood	Duro-Last HD Screws Duro-Last XHD Screws	Must penetrate a minimum of 1-inch (25 mm) from the top surface of deck.
Structural Concrete	Duro-Last Concrete Nail Duro-Last Concrete Screw Duro-Last HD Screws Duro-Last XHD Screws	Must penetrate a minimum of 1-inch (25 mm) from the top surface of deck. Pre-drill a minimum of 1/2-inch (12.7 mm) deeper than the required depth of the fasteners using a 3/16-inch (5 mm) bit.
Gypsum	Auger Fastener* Liquid Auger Fastener**	Minimum pullout requirements must be met. See "Fastener Spacing Tables", page 7.
		Pre-drill required for auger fasteners. Use a 7/16–9/16-inch (11 – 14mm) bit.
		* Must penetrate a minimum of 1-1/2-inch (38 mm) from the top surface of deck. * Factory Mutual designed systems require minimum of 2-inch (50 mm) penetration.
		** Liquid Augers must penetrate a minimum of 2-inch (50 mm) from the top surface of the deck.
Cementitious Wood Fiber (Tectum)	Auger Fastener* Liquid Auger Fastener**	Minimum pullout requirements must be met. See "Fastener Spacing Tables", page 7.
		Do not pre-drill.
		* Must penetrate a minimum of 1 1/2-inch (38 mm) from the top surface of deck. * Factory Mutual designed systems require minimum of 2-inch (50 mm) penetration.
		** Liquid Auger must penetrate a minimum of 2-inch (50 mm) beyond the top surface of the deck.
Lightweight Concrete	Auger Fastener* Liquid Auger Fastener** Duro-Last Concrete Screw Duro-Last Concrete Nail Duro-Last HD Screws Duro-Last XHD Screws	Minimum pullout requirements must be met. See "Fastener Spacing Tables", page 7.
		Pre-drill required. Augers: Use a 7/16–9/16-inch (11 – 14 mm) bit. Others: Use a 3/16-inch (5 mm) bit.
		* Must penetrate a minimum of 1-1/2-inch (38 mm) from the top surface of deck. * Factory Mutual designed systems require minimum of 2-inch (50 mm) penetration.
		** Liquid Auger must penetrate a minimum of 2-inch (50 mm) from the top surface of the deck.
Walls and Curbs	**Fastener Type**	**Notes**
Cinder and Concrete Block	Zinc Plated Metal Anchors Duro-Last Concrete Screw Duro-Last Concrete Nail Duro-Last HD Screws Duro-Last XHD Screws	Must penetrate a minimum of 1-inch (25 mm) from the top surface. Pre-drill a minimum of 1/2-inch (12.7 mm) deeper than the required depth of the fasteners using a 3/16-inch (5 mm) bit (1/2-inch (12.7 mm) for metal anchors).

FASTENING PATTERN

The fastening pattern used to install the Duro-Last roofing system is determined by the pull-out resistance of the mechanical fasteners to be used and the uplift pressure that the system is designed to resist. The minimum uplift design required by Duro-Last is 60 psf. Resistance to higher uplift pressures may be required as part of a project specification or as required by state building codes. Contact the Duro-Last Engineering Services Department for assistance in determining the fastening patterns for the specific uplift design pressures or if the project is located in the state of Florida.

The tables below are used to determine the appropriate fastening pattern for a project for which the pullout resistance and required uplift design are known. The pullout result column shows the minimum resistance required to utilize the tab and fastener spacing shown for a given uplift design. The fastening patterns shown are for the field of the roof. If the project requires enhancement in the perimeter and corner areas, contact the Duro-Last Engineering Services Department for assistance.

Note: Projects in high wind zones (≥110 mph (177 km/h)) or on a building with a height ≥40 ft. (12.19 m) must have the fastening pattern designed by the Duro-Last Engineering Services Department.

57-inch (1.45 m) Tab Spacing

Pullout Resistance (lbs.)	Fastening Spacing in. (m)	Uplift Design (psf)
570	24 (.61)	60
500	21 (.53)	60
430	18 (.46)	60
360	15 (.38)	60
285	12 (.30)	60
215	9 (.23)	60
145	6 (.15)	60
715	24 (.61)	75
625	21 (.53)	75
535	18 (.46)	75
445	15 (.38)	75
360	12 (.30)	75
270	9 (.23)	75
180	6 (.15)	75
825	21 (.53)	90
640	18 (.46)	90
535	15 (.38)	90
430	12 (.30)	90
325	9 (.23)	90
215	6 (.15)	90
825	18 (.38)	120
715	15 (.38)	120
570	12 (.30)	120
430	9 (.23)	120
285	6 (.15)	120
750	9 (.15)	210
500	6 (.23)	210

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87-inch (2.21 m) Tab Spacing

Pullout Resistance (lbs.)	Fastening Spacing in. (m)	Uplift Design (psf)
825	21 (.53)	60
650	18 (.46)	60
540	15 (.38)	60
435	12 (.30)	60
325	9 (.23)	60
215	6 (.15)	60
825	18 (.46)	75
675	15 (.38)	75
540	12 (.30)	75
405	9 (.23)	75
270	6 (.15)	75
825	15 (.38)	90
650	12 (.30)	90
485	9 (.23)	90
325	6 (.15)	90
825	12 (.30)	120
650	9 (.23)	120
435	6 (.15)	120
825	9 (.15)	150
545	6 (.23)	150
825	6 (.23)	210

120-inch (3.05 m) Tab Spacing

Pullout Resistance (lbs.)	Fastening Spacing in. (m)	Uplift Design (psf)
825	15 (.38)	60
600	12 (.30)	60
450	9 (.23)	60
300	6 (.15)	60
750	12 (.30)	75
565	9 (.23)	75
375	6 (.15)	75
825	9 (.23)	90
450	6 (.15)	90
600	6 (.15)	120
825	6 (.15)	150

DECK/SUBSTRATE CRITERIA AND PREPARATION

The substrate should be clean, smooth and free of fins, sharp edges and loose, foreign materials. Any portions of the substrate or protrusions that could affect the installation of the membrane must be repaired.

Direct application of the Duro-Last membrane is permitted when applied over new smooth-troweled concrete, new lightweight insulating concrete, new plywood, OSB, wood planking and cementitious wood fiber. All other surfaces require a minimum slip sheet or cover board prior to installation of the Duro-Last membrane.

When roofing over asphalt or coal tar roofs (including full tear-off) an insulation or slip sheet having an approved facer must be used. If the existing system remains, all blisters must be cut down and secured with screws and plates to create a level roof surface. If water is present under the existing system, remove it along with any wet insulation. Resulting voids should be built up level to the surrounding roofing surface. A slip sheet (minimum three-mil polyethylene) is required. The slip sheet shall be overlapped six inches and fastened to hold in place.

CONCRETE (NEW CONSTRUCTION OR RE-COVER)

Concrete decks shall be smooth and have no joints or cracks greater than 1/4-inch (6.35 mm). Sharp stones sticking out of concrete and sudden changes in elevation due to the pouring forms, etc., shall be ground down. If the concrete is not troweled smooth, a minimum of 3/8-inch (9.5 mm) underlayment must be installed over deck prior to membrane installation.

METAL DECK (NEW CONSTRUCTION OR RE-COVER)

A metal deck requires a minimum layer of 15/32-inch (12.7mm) hardboard (gypsum, plywood, or oriented strand board) or one-inch rigid insulation prior to the installation of the Duro-Last membrane. Replace all deteriorated decking. It is the responsibility of the contractor to ensure that the selected insulation is adequate to span the flutes of the deck. If it is not, the flutes must be filled with an approved insulation. See "Insulation Selection and Installation" for further details.

WOOD DECK (NEW CONSTRUCTION OR RE-COVER)

Plywood decks (15/32-inch (11.9 mm) minimum) shall be clean, smooth, and have no joints or cracks greater than 1/4-inch. Plywood shall be installed with nails or screws. If staples have been used, re-fasten the deck with nails or screws. If H-clips are used, cover them with duct tape or overlay the entire deck with an approved underlayment or rigid insulation. Replace all deteriorated decking.

CEMENTITIOUS WOOD FIBER (NEW CONSTRUCTION OR RE-COVER)

Cementitious wood fiber (Tectum) decks shall be clean, smooth and have no joints or cracks greater than 1/4-inch (6.35 mm). Replace all deteriorated decking.

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SECTION 3 - - - IMPLEMENTATION

INSTALLATION

WOOD NAILER

Wood nailers must be a #2 grade lumber, or better and must be fastened to the deck, wall or existing secured nailer in such a manner that they resist 180 lb. of force per linear foot (2,643 N/M) of nailer in any direction. Fasteners used to attach wood nailers must be spaced no greater than 18-inch (455 mm) apart. Wood nailers are required in any situation where 1-inch (25 mm) or greater of insulation is added to the roof perimeter edge. The top of the nailers must be flush with the top of the insulation. Wood nailers are not required at a change of plane such as the intersection between a parapet wall and the decking.

Duro-Last Engineering Services requires that for nailers and other lumber supports identified as ACQ or CA treated, only stainless steel fasteners be used. Additionally, for all new construction, untreated lumber should be used for nailers with standard e-coated fasteners. Further, treated lumber dating 2003 or earlier is acceptable for use with e-coated fasteners as lumber prior to 2003 is unlikely to contain the copper based treatments.

INSULATION SELECTION AND INSTALLATION

Insulation products must be neatly fitted to the roof deck and its penetrations. 4 x 8-feet (1.2 x 2.4 m) insulation boards must have a minimum of five fasteners/distribution plates installed per board. No gap should exceed 1/4-inch (6 mm) in width. No more insulation products should be installed than can be covered with membrane and completed before the end of the day's work or before the onset of inclement weather. Duro-Last fasteners and Duro-Last plates as well as approved fastening patterns are required for attachment of all insulation products.

The minimum compression characteristics of insulation products as determined by ASTM D-1621 will be as follows:

- Polyisocyanurate products: 20 psi (137.8 kPa)
- Fiberglass products: 16 psi (110.3 kPa)
- Extruded polystyrene products: 25 psi (172.3 kPa)
- Expanded polystyrene products: 15 psi (124.1 kPa) and 1.5 pcf (24 kg/m^3) density (certified) and a minimum 1-inch (25 mm) thick.
- Expanded polystyrene products covered with or laminated to a hardboard facer: 12 psi (82.7 kPa) and 1.25 pcf (20 kg/m3) densities and a minimum of 1-inch (25 mm) thick.

MEMBRANE INSTALLATION

1. The prefabricated roof section is unrolled and positioned on the deck to expose the first 6-inch (152 mm) securement tab. Place fasteners and plates in the **center of the tab** and at the spacing along the tab required to meet the fastening pattern.
2. After the fasteners have been installed, apply the Duro-Last Tab Sealer 4725 to the top of the fastening tab and also to the bottom side of the membrane that will cover the fastening tab (see detail 9500). The application rate for this 2-sided application must be 30 square feet per gallon of tab sealer. This application rate will cover both sides along 30 feet (9.14 m) of the tab. Use a solvent resistant 9-inch (228.6 mm) medium nap paint roller to apply the sealer in an even coat with no puddles or globs. When not in use, keep the tab sealer container closed. See the Cautions and Warnings" section regarding the open time of the sealer.
3. Once the tab sealer has been applied, quickly unfold the roof section to expose the next fastening tab. Pull the membrane taut and then push the membrane into the adhesive using a heavy-duty squeegee. Take care to eliminate any air pockets. This step must be done before the tab sealer tacks up or else an additional coat of sealer will need to be applied.
4. Repeat the steps above until the roof section is completely attached.
5. Position the next roof section to provide a 9-inch (228.6 mm) overlap along the edge parallel with the fastening tabs. After securing the reverse tab(s), if present, on the new section, the tab sealer may be applied so that it covers a 6-inch (152 mm) wide strip at the edge of the previous section. The tab sealer must also be applied to the bottom side of the new section. Care must be used to keep the tab sealer off

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of the membrane where the hot air weld will occur. It may be helpful to place a length of wood (or chalk a line) to define where the tab sealer should stop. Again, use a squeegee to push the membrane into the adhesive and to remove air pockets.

6. Tab sealer is not required along “end-laps” between roof sections and the overlap only needs to be 6 inches (152 mm).

PERIMETER MEMBRANE INSTALLATION

1. The first fastening tab on all perimeter roof sections that have tabs parallel with the roof edge or parapet wall, must be between 24 - 36 in (610 - 915 mm) from the edge or the wall. If the parapet wall is greater than 24-inch (610 mm) tall, the perimeter tab may be placed up to 63-inch (1.6 m) away from the roof edge when utilizing roof sections with maximum lap spacing of 60-inch (1.5 m) on center.
2. When using roof sections with fastening tabs spaced 120-inch (3 m), the first tab along all perimeter roof edges must be located 24-36-inch (610 – 915 mm) from the edge. The second tab must be placed 84-96-inch (2130 – 2440 mm) from the edge. Parapet wall height does not change this requirement.
3. On buildings with multiple roof levels, treat all roof edges as perimeter edges if they stand 3-feet (915 mm) or more above adjacent or surrounding roof areas.
4. On buildings located in high wind zones (greater than 110 mph [177 km/h]) or on structures that are 40-feet (12 m) or taller, additional wind tabs and/or increased fastener density may be required. Contact the Duro-Last Engineering Services department for assistance.

HOT-AIR WELDING

1. Position the membrane so that the top membrane overlaps the bottom membrane a minimum of 9-inch (228 mm). Ensure the welding area is dry, clean and free of foreign material.
2. Weld the top membrane to the bottom membrane using a hand-held welder or an automatic welding machine, and silicone roller. A minimum 1-1/2-inch (38 mm) wide continuous weld is required.
3. All field-welded seams must be inspected with a tack claw or similar tool (cotter key extractor), and all deficiencies repaired prior to inspection by Duro-Last.

FLASHINGS

1. The Duro-Last membrane must not contact surfaces which maintain or exceed temperatures of 120° F including all insulated chimney pipes, exhaust pipes, and combustible fuel pipes.
2. All flashings, with the exception of pitch pans, must be terminated at a minimum of 8 inches (203 mm) above the roof surface. See “Pitch Pans” section for pitch pan installation criteria.
3. See “Mechanically Fastened” details section for installation references.

PITCH PANS

1. Use pitch pans only when standard Duro-Last flashings cannot be used.
2. Only Duro-Last Duro-Caulk Plus or approved sealer such as CSL may be used when creating a pitch pan.
3. All pitch pans must be terminated at a minimum of 4 inches above the roof surface.
4. See Details 4030, 4040 and 4045 for installation references.

TWO WAY AIR VENT

1. Install Duro-Last Two-Way Air Vents following these guidelines:
   a. Install at a rate of one vent for every 1,000 ft^2 of deck area.
   b. Do not install the vents near drains or in valleys.
   c. Evenly space the vents across the roof area and center them between fastening tabs.
   d. It is the contractor’s responsibility to ensure that adequate secondary drainage exists to prevent flooding during extreme weather when water could infiltrate the two-way vent.
2. See Details 5020 for installation references.

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ROOF DRAINS AND SCUPPERS

1. Drain Assemblies with Clamping Rings
   a. All existing roofing materials must be removed from drain bowl and clamping ring.
   b. Use Duro-Caulk Plus between the membrane and bowl, and between the membrane and clamping ring (1/2 tube minimum).
   c. After the Duro-Last membrane is properly installed onto the bowl and the clamping ring set in place, all bolts securing the ring must be installed to provide constant, even compression on the sealant. If bolts are broken or missing, replacements must be installed.
2. Duro-Last Drain Boots
   a. If the Duro-Last drain boot is to be used, apply one-half (1/2) tube of sealant minimum to the outside of the drain boot and insert it into the drain.
   b. Install composite compression drain rings as low into the drain as possible.
   c. See Details 2011, 2020, 2021, 2025, 2030, 2041, 2050, 2060, 2061, 2070 and 2071 for installation references.

EXPANSION JOINTS

1. See Details 1140, 1150, 1160, 1170 and 6160 for installation references.

WALKWAY PADS

1. Duro-Last Roof Trak® III Walkway Pad is recommended at all roof access points, service units and high traffic areas. The risk of potential third party damage to the Duro-Last roofing system may increase should the building owner choose not to utilize the Duro-Last Roof Trak III Walkway Pad. Note: Prior to inspection of the installation by Duro-Last, attach only one side of any Walkway Pads that will be covering any field seams. This will allow the Duro-Last Technical Representative to inspect the entire field seam. After the inspection, hot-air weld the remaining side to complete the attachment of the pad.

CAUTIONS AND WARNINGS

1. Open time for the Duro-Last Tab Sealer 4725 is 20 minutes. Do not exceed this open time.
2. Duro-Last Tab Sealer 4725 must not be applied to the membrane where a field weld will occur.
3. See “Product Data Sheet” for Duro-Last Tab Sealer 4725 for additional information.
4. The ambient air temperature and the substrate temperature must be 40° F (5° C), or higher, before proceeding with installation. Do not use the tab sealer if the temperature is expected to drop below freezing within 48 hours.
5. Protect tab sealer from freezing. Store product between 50° F (10° C) and 70° F (21° C) for maximum shelf life. Do not store below 40° F (5° C). Shelf life is one year in unopened container when following recommended storage procedures.
6. Duro-Last, Inc. is not responsible for damage that may occur as a result of moisture created from condensation occurring within or beneath a roof deck subassembly or building.
7. Duro-Last recommends the use of vapor barriers, however it is the responsibility of the Duro-Last contractor of record to ensure that all applicable specifications, building codes, regulations and ordinances are complied with and followed. A roofing professional, such as a consultant or architect, should be utilized for correct roof system design prior to installing any roof system.
8. Asphalt-based products are incompatible with the Duro-Last roofing membrane. Should the Duro-Last membrane become contaminated with roofing asphalt, the affected membrane must be cleaned immediately with approved cleaners and procedures. If the asphalt cannot be properly removed from the membrane, the affected membrane must be removed and new membrane installed, or the affected area must be overlaid with an approved slip sheet and new membrane. Extreme caution should be taken if you are doing a tear-off while installing the membrane.
9. EPS insulation cannot be used over coal tar pitch or asphalt without a slip sheet. Duro-Last underlayments are approved for direct application over aged coal tar pitch roofs.

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10. Duro-Last, Inc. does not approve the practice of roofing over existing roofing systems that contain excess water. Excess water is defined as water observed within a core cut or moisture squeezed from the core sample taken.
11. The Duro-Last membrane must not be in contact with substrates that maintain or exceed temperatures of 120º F including all insulated chimney pipes and combustible fuel pipes. See “Mechanically Fastened” details section for installation references.
12. All Polystyrene insulation (Styrofoam, Formular, Dow, EPS, etc. - blue, white, gray, green, or pink) must have an approved non-styrene facer or a 3 mil polyethylene slip sheet covering when installed in direct contact with existing or new PVC membranes. Polyethylene or polypropylene facers are acceptable only after testing, and approval by Duro-Last for compatibility.
13. Phenolic foam is not an approved insulation in new construction or re-roofing applications. The Duro-Last roofing system may not, under any circumstance, be installed over phenolic foam.
14. Perlite and wood/mineral fiber-boards are not acceptable substrates for the Duro-Last membrane.
15. High density wood fiber boards are only acceptable on a metal roof that is being retrofitted.
16. If asbestos is encountered, the building owner must be notified at once. The owner is solely responsible for determining the proper course of action.
17. A Duro-Last roof shall not be installed over areas of roofs if one or more of the following conditions exist:
    a. The building structure is not sufficient to handle the load of the completed system.
    b. It is not possible to find an approved fastener that will properly hold in the substrate.
    c. Roofs are subject to hot embers, slag, or burning debris.
    d. Incompatible chemicals exhausted directly onto the roof or may come in contact with the roof in liquid form. (See “Chemical Resistance”, page 4)
    e. Steam is exhausted directly onto the roof that is in excess of 120º F (49º C).

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