



**DURO-
LAST[®]**
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**Duro-Last[®] Roofing, Inc.
MECHANICALLY-ATTACHED
SPECIFICATIONS
“10 FOOT TAB SYSTEM”**

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MECHANICALLY-FASTENED SYSTEM

SECTION 1---GENERAL

1. INTRODUCTION

The following is the information required to install the Duro-Last Roofing System. Each installation should be in compliance with the detail drawings, instructions, material descriptions, and other information stated herein.

2. REQUIREMENTS

1. The 10 Foot Tab system cannot be used on cementitious wood fiber decks.
2. The Duro-Last Roofing System must be installed by an authorized Duro-Last contractor.
3. The proper slipsheets must be installed between the Duro-Last membrane and the substrate.
4. A Duro-Last quality assurance specialist must inspect the Duro-Last Roofing System for compliance with the Duro-Last specifications before a commercial/industrial warranty is issued.
5. All materials used in the installation of the Duro-Last Roofing System must be products of Duro-Last Roofing, 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.
6. The Duro-Last contractor is responsible for following all applicable building, plumbing and electrical codes.
7. The first tab on all perimeter roof edges must be between 24-36 inches (.6 m and .9 m) from the edge followed by an additional 60-inch (1.52 m) panel. The 10 Foot Tab system is not intended for buildings in excess of 40-feet (12 m) in height and or structures located in wind zones in excess of 120± mph. For these and other special conditions, consult the DURO-LAST ENGINEERING SERVICES DEPARTMENT at 800-248-0280.

SECTION 2---QUALITY ASSURANCE

3. PRE-JOB INSPECTION

CORE CUTS

1. When recovering an existing roofing system, the authorized Duro-Last contractor or representative appointed by Duro-Last Roofing, Inc., will conduct an inspection of the proposed job site roof conditions, determine the needed fastener type and length, moisture content of the existing roofing system, and note damaged areas to be repaired prior to installation of the Duro-Last Roofing System.
2. 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.

PULL TEST

1. Fastener pull-out tests must be conducted on the roof deck with approved fasteners to verify the integrity of the deck and to establish fastening pattern limits which meet the requirements of Duro-Last specifications. Contact the Duro-Last Engineering Services Department at 800-248-0280 with any questions.
2. Pull-out tests must be taken on-site by the fastener manufacturer, the Duro-Last contractor or the Duro-Last sales representative. The sections of decking where integrity is most in question should be the locations for the tests. Values must be documented on a roof drawing locating the test pulls and pull-out test values. In the situations where new construction prevents on-site pull-out tests, a pre-assembled deck representing the proposed deck type should be constructed and tested. The number of pull tests required will be as follows: perform a minimum of 10 pull tests for up to 50,000 sq. ft. and five additional pull tests for each additional 50,000 sq. ft. or portion thereof, on each project. Areas of low pull test results will require additional pull tests.

4. FASTENER SELECTION AND DECK COMBINATIONS

This section is to provide the basis for the decision on type of fastener and fastener spacing required for the application of the membrane on a prepared surface. For installation over particleboard, waferboard, oriented strand board, other wood composite board, and layered sheet gypsum decks, contact the Duro-Last Engineering Services Department at 800-248-0280.

1. **Steel Decks:**
 - Duro-Last HD Threaded Fasteners
 - Duro-Last XHD Threaded Fasteners
2. **Wood Decks:**
 - Duro-Last HD Threaded Fasteners
3. **Structural Concrete Decks:**
 - Duro-Last Concrete Nail
 - Duro-Last Concrete Screw
4. **Gypsum Decks:**
 - Auger Fasteners
5. **Lightweight Concrete**
 - Auger Fasteners
 - Duro-Last HD Threaded Fasteners
6. **Light Gauge Steel Decks:**
 - Duro-Last HD Threaded Fasteners
 - Duro-Last XHD Threaded Fasteners

FASTENER SPACING TABLE*

ALL DECK TYPES

	Pull-out Result (pounds)	Tab Spacing (inches)	Fastening Spacing (inches)
60 PSF Design Table (Field Area Only)	900 (Structural Concrete only)	120" (3.0m)	18" (.45 m)
	600	120" (3.0 m)	12" (.30 m)
	450	120" (3.0 m)	9" (.22 m)
	300	120" (3.0 m)	6" (.15 m)

FASTENER SPACING TABLE*

ALL DECK TYPES

	Pull-out Result (pounds)	Tab Spacing (inches)	Fastening Spacing (inches)
90 PSF Design Table (Field Area Only)	900	120" (3.0 m)	12" (.30 m)
	675	120" (3.0 m)	9" (.22 m)
	450	120" (3.0 m)	6" (.15 m)

NOTE: The first tab on all perimeter roof edges must be between 24-36 inches (.6 m - .9 m) from the edge followed by a second tab placed 84-96 inches (2.1 m - 2.4 m) from the edge. The 10 Foot Tab system is not intended for buildings in excess of 40 feet in height and/or structures located within wind zones in excess of 120 mph. For these and other special conditions, consult the DURO-LAST ENGINEERING SERVICES DEPARTMENT at 800-248-0280.

** Membrane fastening on Duro-Last designed buildings and all Factory Mutual-insured buildings requires special field, perimeter, and corner fastening. The width of the perimeter area is determined by the lesser of .4 times the height to the eaves or .1 times the width of the roof area. The perimeter must never be less than four feet wide. Contact the Duro-Last Engineering Services Department at 800-248-0280 for additional design information.*

NOTE:

1. **Steel, Concrete & Wood Decks:** Fasteners must penetrate into the decking a minimum of 1-inch (25 mm) from the top surface of the decking. Concrete decks require pre-drilling a minimum ½-inch (13 mm) deeper than the required depth of the fasteners using a 3/16-inch (5 mm) bit. Care must be taken not to spall the bottom side of the concrete deck.
2. **Cinder & Concrete Block:** All fasteners must penetrate a minimum of 1-inch (25 mm). Pre-drilling a minimum ½-inch (13 mm) deeper than the required depth of the fasteners using a 3/16-inch (5 mm) bit is required.
3. **Gypsum & Lightweight Concrete:** All fasteners must penetrate a minimum of 1½-inch (38 mm). Pre-drilling is required for auger fasteners. Use a 7/16 – 9/16-inch (11 mm-14 mm) bit. For Factory Mutual designed systems, minimum penetration must be 2-inches into the gypsum.

SECTION 3---IMPLEMENTATION

5. SUBSTRATE PREPARATION

1. RECOVER

- a) If the pea gravel or crushed stone is 1/4-3/8 inches (6 mm - 10 mm) in size and is leveled and maintained at 4 lbs/sq.ft. (20 Kg/m²), then a minimum 3/8-inch (10 mm) Duro-Last supplied underlayment or 1-inch (25 mm) thick insulation must be used. If the loose stone on an old BUR is vacuumed or swept, a separator sheet of a minimum 3/8-inch (12 mm) thickness, such as a Duro-Last approved recovery board, must be used. **CAUTION:** Removing more than the loose gravel may affect the resulting fire rating. Consult the Duro-Last Engineering Services Department at 800-248-0280 for fire rated assemblies.
- b) All existing single-ply roofing membrane must be cut free from the entire roof perimeter, cut free around all penetrations, and sliced prior to the installation of the Duro-Last membrane. When re-roofing after a tear-off, caution should be used to prevent the Duro-Last membrane from contacting incompatible materials. (See Substrate Separation within the General Section for approved substrates)
- c) If the existing system is mechanically attached, there is often a problem with the loose fasteners. Because of this problem, cut the membrane open and remove all loose fasteners before installing the slipsheet.
- d) If a PVC membrane has been installed directly on styrene insulation without a separation sheet, then the old membrane must be removed, damaged insulation replaced, and an approved slipsheet installed.
- e) If the existing membrane is ballasted and the Duro-Last membrane is to be mechanically fastened, it is necessary to do fastener pullout tests on the deck. Also, the type of insulation and its density needs to be determined to insure that the insulation will meet Duro-Last Roofing, Inc. density requirements. (See Substrate Separation within the General Section for approved substrates). Be aware that if the existing insulation is "loose-laid", it must be fastened with an approved fastening pattern. (See Mechanically-Attached Detail 1020)
- f) When roofing over asphalt or coal tar roofs (including tear-off), an approved separator sheet must be used.

2. NEW CONSTRUCTION

- a) All concrete surfaces must be troweled smooth. If the concrete surface is not smooth, a minimum 3/8-inch (10 mm) fanfolded underlayment is required.
- b) The roof deck or existing roof system must be clean, smooth, free of sharp edges, and loose foreign material. Damaged areas and other factors affecting the installation of the Duro-Last Roofing System must be repaired prior to the installation of the membrane.
- c) A metal deck must be separated from the Duro-Last membrane by at least a 1/2-inch (13 mm) hardboard (gypsum, plywood, or oriented strand board) or 1-inch (25 mm) rigid insulation. 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.
- d) All plywood surfaces must be smooth and free of all foreign material. If H-Clips are used in a plywood deck, a separator sheet must be installed over the H-Clips prior to the installation of the membrane. Gaps between sheets of plywood should not exceed 1/4".

6. INSTALLATION

WOOD NAILER

- a) Wood nailers must be #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-lbs. (2,643 N/M) of force per linear foot of nailer in any direction. Fasteners used to attach wood nailers must be spaced no greater than 18-inches (.46 m) 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.

INSULATION SELECTION AND INSTALLATION

- a) Insulation products must be neatly fitted to the roof deck and its penetrations. 4' x 8' insulation boards must have five fasteners/distribution plates. No gap should exceed a 1/4-inch (6 mm) in width. No more insulation products will 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.
- b) 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: 18 PSI (124.1 kPa) and 1.5 PCF (24 Kg/m³) 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) density and a minimum of 1-inch (25 mm) thick.

MEMBRANE INSTALLATION

- a) The prefabricated roof section is positioned on the deck to expose the first securement tab. The securement tab is mechanically fastened to the deck with approved fasteners, and stress distribution plates (see Fastener Selection and Deck Combinations in this section). The roof section is then unrolled and pulled taut to remove any wrinkles exposing the second securement tab. This process is repeated until the entire roof section has been mechanically attached to the deck, including all securement tabs and all edges. The next section of roofing membrane is then positioned to provide a minimum 6-inch (.15 m) overlap. The above processes are repeated until the substrate is completely covered.
- b) The edge of the 2-inch (50 mm) Poly-Plate must be installed even with the outside edge of the fastening tab.
- c) The maximum fastener spacing is 12-inches (.30 m) on center in rows 120-inches (3 m) apart. Refer to the fastener spacing table on page 3 of the "Mechanically Attached **10 Foot Tab** Specifications".
- d) When installing membrane, ensure that the appropriate side of the membrane is exposed to elements. For white and gray membrane, the smooth side should be exposed. On the tan membrane, it will be the embossed side of the membrane that should be exposed.

PERIMETER MEMBRANE INSTALLATION

- a) The first tab on all perimeter roof edges must be between 24-36 inches (.6 m and .9 m) from the edge followed by a second tab placed 84-96 inches (2.1 m and 2.4 m) from the edge.
- b) On buildings where multiple levels of roof exist, such as equipment penthouses, a roof perimeter edge is defined as any roof having a vertical height difference 3 feet or greater than the lower roof areas surrounding it. If this roof condition exists, than that area must be treated as a separate roof and will require a perimeter tab. See note "a".

HOT AIR WELDING

- a) Position the membrane so as to allow an overlap of the top membrane onto the bottom membrane a minimum of 6-inches. Ensure the welding area is clean and free of foreign material.
- b) Weld the top membrane to the bottom membrane using a hand held welder or an automatic welding machine, and silicone roller. A minimum 1½-inch (38 mm) wide continuous weld is required.
- c) All field-welded seams must be inspected with a tack claw and all deficiencies repaired prior to inspection by Duro-Last.

FLASHINGS

- a) See "Mechanically-Attached Details" section for installation references.

TWO-WAY AIR VENT

- a) Two-Way Air Vents must be installed at a density of one vent for every 1,000 square feet of deck membrane. The Two-Way Air Vents must be evenly spaced across the roof area and centered between rows of fastening tabs. See "Mechanically-Attached Details" section for installation references.
- b) Two-Way Air Vents are not to be installed in valleys.

ROOF DRAIN

- a) All existing roofing materials must be removed from drain bowl and clamping ring. 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. See "Mechanically-Attached Details" section for installation references.

EXPANSION JOINT

- a) See "Mechanically-Attached Details" section for installation references.

PITCH PAN

- a) See "Mechanically-Attached Details" section for installation references.

WALKWAY PAD

Duro-Last Roof Trak® II Walkway Pad is recommended at all roof access points, service units and high traffic areas. Building owners who choose not to purchase the Roof Trak II Walkway Pad increase their risk of potential third party damage to the Duro-Last Roofing System. **Note:** Weld only one side of the Walkway Pad if field seams are present so that a Duro-Last inspector can inspect them.

7. CAUTIONS AND WARNINGS

1. Duro-Last Roofing, Inc. will not be responsible for damage that may occur as a result of the dew point falling within a roof deck subassembly or building.
2. Asphalt-based products are incompatible with the Duro-Last roofing membrane. Should the Duro-Last membrane become soiled with roofing asphalt, the affected membrane must be cleaned immediately using approved cleaners and procedures. If the asphalt cannot be properly cleaned from the membrane, the affected membrane must be removed and new membrane installed, or overlay the affected area with an approved slip-sheet and new membrane.
3. 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.
4. The Duro-Last membrane must not be in contact with substrates that maintain or exceed temperatures of 120°F including all insulated chimney pipes and combustible fuel pipes. See "Mechanically-Attached Details Section" for installation references.
5. Duro-Last Roofing, Inc. does not approve the practice of roofing over existing roofing systems that contain excess water. This is water observed by taking core cuts, seeing standing water in the core or having water flowing into the cut, or squeezing the core sample and getting water droplets.
6. All Polystyrene insulation (Styrofoam, Formular, Dow, EPS, etc. - blue, white, gray, green, or pink) must have an approved nonstyrene facer or a 3-mil polyethylene slipsheet covering when installed in contact with existing or new PVC membranes. Polyethylene or polypropylene facers are acceptable only after testing, and approval by Duro-Last for compatibility.
7. 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.
8. If asbestos is encountered, the building owner must be notified at once. The owner is solely responsible for determining the proper course of action.
9. 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 in the General Section)
 - e. Steam is exhausted directly onto the roof that is in excess of 120° F.
10. When determining what plates to use and where to use them, refer to the following table:

	2" Poly-Plate	2" Barbed Metal**	3" Square Metal	Insulation Plate
Fastening Tabs	Yes	Yes	No	No
Parapet Flashings	Yes	Yes	Yes	No
Penetrations	Yes	Yes	Yes	No
Insulation	Yes	No	Yes	Yes

**By deviation only.

