An Architect's Guide To The Duro-Last Roofing System

DURO-LAST®
ROOFING, INC.

Duro-Last®
The World's Best Roof®

Specify the Proven Performer®:
The Duro-Last Roofing System
Dealing with building designs and roofing details can be a daily challenge for you. No matter how simple or complex your project might be, at Duro-Last® Roofing, Inc., our philosophy is: *if you can draw it, we can make it*. Our approach is unique in the commercial roofing industry because the entire system that you design – from deck sheets and parapet walls to penetrations and edge details – is prefabricated in our controlled factory environment, rather than manufactured on the rooftop.

If your project requires a unique configuration, additional fastening strength, or a special wind, fire or hail assembly, Duro-Last’s experienced team of engineers can help you design it. Then we’ll make the roofing system in our factory to your specifications, ready to be installed at the job site.

Duro-Last’s precision fabrication expertise means that you and your clients are assured superior water-tight protection for years to come.

Duro-Last offers the best design support in the roofing industry. Whether you need CAD drawings for a meeting, specifications for a unique project, or an answer to a technical question, we provide the resources you need to get the job done.

Over a billion square feet of Duro-Last membrane have been installed since 1978. Our reputation for quality stems from long-term, steady company ownership, a time-tested product formulation, and a highly-refined installation method that relies on reputable, factory-authorized contractors.

For your next roofing project, draw on the quality, reliability, and durability delivered by the “World’s Best Roof”* – the precision-fabricated Duro-Last roofing system.
Prefabrication…The Duro-Last Difference

Roof leaks usually stem from installation errors – not surprising, considering how challenging a rooftop environment can be and the amount of hands-on labor a typical roof installation requires.

Duro-Last addresses this issue by prefabricating every roofing system in a controlled factory environment. By manufacturing each roof to specification, using state-of-the-art technology, Duro-Last reduces the amount of field welding that contractors must perform on the rooftop by 80-85%. This significantly reduces the likelihood of leaks developing in the future.

Duro-Last’s edge-to-edge precision fabrication provides peace of mind, ensuring a predictable installation that delivers long-term, worry-free, leak-proof protection.

Less Seaming Means An Easier, More Reliable Installation

The diagrams shown at the right compare the seaming required on a typical 42,000 square-foot roof using EPDM roll goods and the prefabricated Duro-Last roofing system. The red lines on both diagrams indicate the amount of on-site rooftop seaming required. The blue lines on the Duro-Last diagram show the seams that are completed in the Duro-Last factory.* By eliminating most on-site rooftop seaming, we substantially reduce the potential for leaks and add the advantages of faster, quieter installations, less maintenance, and reliable roof performance.

* The Duro-Last roofing system has similar seaming advantages over other rolled systems that must be constructed on the rooftop, including modified cap sheet and TPO.
With the Duro-Last roofing system, you design the roof, and we build it. Deck sheets are custom-prefabricated in sections of up to 2,500 square feet each. Plus, we produce virtually all other components in our controlled factory environment. The illustrations and photographs on these pages represent only a small portion of the functional and aesthetic accessories that we offer. Custom prefabricated stack and curb flashings eliminate nearly all rooftop labor from the most critical roof areas – penetrations and transitions. Our EXCEPTIONAL® Metals subsidiary makes a wide variety of standard and custom metal details, providing the integrity and appearance your clients expect.

Note: Illustrations are not to scale.
Duro-Last and EXCEPTIONAL Metals offer a single source of prefabricated roofing materials manufactured for unsurpassed protection, durability, and efficiency.

Duro-Last membrane
Fastening tab
Prefabricated Deck Sheet
Prefabricated Wall Flashing
Duro-Last factory welds

Exceptional Roofs Require Exceptional Details

Duro-Last and EXCEPTIONAL Metals offer a single source of prefabricated roofing materials manufactured for unsurpassed protection, durability, and efficiency.
The Duro-Last roofing membrane is extremely durable and compatible with dozens of chemicals, construction products, and other materials. Some of the most common are below. For information about materials not listed, contact the Duro-Last Engineering Services Department at 800-248-0280.

- Acid Rain
- Acrylic/Latex Paint
- Bird Droppings
- Bleach
- Brick & Masonry Cleaner
- Cooking Grease
- Detergent Solution
- Diatomaceous Earth
- Ethyl/Methyl Alcohol
- Furnace Residue
- Hydrofluoric Acid Cleaner
- Incinerator Ash
- Linseed Oil
- Nitrogen Sulfate
- Polyethylene
- Polypropylene
- Sea Water
- Soldering Acid/Flux
- Tannic Acid
- Triethylene Glycol

### PHYSICAL PROPERTIES

<table>
<thead>
<tr>
<th>Test Description</th>
<th>Test Method</th>
<th>Metric Results</th>
<th>U.S. Standard Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness-Nominal</td>
<td>ASTM D 751</td>
<td>1 mm.</td>
<td>40 mil - Type IV (50 and 60 mil also available)</td>
</tr>
<tr>
<td>Breaking Strength</td>
<td>ASTM D 751 - Grab Method</td>
<td>1579 x 1961 N</td>
<td>355 x 441 lbf./in.</td>
</tr>
<tr>
<td>Elongation at Break</td>
<td>ASTM D 751 - Grab Method</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td>Heat Aging</td>
<td>ASTM 3045, 56 days @ 176˚F</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>Factory Seam Strength</td>
<td>ASTM D 751 - Grab Method</td>
<td>2081 N</td>
<td>468 lbf.</td>
</tr>
<tr>
<td>Tearing Strength</td>
<td>ASTM D 751 - Procedure B</td>
<td>404 x 569 N</td>
<td>91 x 128 lbf.</td>
</tr>
<tr>
<td>Low Temperature Bend</td>
<td>ASTM D 2136-@-40˚F</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>Accelerated Weathering</td>
<td>ASTM G 154 (Formerly G53)</td>
<td>No cracking, checking, crazing or erosion at 5,000 hours of exposure. Pass</td>
<td></td>
</tr>
<tr>
<td>Linear Dimensional Change</td>
<td>ASTM D 1204 - 6 hrs. @ 176˚F</td>
<td>-0.2%</td>
<td></td>
</tr>
<tr>
<td>Water Absorption</td>
<td>ASTM D 570 - 166 hrs. @ 158˚F</td>
<td>1.40%</td>
<td></td>
</tr>
<tr>
<td>Static Puncture</td>
<td>ASTM D 5602</td>
<td>25 kg.</td>
<td>56 lb.</td>
</tr>
<tr>
<td>Dynamic Puncture</td>
<td>ASTM D 5635</td>
<td>20 J</td>
<td>474 pdl-ft.</td>
</tr>
</tbody>
</table>

### Fungi Resistance

- ASTM G-21
- No sustained growth or discoloration

### Solar Reflectance

- ASTM C1549
- 88%

### Thermal Emittance

- ASTM C1371-98
- 87%

### Thermal Emissivity

- ASTM E408
- 95%

### EMAQUA Exposure

- ASTM G90, Desert Sun
- 339,790 M/J/m²
- >8.1 million Langleys

### Moisture Vapor Transmission

- <.086 g/hr/m²
- <.25 U.S. Perms

### Weight

- ASTM D 751
- 1.1 kg per m²
- .22 lb. per ft²

### Underwriters Laboratories

- UL-790
- Classes A, B & C approved

### Factory Mutual Research

- ASTM E-108; FM 4450 & FM 4470

### Additional Tests

- Fungi Resistance
- Solar Reflectance
- Thermal Emittance
- Thermal Emissivity
- EMAQUA Exposure
- Moisture Vapor Transmission
- Weight
- Underwriters Laboratories
- Factory Mutual Research

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You depend on a roofing system that can offer the physical performance properties that your clients demand. The Duro-Last roofing system has successfully passed the following tests for single-ply roofing systems.

The Duro-Last membrane is available in terra cotta, tan, dark gray, gray, and white.
As a registered provider of AIA/CES courses, Duro-Last offers the following:

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Course No.</th>
<th>Description</th>
<th>HSW*</th>
<th>SD*</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-Hour Roofing Fabrication Facility Tour</td>
<td>STD001</td>
<td>Tour of a roof system fabricating plant.</td>
<td>Yes</td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Two-Hour Roofing Fabrication Facility Tour</td>
<td>STD002</td>
<td>Tour of a roof system fabricating plant and classroom session with demonstration.</td>
<td>Yes</td>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>Three-Hour Saginaw Facility Tour</td>
<td>STD003</td>
<td>Guided tour of roofing system manufacturing complex, including knitting, calendering, lamination, laboratory, and classroom demo.</td>
<td>Yes</td>
<td>No</td>
<td>3</td>
</tr>
<tr>
<td>Thermoplastic Roofing – Materials And Systems</td>
<td>STD004</td>
<td>Overview of single-ply roofing systems, characteristics of major players, key selection criteria.</td>
<td>Yes</td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Energy Studies, Codes, And The Sustainable Roof</td>
<td>STD006</td>
<td>Summary and background on reflective roofing and environmental impacts, sustainable design, and life-cycle costs.</td>
<td>Yes</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Rooftop Job Site Tour</td>
<td>STD007</td>
<td>Guided tour of roofing installation in progress.</td>
<td>Yes</td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Cool Thermoplastic Roofing Systems For Sustainable Buildings</td>
<td>STD008</td>
<td>Thermoplastic roofing as a component of high performance buildings. Review infrared case studies for cool roofs.</td>
<td>Yes</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>PVC Single-Plies As Sustainable Roofing Systems</td>
<td>STD009</td>
<td>Review of current issues regarding PVC-based roofing and comparison of thermoplastic single-plies to alternative systems.</td>
<td>Yes</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Beyond Cool And Sustainable – The Five E’s Of High Performance</td>
<td>STD010</td>
<td>Identify and discuss “Five E’s” of high-performance roofing, review checklist of high-performance attributes.</td>
<td>Yes</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Green Roof 101 sign team.</td>
<td>STD011</td>
<td>Description and benefits of vegetative roof systems, selecting a design team.</td>
<td>Yes</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>High Performance Vinyl Roofing – An Active Asset</td>
<td>STD012</td>
<td>Summary of what makes vinyl roofing sustainable and how companies include sustainable activities throughout their processes and facilities</td>
<td>Yes</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Integrating Single-Ply Roofing With Photovoltaic Arrays</td>
<td>STD013</td>
<td>Summary of rooftop solar systems and integration with the roof system.</td>
<td>Yes</td>
<td>Yes</td>
<td>1</td>
</tr>
</tbody>
</table>

* HSW – Health, Safety, and Welfare  
* SD – Sustainable Design
You depend on a roofing system that has the code approvals your clients require. The Duro-Last roofing system has met or exceeded all major fire/wind code requirements, and obtained necessary regional approvals throughout the United States and Canada.

Duro-Last participates in all major technical committees in the roofing industry, plus the American Society of Testing Materials (ASTM); American Institute of Architects (AIA); Construction Specification Institute (CSI); Roof Consultants Institute (RCI); National Roofing Contractors Association (NRCA); and the Single Ply Roofing Industry (SPRI).

Duro-Last is a charter partner of the ENERGY STAR® Roof Products Program; a charter member of the Cool Roof Rating Council (CRRC); and a member of the United States Green Building Council (USGBC). Duro-Last is also a member of the Vinyl Roofing Division of the Chemical Fabrics and Film Association (CFFA).

The “World’s Best Roof”® is backed by the roofing industry’s best warranty.

Duro-Last warranties provide unparalleled security for virtually all commercial roofing applications. Our standard, comprehensive 15-Year No Dollar Limit (NDL) Warranty is the best in the industry. It’s transferable, has no exclusions for ponding water, and provides coverage against consequential damages that result from material defects and the authorized contractor’s installation of Duro-Last products. We also offer 20-year warranties that include 15 years of consequential damage coverage as well as warranties for installations in hail and/or high-wind areas.

Draw on the experience of Duro-Last. With almost 30 years of delivering leak-proof protection for buildings of all types across North America, the precision-fabricated Duro-Last roofing system is the right choice for your next roofing project.