

The D's of Decking

Waterproofing Flat Roof Decks

When waterproofing a walkable roof deck, there are a number of important principles to consider:

- **Deflection**
- **Drainage**
- **Drying**
- **Durability**
- **Detailing**
- **Deconstruction**

Each plays a key role in the performance of the deck, waterproofing system and building envelope.



Roof deck by Duradek MidAtlantic

Deflection

Deflection refers to a deck's ability to control surface water and is affected by a number of factors, including slope, drip edges, and diverters.

In multi-story buildings where decks or balconies are stacked, the structure below will benefit from the overhang provided by the balcony above.

If a deck is designed correctly, water will flow where you want it to go; away from the building into a gutter system or over a drip edge away from the exterior wall system.

Slope

A proper deck slope of 1/4" in 12 will help reduce the possibility of ponding water, even with building shrinkage or settlement.

False fascia detail can be used to hide gutter, fascia, railing mounts and deck slope.

Given the proper slope, a simple drip edge detail is typically the most expedient way of removing surface water from the deck surface.

Diverters

Once the deck has been designed with the proper slope, it is critical that water be deflected away from deck transitions at adjoining walls.

Even a rain-screen wall system would have difficulty handling the volume of water flowing from a deck surface that is not diverted properly.

Simple pre-manufactured diverters can be installed on the deck surface and waterproofed to easily deflect water away from any critical areas.

The images below show three simple, but effective cricket and flap water diverters.

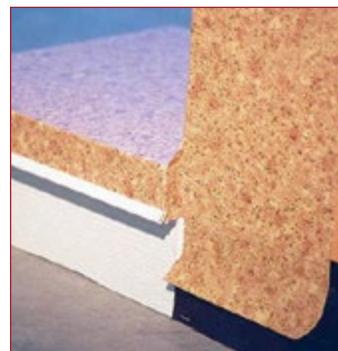
Severe structural damage can occur when water is not properly diverted.



a.)



b.)



c.)

Diverters, a critical component to waterproofing by utilizing deflection for routing surface water on decks.

a.) Corner Diverter

b.) Mid Span Diverter

c.) Wall Return Diverter



Severe structural damage can occur when water is not properly diverted.

Drainage

Drainage refers to the ability of the building assembly to redirect any liquid water that enters the building envelope and allows it to drain to the outside.

Drainage depends on the proper sequencing of moisture barriers and detailing of wall openings and posts.

Proper wrapping of rough door opening jambs and sloping of door sill framing members will help deflect any trapped moisture to the outside.

Flashing

Flashing is a critical component of the deck waterproofing system and must be correctly integrated with the PVC waterproofing membrane.

Flashing may be used to tie a new PVC membrane into the existing wall membrane and wall cladding.

Alternately, the PVC membrane can be brought up the existing wall and covered with metal reglet flashing or through-wall flashing as required.

Curbs or knee walls greater than 3" in height or higher than any wall opening result in a "trapped" deck system that requires special drainage.

With trapped decks, it is important to ensure that the top plate of the curb or knee wall slopes back toward the deck surface (at about 1 in 6).



Cap Flashing on curb with 1 in 6 slope.



Outside Drip Edge Flashing:
Option 1 - pvc clip over wrapped metal (left)
Option 2 - pvc coated metal (right).

In addition, the membrane should extend to the line of the outside drip edge, which should extend well out from the building wall surface.

Incorrect detailing of flashing elements will lead to leaks and water damage.

Sequencing

Proper sequencing of moisture barriers is critical. For example, on a knee or pony wall, a peel and stick capping membrane should overlap two layers of building paper, which in turn overlay the PVC membrane.

Installing the PVC membrane after the wall assembly has been completed will almost always lead to failure.

It is also recommended that the PVC waterproofing membrane extend a minimum of 6" up the vertical surface, behind the water shedding membrane.

Posts are another deck element where proper construction and sequencing of moisture barriers is essential.



Sequencing details for flashing at inside perimeter.



Post with sequencing of membrane, moisture barrier and siding.

To waterproof posts, they must be covered with a moisture barrier and then finished with siding.

For applications where the dramatic effect of a rough hewn wood post is required, special consideration must be made for post attachment.

Curbs, knee walls, posts, and wall openings must be constructed and detailed properly to ensure the performance of the membrane.

Whether modifying an existing door opening or constructing a new door opening, the sill should be sloped toward the deck surface.

In addition, the waterproof membrane should continue into and waterproof the rough door opening saddle in order to deflect any moisture intrusion.

Improper sequencing of building components can lead to severe moisture intrusion.

Drainage

In addition to a properly sized deck drain(s), building authorities may require overflow drains or scupper boxes on trapped decks to provide an additional path for water to drain from the deck.

ABS-shower drains are typically not suitable for any roof deck or multi-family building applications.

Only PVC-coated drains or drains with a positive clamping system are suitable to allow water to drain into the building's storm water system.

With PVC-coated overflow devices, the PVC decking membrane can be welded directly to the PVC-coated surface, with no caulking required.

Drains and scuppers should be sloped toward the outside and scuppers should be let into the deck surface so as not to allow ponding to occur.

In general, scuppers are very difficult to detail in such a way as to make them truly impervious to wind, rain, snow, and structural deflection.



Slope, drains and PVC Coated Scuppers allow water to drain off a trapped deck.

Drying

Drying refers to any features of the building assembly that speed the drying of materials that have been exposed to moisture.

Drying can be aided by the use of a rain screen wall assembly or by the venting of trapped air spaces.

Venting of the air space underneath decks, balconies, and walkways with a closed soffit or ceiling is especially important for adequate drying.

Ventilation

If the underside of a roof deck, balcony, or walkway has a closed soffit or ceiling, venting is required in order to reduce moisture buildup. Follow local building code for venting requirements.

Insufficient ventilation of the deck space can lead to mold, mildew, and rot.

Durability

Durability refers to assemblies and materials that are tolerant of foot traffic, moisture, mildew, chemicals, and environmental conditions. The durability of the assembly will be affected by the selected waterproofing membrane.

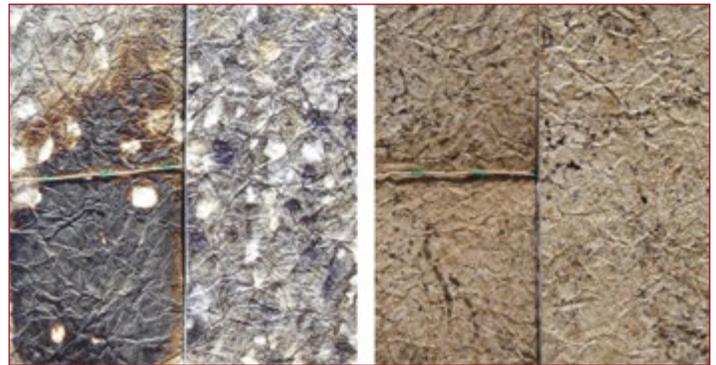
Durability will also be affected by the overall maintenance of the membrane.

In terms of durability, today's waterproof PVC membranes can be expected to last for 15 – 20 years or longer depending on the environment, UV exposure, service use and maintenance.

The quality of the ingredients can vary the price of a similar looking membrane by 25%, and the life expectancy by 75%.

These photos below show accelerated testing samples of two different materials with approximately 840 MJ/m² UV = 3 years of Florida sun exposure.

Testing samples shown have test strips on left side (exposed) and control strips on right side (unexposed). You can see UV effects can vary widely.



Accelerated Weather Testing Comparison - Standard Test Method ASTM G90 conducted by Atlas Material Testing Services. Samples from two different vinyl manufacturers.

Model Building codes dictate the requirements for roof and walking deck membranes.

Roof Covering Classification

When deemed required, roof membranes are tested in accordance with nationally recognized standards, i.e.

- ASTM E-108 (International Codes),
- ULC-S107 (NBC), for Class "A", "B"

Material Standards

PVC Roof and Walking Deck Membranes must conform to the same material standards as PVC Roofing and Waterproofing Membranes. CAN/CGSB– 37.54 is a recognized standard by both the International Codes and NBC. This standard acts as a basis for evaluating PVC membranes used on decking that is subject to pedestrian traffic.

Suitability

PVC Roofing membranes that are specifically designed to sustain pedestrian traffic can be accepted as long as they demonstrate compliance with the performance features of the applicable code. In the United States, ICC Evaluation Service evaluates Roof and Walking Deck Membranes in accordance with the ICC-ES interim Criteria for Walking decks (AC39).

In Canada, PVC Sheet-Applied Waterproof Decking Membranes must comply with CMHC's CCMC technical guide Masterformat number 07543.

Quality Control

Products should be manufactured under an approved quality control program with inspections by an inspection agency accredited by the International Accreditation Service (IAS).



Compatibility

It is important to ensure that all components of the waterproofing system are compatible and will not adversely affect performance.

This includes the membrane, along with any tapes, sealants, adhesives, drains, scupper boxes, flashings, or perimeter fastening devices.



Compatibility is an important consideration in order to avoid messy situations like with this peel & stick membrane incompatibility.

While asphalt paper (building paper) is compatible with pvc membranes, asphaltic membranes are not. Protective separation can be provided with an aluminum foil tape, thin sheet of metal or asphalt compatible thermoplastic membrane.

Maintenance

Waterproof PVC roof deck and flooring systems are highly durable and easy to maintain with periodic washing to remove surface dirt.

In areas of environmental pollution or heavy service use, membranes may require washing with a scrub brush and mild detergent or pressure washing.

Regular inspection of caulking and immediate attention to any loose seaming will ensure that the PVC membrane lasts for years to come.

Detailing

Detailing refers to the workmanship involved in installing materials and assemblies such that they are water-tight and aesthetically appealing.

A good or bad detail can often mean the difference between a good and a bad installation.

Good workmanship and proper detailing are critical to the long-term performance of a waterproof walkable roofing system.

Waterproofing systems should always be installed by manufacturer-approved and/or trained technicians.

PVC membranes can be hot-air welded to provide a completely water-proof seam, making them well suited to fine detailing.

Poor workmanship and improper detailing results in poor deck performance.



Welding with a hot-air gun provides a reliable, water-tight seal best obtained with the skilled techniques of professional installation.

Various details can be used to reduce the possibility of water intrusion at railing post connections.



PVC coated gutter system with curves and corner details.



Raised base plate railing post detail.

Deconstruction

Deconstruction refers to the use of waterproofing solutions that offer long-term life expectancy as well as ease of replacement.

Deconstruction is a relatively new concern that has become increasingly important for “green” construction and some manufacturers have a program in place for recycling deconstructed materials.

Demountable flashing systems are one way to reduce the amount of deconstruction required to repair or replace a waterproofing membrane.

In terms of durability, today’s waterproof PVC membranes can be expected to last for 10 to 15 years with proper care and cleaning.

As for ease of replacement, one way to significantly reduce the amount of deconstruction required is to use demountable flashing systems.

These systems are easy to remove and allow the PVC membrane to be repaired or replaced quickly and easily with minimum destruction.

Deck Railing Mounting Options



a.)



b.)



c.)



d.)

Railing Mounting Options:

- a.) Fascia Mounted
- b.) Fascia Mounted with trim board to hide slope and gutters
- c.) Surface Mounted
- d.) Combination of surface and fascia mounted



Various installation stages to accommodate deconstruction for ease of replacement of membrane systems.

Quick Links for Duradek:

- [3-Part Specifications](#)
- [BIM and CAD](#)
- [Testing and Approvals](#)
- [AIA CES Course](#)

Check off Your D's When Designing Your Deck

By following the points outlined in the D's of Decking; Waterproofing Decks Over Living Space and ensuring each of these critical details are given consideration, you will have significantly increased the longevity of your roof deck.

This investment in avoiding costly repairs or replacement allows the homeowner their time and resources to be dedicated to purely enjoying the deck and the quality of life that brings.

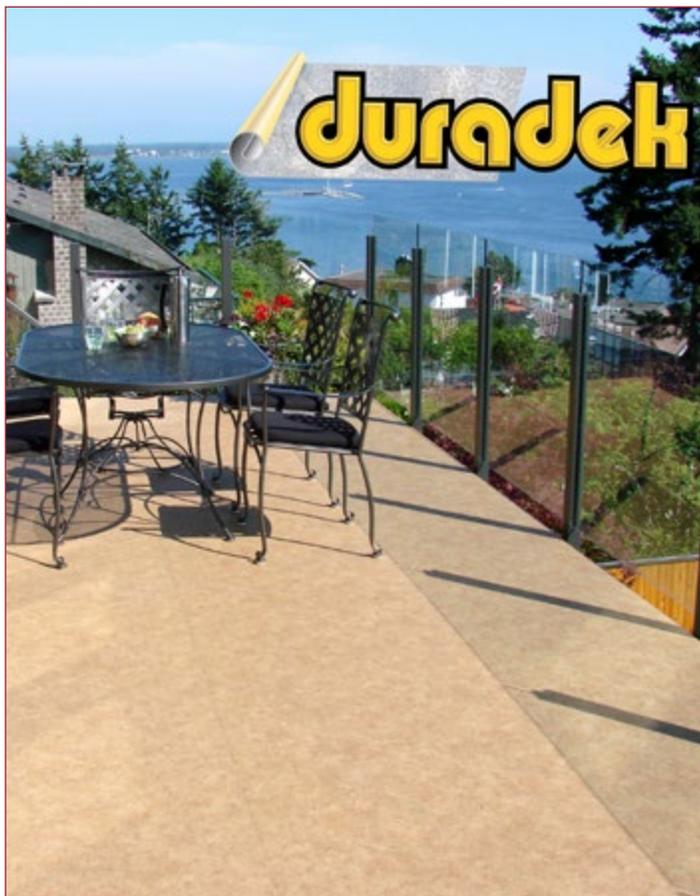
In addition to these best practices, always be sure to check your local building code requirements to ensure your project is planned to meet all necessary details as they can vary from region to region.

It's All In The Details

Each of the elements involved in the D's of Waterproofing demand a notable degree of attention individually in order to work together cohesively.

Duradek provides a collection of **BIM models** and **40 Detail Drawings** available in .dwg, .dwf and .pdf formats for free download on their website:

<http://www.duradek.com/bim-and-cad-drawings/>



Deflection $1/12$ slope away from the house.



Drainage use of drains and scuppers with slope.



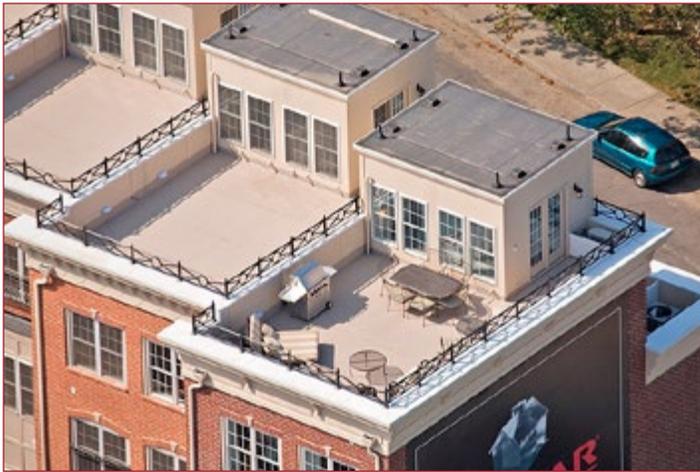
Drying and Durability are considerations.



Detailing is critical for success.



Deconstruction sequencing for replacement ease.



Duradek President, John Ogilvie's Bio

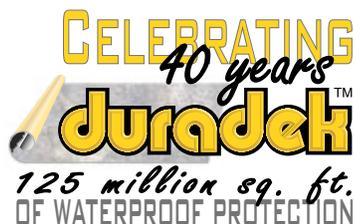
John Ogilvie is a pioneer in pvc waterproofing and has been involved with waterproofing decks and balconies with Duradek since 1976. When the concept of a decorated, textured pvc membrane being glued to an outdoor pedestrian traffic surface was just in its infancy, Mr. Ogilvie started a contracting company focused on its sales and application. After successfully establishing the product's introduction in the greater Vancouver market, he and his partner purchased a significant shareholding in the organization that developed the product line (they have subsequently become the sole owners).



With his contracting and marketing background, Mr. Ogilvie has been instrumental in development of the vinyl waterproofing products and installation that are currently being marketed all over North America. Mr. Ogilvie was a key figure in developing the product line into the industry's first approved "walkable roof deck pvc system". He is currently involved in teaching new contracting firms how to install the products, certifying "journeymen" installers, as well as running "Best Practices for Deck Waterproofing" seminars to building envelope specialists in Canada and the U.S.

Duradek, the original vinyl deck waterproofing membrane hit the notable benchmark of 40 years in business. Having grown from pioneering product to leading brand in the competitive niche market of deck waterproofing, our job is to protect where you live and allow you to enjoy it as much as possible.

Originally conceived by two contractors in British Columbia's Okanagan region in 1974, Duradek was inspired by a marine vinyl used to cover the interior floor of small boats. These two boating enthusiasts recognized that the attractive, slip resistant vinyl surface, tough enough for wear, waterproof and easy to clean could be a perfect solution for the lake view decks so popular in the region...and an industry was born! [**Download the full Duradek Story. \(753 kb .pdf\)**](#)



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