The Essential Guide

Single-Ply Membrane Roofing

Everything you need to know before installing a new commercial roof.

West Roofing Systems, Inc.

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CHAPTER ONE

What is Single-Ply Membrane Roofing?

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Single-Ply Membranes are sheets of rubber and other synthetics that can be ballasted, mechanically fastened or chemically adhered to insulation creating a layer of protection on your commercial facility.

While Single-Ply Membrane Roofing is one of the most well-known types of commercial roofing material, there are several types to fit your budget and facility needs.

Types of Single-Ply Membrane Roofing

There are two main types of single-ply membrane commercial roofing: Thermoplastic Polyolefin (TPO) and Ethylene Propylene Diene Terpolymer (EPDM). They differ in their chemical makeup, how they are installed and their energy efficiencies.

TPO

One of the fastest growing commercial roofing systems on the market, TPO roofing systems are made up of a single layer of synthetics and reinforcing scrim that can be used to cover flat roofs. TPO has gained industry acceptance with the natural reflective surface to reflect UV rays.

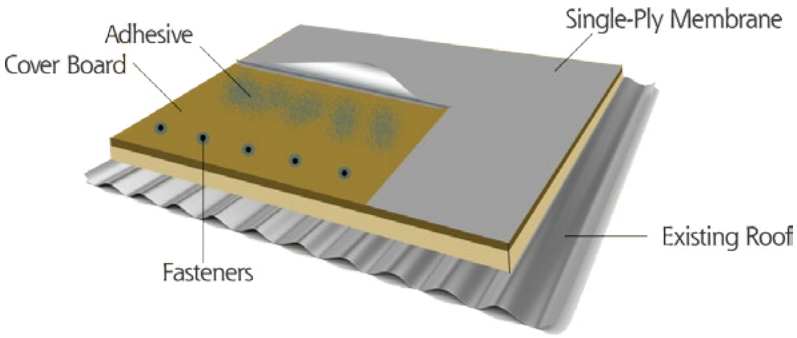
EPDM

EPDM consists of a synthetic rubber compound that allows it to be flexible. EPDM has been used on commercial roofing facilities since the 1960s and is considered a time-tested option.

While TPO has a natural white color, EPDM results in a dark gray or black color for your roof. While the darker color is not helpful in reflecting UV rays, it does retain heat and can be useful in cooler weather.

How Single-Ply Membrane Roofing is Installed

The beginning of the installation process is similar between TPO and EPDM single-ply membrane roofing systems.



After the existing substrate is prepared, either by cleaning or removing the existing roof, the insulation is installed.

There are a few types of insulation options the facility manager/owner can to choose from:

- Polyisocyanurate (Polyiso)
- Expanded Polystyrene (EPS)
- Extruded Polystyrene (XPS)

After the existing substrate is prepared, either by cleaning or removing the existing roof, the insulation layers are installed. Generally, a cover board is placed on top for the membrane to be adhered to. The membrane is then attached to the cover board one of three ways:

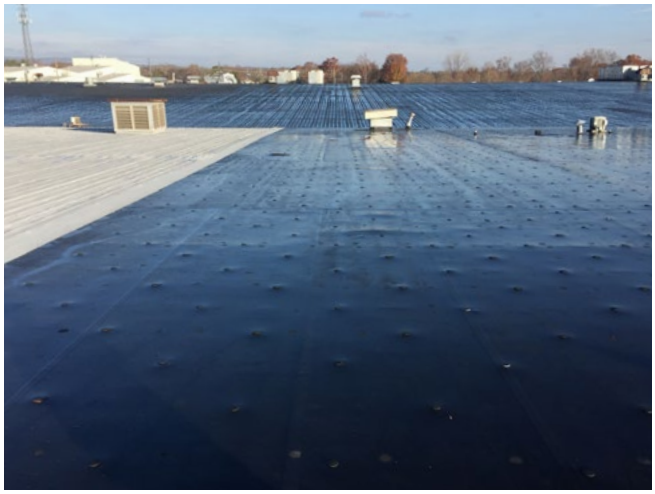
- Ballasted
- Mechanically Fastened
- Chemically Adhered

Both TPO and EPDM membranes are manufactured in sheets that are 10, 12 or 20 feet wide. These sheets are then rolled up and taken to the commercial facility. As the contractors are applying the membrane, sheets roll out overlapping on the sides.

The significant difference between TPO and EPDM comes when it is time to adhere the seams together.

TPO

Thermoplastic Polyolefin is a single-ply membrane, the TPO membrane can be attached to the cover board with a bonding adhesive or mechanically fastened. When the membrane is rolled out, the contractor then returns and uses a hot-air gun to hot air weld the seams together.



EPDM

Ethylene Propylene Diene Monomer, like TPO, is mechanically fastened or adhered to the cover board. The membrane is rolled out on the flat roof, then the contractor returns and secures the seams with a layer of seam tape or an additional adhesive.

FREE DOWNLOAD

Download our TPO vs EPDM infographic today and compare the two types of single-ply membrane roofing head to head.

Download today!

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CHAPTER TWO

What Does Single-Ply Membrane Roofing Cost?

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There are many factors that can affect the price of a commercial roof; from the climate to the material choices.

So, in this section, will review the average price of a single-ply membrane roof and break down factors that could change your price. Keep in mind that when you are looking to invest in a new roofing system, it's a good idea to get a couple of quotes from different contractors.

For an average 20,000 sq. foot commercial roof, it will usually cost between **$3.50 and $7.50 per square foot** in materials and labor to install a typical single-ply membrane commercial roofing system.

To get the best roofing system for the right price, you will need to consider these key factors:

- The Size of Your Roof
- Access to Roof
- Condition of Existing Roof
- Insulation Choice
- Membrane Choice
- Roof Penetrations
- Installation Choice
- Type of Warranty

In the next section, we will review each of these key aspects that affect the price of a single-ply membrane roofing system.

Please note that the prices listed in the guide are not a quote. For actual pricing, please contact our team for a quote.

Factors for Single-Ply Membrane Roofing Cost

The Size of Roof

When a contractor is pricing a new roofing system, the economies of scale starts around 20,000 square feet; which means after 20,000 square feet you can start saving money per square foot of roof.

Other size factors that can impact your cost also include:

- The logistics of moving equipment up to and across a large roof
- Debris removal costs
- Material transport costs – this cost can take up 2-3% of the total project costs

Access to Roof

Not all commercial roofs are flat; not all roofs can be walked on. Additional costs can occur when your contractor has limited access to the facility roof.

Height and distances of the roof can be multipliers for the cost of your roof installation. Sloped roofs often require the contractors to use a man lift or rappelling gear for roof installation. Contractors may need to rent conveyance equipment such as a crane or passenger hoist to move the crew and equipment.

Condition of Existing Roof

The condition of your existing roof will be a crucial factor in the cost of your new Single-Ply Membrane roof. There are three options when dealing with the existing roof:

1. **Clean and Prepare Existing Roof (No Significant Alterations)**
   $0.10 – $0.75/sq. foot
   When you have a solid roof that doesn't require major modifications or corrections or removal, the contractor will need to clean and prepare the roof.

2. **Recovery Board Fastened on top of existing roof**
   $0.60 – $0.80/ sq. foot
   Recovery boards are commonly used to recover and improve the application surface. This process could be used to cover joints and to provide a separation layer between the existing and new roofing systems.


Example of a commercial roof that needs repairs

3. **Stripping and Removal of Roof**
   $1.00 – $2.00/sq. foot
   A building can't have more than two roofing systems. This means if you currently have two roofs, your contractor will need to remove them before installing your new roof. If your roof is damaged, saturated or unstable, your contractor will need to strip the existing roof to install a new working roof.

FREE DOWNLOAD
Should You Repair, Restore or Replace Your Commercial Roof?
Download our eBook today!

Insulation Choice

After the existing substrate is prepared, either by cleaning or removing the existing roof, the insulation is installed. In general, two layers of insulation are used.

There are a few types of insulation options the facility manager/owner can choose from:

Polyisocyanurate (Polyiso)

Polyiso is the most commonly used insulation for roofing. It's a rigid material that can be cut to size for installation. The R-Value for Polyiso lasts longer, and the aged R-Value is still higher than EPS and XPS.

Below are the costs for three different thicknesses:

- 1 in. – $1.40 – $1.75 per sq. foot in materials and labor
- 2 in. – $2.00 – $2.50 per sq. foot in materials and labor
- 3 in. – $2.80 – $3.15 per sq. foot in materials and labor
  *Attached Polyiso cost associated with mechanical attachment would be based on industry average applications.

Expanded Polystyrene (EPS)

EPS can be used for roofing, walls or floor insulation, but more commonly used with concrete. You get more R-Value per dollar with EPS being the lowest cost insulation choice.

Extruded Polystyrene (XPS)

XPS insulation can be found in blue, pink or green and is most commonly used for wall insulation. This is probably what you think when you hear insulation because it is the middle of the road in terms of cost and R-Value.

Membrane Choice

When you are considering single-ply membrane roofing, there are two types of membrane to choose from: TPO and EPDM.

TPO

Thermoplastic Polyolefin is a single-ply roofing membrane that is one of the fastest growing commercial roofing systems on the market. TPO roofing systems are made up of a single layer of synthetics and reinforcing scrim that can be used to cover flat roofs.

For an average 20,000 sq. foot commercial roof, it will usually cost between $**1.90 and $3.50 per square foot** in materials and labor to for a TPO membrane.

EPDM

Ethylene Propylene Diene Monomer is a single-ply membrane that consists of a synthetic rubber compound that allows it to be flexible. EPDM has been used on commercial roofing facilities since the 1960s and is considered a time-tested option.

For an average 20,000 sq. foot commercial roof, it will usually cost between **$1.80 and $3.50 per square foot** in materials and labor to for an EPDM membrane.

Roof Penetrations

Most commercial roofing systems have accessories attached such as A/C units, skylights, air vents, plumbing vents and more. These penetrations on the roof can be in the way of rolling out a straight section of membrane.

When the contractor approaches these penetrations with single-ply membrane roofing, they need to cut smaller membrane pieces to size and essentially building up the roof around the vents/units which takes up more time and can cost more money to work around.

Installation Choice

When it comes to installing the membrane of your choice to your roof (whether it's to the insulation or to a cover board), there are three ways to choose from. They each have their own advantages and disadvantages when it comes to price, longevity, and ease of installation.

Ballasted

A Ballasted attachment is a low-cost option. It consists of laying down the membrane (TPO or EPDM) and covering it with gravel, pavers, river rock, and other similar materials. While this option can save you money (and look pretty cool), it adds up to 10 pounds per square foot onto your building structure. And as the rocks degrade over time, they can easily damage the membrane underneath.

Fastened

Fastened attachment is when the membrane (TPO or EPDM) is mechanically attached over the cover board with metals screws and plates. These are inserted along the seams of the membrane sheet.

Adhered

A chemically adhered membrane is rolled out onto the cover board after a bonding adhesive is applied. This method does not penetrate the membrane which alleviates the chance of leaks even more.

Cost Table

	045 mils Thickness	065 mils Thickness
TPO		
Ballasted	$1.90 – $2.35 per sq. foot	$2.00 – $2.50 per sq. foot
Fastened	$2.50 – $3.00 per sq. foot	$2.65 – $3.15 per sq. foot
Adhered	$2.75 – $3.25 per sq. foot	$2.85 – $3.50 per sq. foot
EPDM		
Ballasted	$1.80 – $2.25 per sq. foot	$2.00 – $2.35 per sq. foot
Fastened	$2.00 – $2.25 per sq. foot	$2.20 – $2.70 per sq. foot
Adhered	$2.80 – $3.20 per sq. foot	$3.00 – $3.50 per sq. foot

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CHAPTER THREE

How Does Single-Ply Membrane Roofing Compare?

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	Single-Ply Roofing	Metal Roofing	Built Up Roofing
Basics	Single-Ply Membranes are sheets of rubber and other synthetics that can be chemically adhered to insulation or ballasted creating a layer of protection on your commercial facility. There are two main types of single-ply membrane commercial roofing: TPO and EPDM.	Metal Roofing is one of the oldest commercial roofing systems on the market. Most metal roofing systems use corrugated galvanized steel, although other materials such as aluminum or tin can also be used. After a metal roofing system is installed, a coating can be added for waterproofing, rust protection, and UV protection.	Built-Up Roofing Systems have been in use in the U.S. for over 100 years. These roof systems are commonly referred to as “tar and gravel” roofs. You can choose the number of layers (or plies) that are installed. The final layer of a built-up roofing system consists of stone or gravel.
Cost	$3.50 to $7.50 per square foot in materials and labor.	$5.00 and $10.00 per square foot in materials and labor.	$5.50 – $8.50 square foot in materials and labor.
Installation	After the existing substrate is prepared, either by cleaning or removing the existing roof, the insulation layers are installed and covered by a cover board. There are three ways to attach the membrane to the cover board: ballasted, with an adhesive or mechanically fastened.	The first layer is your choice on insulation. After the insulation is installed, metal panels are cut and attached to the frame with screws. These panels are installed with overlapping edges to cover all the exposed insulation underneath. Flashings are mounted on the joints of the roof.	A built-up roofing system is installed by alternating layers of bitumen and reinforced fabric. You can choose three, four or five ply roofs to meet your needs. The last layer is rock or stone, this layer protects the underlying layers from UV rays, extreme heat or cold, and wind damage.
Pros	• Waterproof • Reflects UV Rays • Low- maintenance	• Design Options • Stable • Energy Efficient • Fire Resistant	• Seamless • Reflects UV Rays • Low- Maintenance
Cons	• Durability • Seams • Roofing Accessories • UV Rays	• Water Damage and Rust Prone • Full Replacements Needed • Seams • Noise	• Long Installation Time • Safety • Add Weight to Structure • Costs • UV Rays Degrade Over Time

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CHAPTER FOUR

Common Problems with Single-Ply Membrane Roofing

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Single-ply membrane roofing is one of the most popular for commercial roofing on the commercial market, the benefits of installing a single-ply membrane roofing system, rather than another roof type, are numerous regarding installation, performance, cost, and longevity.

West Roofing Systems has installed all types of roofing, and none of them are without problems.

These are a few common problems we see with Single-Ply Membrane Roofing and how you can solve them:

1. Membrane is Easily Punctured

While a roofing system with a single-ply membrane can be walked on, the lightweight and flexible, membrane layers are easily punctured.

From roofing contractors to maintenance crews, there can be a high volume of traffic on your roofing system. Single-ply membrane roofing does not have a hard-top layer to protect the synthetic rubber from dropped tools, gravel or loose screws from being pushed into the rubber membrane. This kind of damage could create holes in the rubber and insulation and be vulnerable to leaks.

Solution: The best solution is prevention. Here are some tips to help prevent punctures in your roofing systems:

- Keep nearby tree limbs trimmed
- Consider putting down protective mats in areas that get the most foot traffic
- Keep roof system clean of debris and loose equipment
- Install warning signs to remind workers to keep their work areas clean

2. UV Rays Can Degrade Adhesives

Adhesives are used to not only attach the membrane to the substrate but also to seal the seams of the membranes together.
If UV rays shine directly on the roof, they can degrade the adhesives quickly over time.

This is what can make those seams vulnerable to leaks. If there is a puncture, tear or other damage to the roof, the UV rays coming onto the adhesive layer can cause more damage with the adhesives deteriorating.

Solution: When installed correctly, the membrane sheets should be overlapping and blocking the adhesives from UV rays. Therefore, it's important to find contractors that are efficient and reliable during the single-ply membrane roof installation.

3. Expired Warranty

When you install a new roofing system, it's best to purchase a warranty. Most manufacturer warranties require the contractor to perform repairs for the first few years after the install.

Warranties for a single-ply membrane roofing system can be 15, 20 or 30 years. It's important to stay on top of your warranty because when your warranty expires, you are prone to high maintenance and repair bills if your facility encounters problems.

Solution: With Single-Ply Membrane Roofing, since there is no top coating, when your warranty is up you have two options to renew your warranty:

- New silicone restoration membrane
- New roofing system such as SPF roofing

CONGRATULATIONS!

You are now a Single-Ply Membrane Roofing Expert!

In this guide, you learned:

- Single-Ply Membranes are sheets of rubber & other synthetics that can be ballasted, mechanically fastened or chemically adhered to insulation.
- Single-Ply Membrane will usually cost between $3.50 and $7.50 per square foot depending on your facility.
- Differences between Single-Ply Membrane, Metal and Built-up roofing systems.
- Common problems and solutions people experience with Single-Ply Membrane Roofing.

Is Single-Ply Membrane Roofing right for your facility?

Get your free, no-obligation quote today to learn about your new Commercial Roofing System!

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