

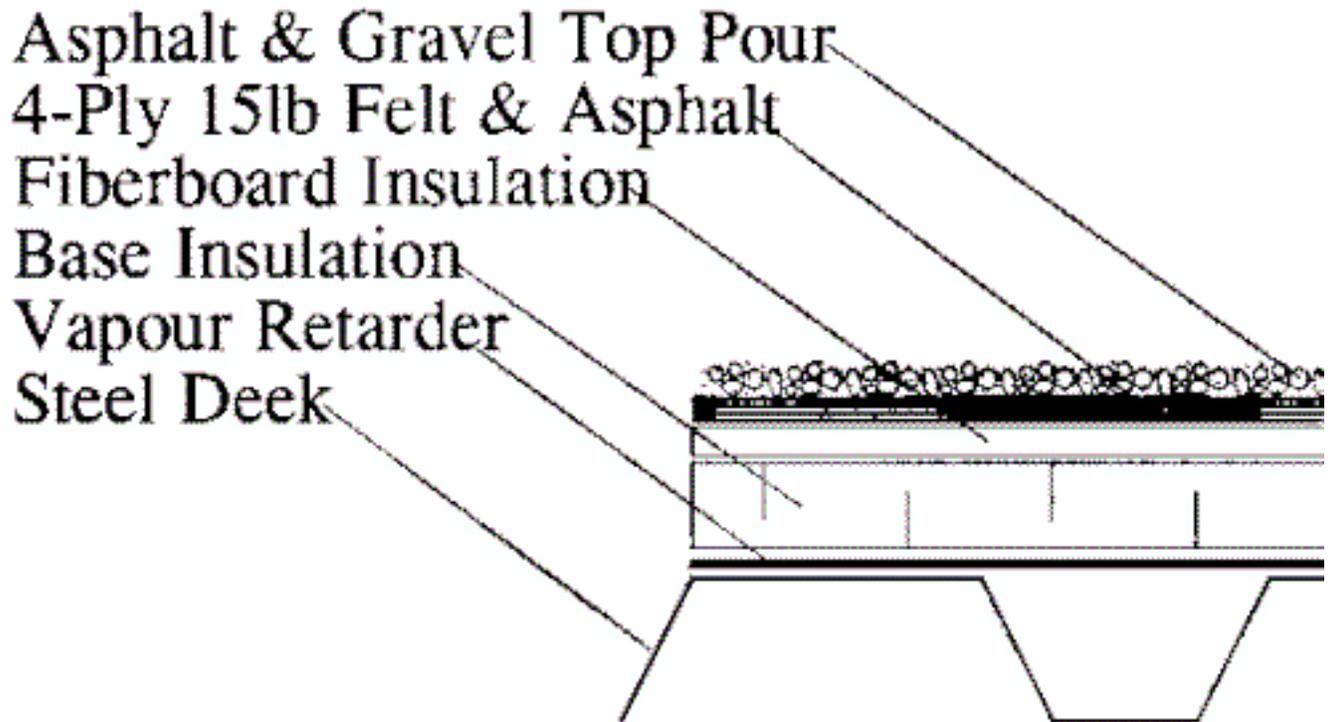
## **Roofing Systems**

There are many different systems, each with its own special requirements and benefits. Browse through all the options below.

### **BUR (Built-Up Roofing)**

Built-Up-Roofing, BUR is a roof that is built with 3 to 5 plies of roofing felts, typically adhered to each other with hot asphalt. This system is often perceived as the standard roof system, and is sometimes referred to as a "Pitch" or "Tar and Gravel" roof. It is still the most common type of roof installed in the Ontario region., although it is steadily losing ground to single ply roofing systems.

The system usually includes a vapour retarder installed over the roof deck, then one or more layers of insulation that is fastened to the deck by hot asphalt, adhesive or mechanical means. Roofing felts are then applied over the insulation with hot asphalt. A gravel and asphalt pour is then installed over the felts. This protects the roof from UV and physical damage, while stabilizing the base felts, and providing ballast to hold the system in place.



### **Applications:**

This roof can be installed with or without insulation, over any type of roof deck. It can be installed **conventionally**, as described or **Inverted**.

### **Advantages:**

- Relatively inexpensive when used with standard specifications.
- Resists mechanical damage, i.e. punctures from debris
- Extended warranties of up to 20 years can be obtained directly from the manufacturer or supplier, provided the roof is installed by an **Approved Roofing Contractor** such as Provincial Roofing.

### **Disadvantages:**

- Due to asphalt slippage not practical for roofs with more than 8% slope.
- Not compatible with many types of insulation substrates.
- Asphalt odours are often offensive.
- Petroleum product pricing is escalating and volatile
- Low tolerance to expansion and contraction.
- More susceptible to weather during installation, which could affect the quality of the roof.

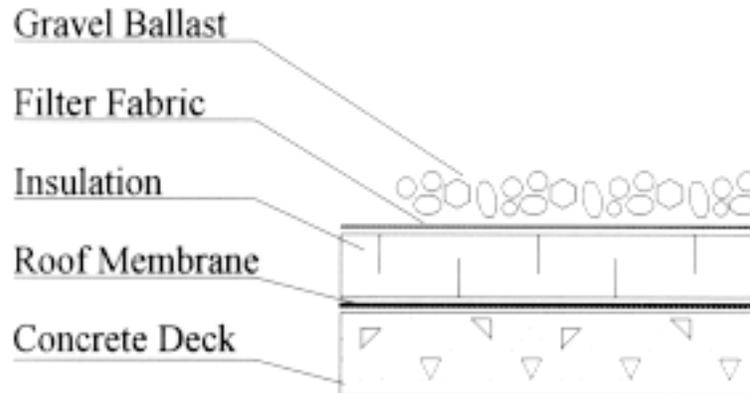
### **Protected Membrane (Inverted)**

In this type of installation, the insulation is installed above the roof membrane. The logic being that the roof membrane is kept at a constant temperature, close to that of the building interior. This inhibits accelerated aging, caused by the extreme temperature fluctuations experienced in conventional roof systems.

Inverting the roof also protects the roof membrane from mechanical damage, Ultra Violet radiation and wind uplift.

In this system the roof membrane is installed directly onto the roof deck, gypsum or concrete board is installed over steel decks to provide a solid roof surface.

Extruded Polystyrene insulation is laid loose over the membrane. A layer of filter fabric and ballast is then installed over the insulation to hold the system in place. The ballast can consist of gravel, patio stones, cast in place concrete, etc.



### **Applications:**

Typically this system is used as an upgrade to a conventional roof system, installed over any type of flat deck. Most roof membranes can be utilized, although some single ply manufacturers discourage it due to the difficulties in locating the exact location of a leak.

### **Advantages:**

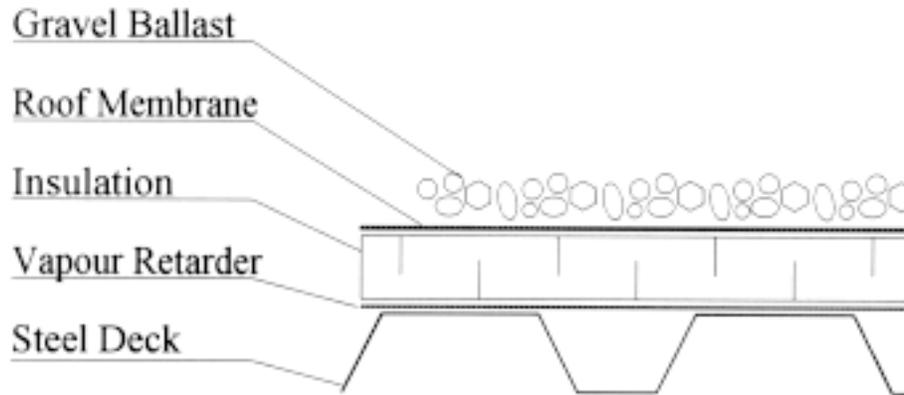
- It stabilizes the roof membrane, and protects it from the elements

### **Disadvantages:**

- The systems dead weight is considerable, and can exceed 20 lbs per square foot.
- Typically this system is more expensive than the conventional roof system

## **BALLASTED**

The ballasted system uses a single ply roof membrane, held in place with gravel. The system usually includes a vapour retarder, with the insulation laid loose, or mechanical fastened to the deck. The roof membrane is then covered with well rounded river stones with a diameter of .75" to 1.5"



### **Application:**

Can be used with all single ply membranes, including T.P.O., E.P.D.M., Hypalon, P.V.C., and sometimes Modified Bitumen. Must be installed over a flat deck.

### **Advantages:**

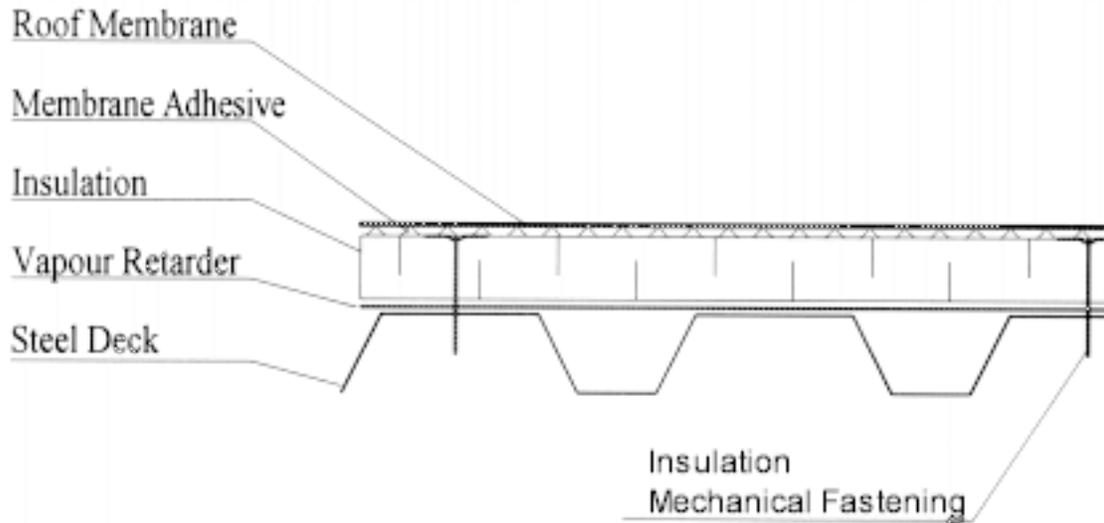
- Great versatility in single ply membrane selection.
- Compatible with most roof insulation materials.

### **Disadvantages:**

- Readily availability of suitable gravel ballast may be difficult, as it has to be well rounded to prevent puncture of the membrane.
- The membrane is exposed, and can therefore be more easily damaged.
- This system is not suitable for sloped roofs.

### **FULLY ADHERED**

The fully adhered system uses, like the ballasted system, a single ply membrane. But in this system the membrane is held in place by adhesives. The system usually includes a vapour retarder, with the insulation mechanically fastened to the deck. The roof membrane is then fastened with adhesives to the insulation.



#### **Application:**

Can be used with all single ply membranes, including E.P.D.M. and P.V.C., T.P.O. etc. Can be installed on any type of deck, and at any slope. This system is ideal for odd shape roofs, such as the Calgary Saddledome.

#### **Advantages:**

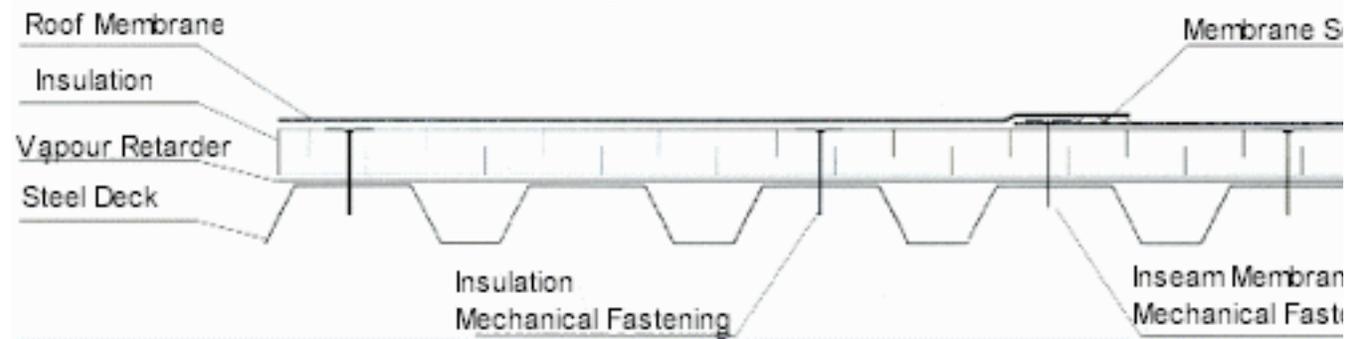
- Can be installed on any slope or shape.
- Versatility in membrane selection.
- Dead weight is relatively light, allowing for lighter construction, thus saving on overall building construction costs.

#### **Disadvantages:**

- Because the membrane is fully exposed, there is more risk of mechanical damage.

## MECHANICALLY FASTENED

The mechanically fastened system uses a single ply membrane, where the membrane is fastened in place with screws and stress plates. This system will include a vapour retarder, insulation which is mechanically fastened to the deck, and a roof membrane mechanically fastened to the roof surface. The fastening can be installed in the seam of the roof membrane (inseam disk system), or a bar may be fastened over top of the membrane and sealed with a cover strip (bar & cover strip system).



### Application:

Can be used with all single ply membranes, including T.P.O., E.P.D.M., Hypalon and P.V.C. This system is ideal for large production facilities, such as the Honda Manufacturing Plant in Alliston, Ont.

### Advantages:

- Can be installed on any slope or shape.
- The light dead weight of this system allows for lighter structures, saving on overall building construction cost.

### Disadvantages:

- Because the membrane is fully exposed, there is more risk of mechanical damage.

## **TORCH APPLIED**

This system is used exclusively with **Modified Bitumen** roof materials. This is when specially designed propane hand torches are used to heat the modified bitumen membrane just enough to melt its outside layer in order to adhere the membrane.

This product can be installed conventionally as in **BUR** systems, except the felts are replaced with two plies of modified bitumen. The first ply (base sheet) is usually mopped in with hot asphalt, but may be torched in place. The second ply (cap sheet) is then torched in place over the first. The Cap sheet is usually factory granulated, and needs no further protection.

### **Application:**

Can be installed on any type of non-flammable roof deck or insulation and at any slope.

### **Advantages:**

- More durable and resistant than other roof membranes to mechanical damage.
- Cap sheets are manufactured in a wide variety of colours, allowing for greater architectural versatility

### **Disadvantages:**

- This system is typically more expensive to install.
- If not handled professionally, the open flame torches can obviously cause fire hazards. This process should only be used on non-flammable products
- Higher costs due to increased insurance costs

## **RECOVER**

This is when a new roof is installed directly over an existing roof system. This can be completed successfully provided that any wet materials in the existing roof are replaced, that the roof is relatively smooth, and that the structure can support the extra weight. Typically, any loose gravel or ballast is swept away or scraped from the original roof membrane before the new roof is installed. This is to reduce the dead weight load and to provide a suitable substrate to adhere or mechanically fasten the new roof membrane

### **Application:**

Any of the aforementioned roof systems can be installed over any existing roof system. However, the most typical application is a Ballasted or Mechanically Fastened roof system installed over an existing BUR system.

### **Advantages:**

- Cost savings in labour and disposal expenses as compared to a full retrofit.
- Because the original roof is retained, there is less of a need for additional insulation in the new roof system.

### **Disadvantages:**

- The existing membrane must be relatively dry, and in reasonable shape.
- The dead weight is heavy, and this system can not be used over light structures.

- **STEEP SLOPED**
- A steep sloped roof usually refers to Slate, Tile, Wood Shakes or Shingles, Copper, Zinc, Pre-painted metal, or asphalt shingles roof system.
- Slates and tiles come in a wide variety of sizes, shapes and quality. Slates, a natural stone, are supplied from quarries around the world. They are available in several natural colours. Tiles are made from clay, or concrete derivatives, and are also available in many colours & styles.
- Both slates and tiles are typically installed on wooden battens. The battens provide air movement, so that water will not be retained in the tiles. They also provide a stable base, allowing the slates or tiles to lay flat, this helps reduce the risk of breakage. Last but not least it helps to provide an aesthetically pleasing appearance.
- Slates and tiles have a valued appearance, and numerous architectural uses. However they are relatively heavy, requiring stronger structures to support them. Also the initial purchase and installation expense is somewhat higher. When properly installed, they have a serviceable life that by far exceeds that of the average asphalt shingle roof.
- Wood shakes or shingles are also available in several grades of quality, being either hand split, or sawed to the appropriate size. Installation is similar to slates or tiles, over wood battens.
- The aesthetics of wood shakes or shingles is obvious, and they are less expensive compared to tiles or slates. They also do not add as much weight to the structure, and can be used on lighter structural designs
- Copper and Zinc roofs are most commonly installed as either a Flat Seam, Standing Seam, or Batten Seam roof system. Both metals are very versatile in their uses. They are easily formed, soldered and seamed to almost any shape. Although they are fairly expensive to install initially, their longevity may well be worth the initial capital outlay. A properly installed copper or zinc roof could last for over 200 years. Acids, normally associated with large city air, may reduce their serviceability somewhat.
- Pre-painted metal roofs are also popular. Architecturally they can be installed in many colours and profiles. They tend to be much less costly than the above mentioned steep slope products, and still will last much longer than asphalt shingle roofs. The only difficulty is the seaming techniques, since the Pre-Painted metals can not be soldered. They must rely on caulking to keep the details water tight.
- Asphalt shingles don't really require any explanation. They come in a wide variety of styles, colours and qualities, and are mainly used in the residential roofing sector

## **COLD PROCESS**

There are two systems that, as the name implies, make use of cold processed bitumen to assemble a roof system.

The **Cold Process** roof system is essentially the same as regular BUR system, except that the hot asphalt is replaced by emulsified cold asphalt. This is brushed, sprayed or squeegeed into place. Specially developed roofing felts are normally used with this system.

In a **Resaturated** system, an existing BUR roof has all its loose gravel top pour removed with a specially designed industrial wet vacuum cleaner. This provides a clean surface for the installation of the resaturate coating of cold processed asphalt. Again this is brushed or squeegeed into place.

In both systems a gravel surface layer is then added to stabilize and protect the new roof surface.

### **Application:**

These roofs can be installed with or without insulation, over any type of flat roof deck. The resaturated roof is always installed directly over an existing BUR roof.

### **Advantages:**

- No heating is required, with less fire risks and less offensive odours.
- In case of a resaturated roof, the old BUR roof remains in place.
- Longer Warranties can typically be achieved compared to hot BUR systems.

### **Disadvantages:**

- A cold process BUR system is an upgrade and is comparably more expensive.

