

Environment friendly e-library

Basics

- Roof installations are approximately 2% of all construction spending but are 50% of construction related law suits.
- Roof systems fail primarily for three reasons:
 - Poor design
 - Bad installation
 - Lack of maintenance



Basics

- There are dozens of commercial roof manufactures.
- Each manufacture has dozens of configurations.
- The right system and configuration is dependent on your:
 - Building design.
 - Operations with in the building.
 - Your needs and budget.
 - The condition of your current roof and substrate.
 - Equipment on the roof.
 - Local codes.



Basics

- Verify that your roofing company is an authorized installer for the specified roof system.
- The use of a manufacturer that inspects the roof during and after the installation is a good practice.
- Ask for a warranty sample in the proposal and read it carefully!



Understand the difference between a full system warranty, NDL (no dollar limit) warranty, labor and material warranty and material warranty.

Popular Systems

- EPDM** - Rubber single ply roof, typically black but new white product is available.



- PVC** - White single ply roof; other colors are available. Ponding water is acceptable condition.



- TPO** - Newer single ply system that utilizes heat welded seams similar to PVC. Ponding water is acceptable condition.



Popular Systems

•**Modified Bitumen** - Often mistakenly referred to as single ply. This system is an asphalt based product often with granules in a variety of colors..



•**Built Up Roof or BUR systems** - The old asphalt system is a proven performer but due to high cost of asphalt and fumes variations of asphalt products are currently used.



Ask your contractor to explain benefits of the roof system selected for your building.

Warranty

- Manufactures offer a variety of warranties and terms.
- Some manufactures include the warranty in the price of the materials; other manufactures have a separate charge based on square feet.
- Some contractors will mix and match roof components to save cost. The consumer will be provided with several warranties that may conflict. **Verify that your roofing contractor offers full system warranties from the roof membrane manufacture.**



Energy



- The National Roofing Contractors Association estimates 5% of all land fill waste is roof related. Some insulation can be reused.

- Buildings consume 38% of all energy and two thirds of all electricity generated.

- ASHRAE 90 R Value Standard for Michigan is R 21.

- Tools are available to determine the cost effectiveness of additional insulation. Ask your roofing contractor to provide a return on investment calculation for additional insulation.



Energy

- Using a single layer of insulation can cause a loss of R-Value through a process called thermal bridging. An example is a metal fastener transferring heat or cold through insulation. Some data suggest a 5% reduction in overall R-value is caused by thermal bridging.

- When possible insulation should be set in adhesive or use two layers of insulation with staggered joints. The bottom layer of insulation can be mechanically attached while the top layer is set in adhesive.

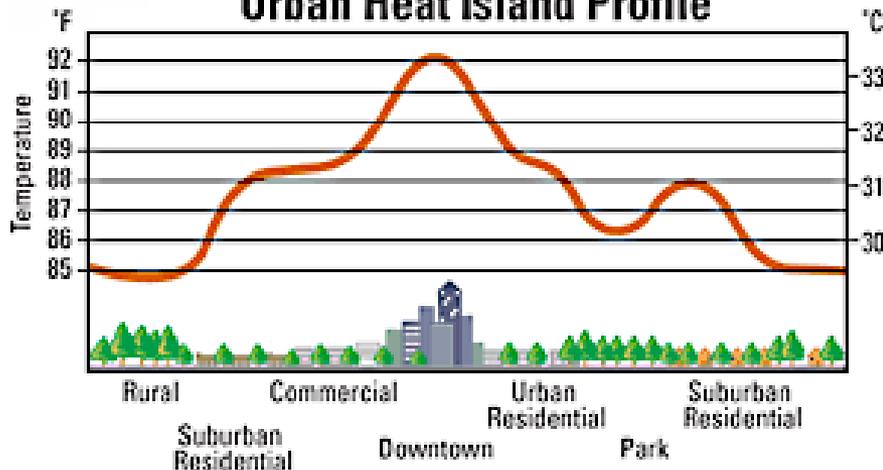


Energy

•As a rule light colored roofs save energy even in areas where there are more heating than cooling days. Light colored roofs:

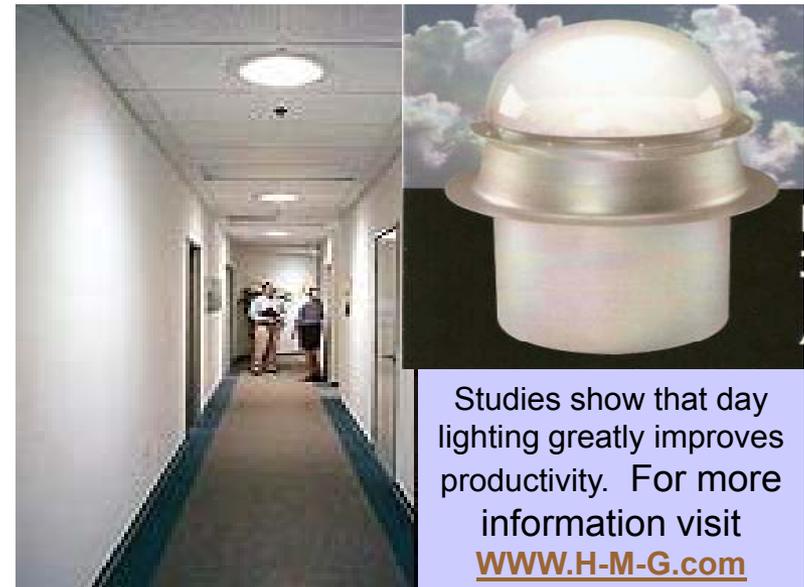
- Lowers air temperatures around HVAC units reducing their workload and extending their life.
- Reduces thermal shock extending the life of the roof. Thermal shock happens when cold moisture impacts a hot surface.
- Reflective roofs can directly save up to 40% in heating and cooling energy costs, as reported by the Oak Ridge National Laboratory.
- In some cities the “heat island” effect can increase the local temperature by as much as 12%.

Urban Heat Island Profile



Day Lighting

- Buildings consume 38% of all energy and two thirds of all electricity generated. One third of building energy usage is consumed by lighting.
- Traditional sky lights have a solar heat gain and loss that offsets the energy saved by solar lighting. New technology greatly reduces solar heat gain making day lighting a good option to consider when replacing a roof.



Studies show that day lighting greatly improves productivity. For more information visit WWW.H-M-G.com

Safety

- Even with hold harmless clauses building owners may be enjoined in costly law suits.
- Building owners should ensure that contractors have and follow their safety manual. Check the contractors EMR rating.
- Consider worker safety after the roof is installed; tie off points for HVAC mechanics, sky light protection that meets OSHA fall protection standards.



Ponding Water

- Some roofs do not have positive drainage or due to deck deflection, have areas where water ponds. Many roof manufacturers do not warrant their membranes for ponding water conditions.
- There are three solutions for ponding water conditions.
 - Add additional drains.
 - Include a tapered insulation system.
 - Provide a roof membrane that accepts ponding water.



Common Extra Charges



- In extreme cases deck may need to be torn off. Make sure your contractor supplies a square foot price for deck replacement and repair.

- Small holes in the deck can be “plated”.

- Wood nailer is often rotted or in some cases missing all together. Make sure your contractor provides a linear foot price.



Walls

- Verify that your roofing contractor has inspected the walls and has included plans to repair cracks or crumbling surface areas.

- Crock coping should be repaired or replaced



Metal Details

- Termination and penetrations are the largest source of leaks. Metal used for counter flashing and copings should be designed to last the life of the roof. **Metal terminations are not a place to save cost.**



Walk Way Pads

- Single ply roof systems are not meant to withstand walking or dragging of tool carts. To prevent punctures it is recommended that walk way pads be installed from access points around HVAC units and that these pads be inspected annually.



Electric Conduit

- Most often electrical conduit is in poor condition. Decide who is responsible for broken electrical conduit in advance of roof installation.



Interior Protection

- Insulation often crumbles as it is removed. The deck must be cleaned with power brooms or vacuums..
- Depending on the condition of the deck some particles may enter the building.
- Determine how and who will be responsible for interior protection prior to roof installation.



New Technology

- Green roofs are becoming more popular despite the high initial cost. Green roofs:
 - Allow a larger building foot print on available land due to water retention.
 - Can add outdoor space.
 - Reduce the heat island effect.
 - Extend the life of the roof system.



- If water retention and reduction of the heat island effect are the only concerns a major manufacture has developed a mat to absorb water and reduce air temperature. The mat is far less costly than a green roof.

New Technology

- Roof coatings have become a viable option for sustaining the life of a roof. Roof coatings have the following advantages:
 - Coatings are not considered a second roof. The roof can be continually re-coated.
 - Coatings are considered maintenance and can be fully depreciated in the installed year.
 - Coatings come in a variety of colors and include manufacture warranties.
 - Coatings are less-disruptive to building operations.
 - Coatings can reduce the life cycle cost of a roof by up to 50%



New Technology

•Photo voltaic installations are becoming more common place. New PV technology have the following benefits:

- Adhere directly to most smooth surface roofs. No leaks from multiple penetrations.
- Are light weight at about one pound per square foot.
- Are flexible and can be walked on.
- Maintenance is limited to using a garden hose to rinse twice a year.



Common Terms

•**Flashing** - vertical wall membrane.



•**Counter Flashing** - Metal strip used to terminate wall flashing.



•**Term Bar** - Metal bar used to terminate wall flashing.



•**Coping** - Metal cap used to cap a wall.



Common Terms

•**Pipe Boot**- Pre-manufactured boot that fits over a penetration.



•**Grave Stop** - Metal strip used to terminate an edge and retain gravel. Sometimes a gravel stop is used in place of coping.



•**Pitch Pan or Sealant Pocket** -A method of terminating pipes or legs or electrical lines that penetrate the deck below the roof membrane.



•**Curb** - A wood or metal box that is used to support HVAC, skylights or other equipment.



Common Terms

•**Square**- A unit of measure, 100 square feet.



•**Expansion Joint**- most often a rubber joint spanning building structures. Sometimes expansion joints can be a combination of metal cap and rubber.



•**Sleeper** - A wood block used to support equipment, gas or electric lines.



•**Ballast** - Rock used to hold the roof membrane in place.