



Commercial and Residential Roof Differences

Roof damage, for both commercial and residential buildings, is a major source of property loss each year as a direct result of natural disasters. The quality of roofing materials and proper installation methods are critical to the overall performance of a building. However, commercial and residential roofs are not created equal; it is important to understand the key differences between the two to ensure the best quality roofing system for a building.

Some of the differences in residential and commercial roofing may call for distinctive mitigation measures related to the perils inherent in a particular region of the country. The [IBHS Zip Code Tool](#) helps business owners identify region-specific perils; because a commercial roof is a major investment, business owners should work with experienced contractors to make sure that the designer and building owner (if different from the business owner) are cognizant of all appropriate perils and utilize cost-effective mitigation techniques.

Roofing Materials

Several types of roofing materials are commonly used for commercial buildings. Selection of specific materials may depend on occupancy, cost, the slope of the roof, and the typical weather conditions in a particular region of the country.

Some commercial buildings may utilize the same types of roof coverings used in residential construction, such as asphalt shingles and wood shakes, depending on the shape and size of the roof. Frequently, historic homes are converted for business use, but continue to use residential roofing materials to maintain the building's original aesthetic integrity. Apartments, on the other hand, are considered residential occupancies, but generally fall under the requirements of the commercial building codes for roofing purposes. It is important to consult local building codes to determine which is most appropriate to reduce the potential for damage.

NOTE: At the end of this article there is a list of some of the more commonly used commercial roofing materials.

Design May Cause Weaknesses

Roof-access doors from the interior of the building, chimneys, ventilation stacks, piping, HVAC systems and other machinery affixed to the roof cause potential weak points in the roof. High winds and other severe weather pounding on rooftop equipment can cause lifts and ultimately tears in the roofing materials where separation occurs. Water intrusion at the connection points is another concern.



Commercial roofs are commonly flat or low slope (less than a 2" in 12" slope), and typically larger than residential roofs. Flat roofs frequently are unable to be repaired, and sometimes require replacement of a significant portion of the roof in order to maintain the integrity of the roofing materials and/or installation process. This emphasizes the importance of regular inspection and maintenance.

The added complexity of a commercial roof requires a more specialized design to deal with issues like the weight of snow, ice and equipment. Commercial roofs also generally require a specialized roofing contractor for installation, maintenance, and repair. Many smaller or residential-focused roofing companies may not have the experience, access to manpower, equipment or tools needed for commercial roofing projects.

National, State and Local Building Codes

Building codes provide the framework for use and installation of commercial roofing systems. These codes, along with adequate enforcement, play a vital role in public safety and loss prevention. Model codes developed by the International Code Council and other organizations specify the performance requirements of commercial roof coverings, which include wind resistance requirements, fastening requirements, test standards, fire classification, underlayment requirements, and many other criteria. The model codes are adopted by states or local jurisdictions, and may be amended for specific local climatic or geographic needs. However, substantive content addressing design, construction or performance standards within these codes should remain untouched to ensure that minimum safety and performance standards for roofs and other elements are met. When technical content in local codes deviates from the standard, it should be allowed only to strengthen, rather than relax, code provisions.

More Research Needed

As noted in last month's commercial roofing article, [Commercial Roofs – The Importance of Roofs to Loss Reduction](#), there are many areas where more research needs to be completed regarding losses related to commercial roofing material design, materials and installation practices. For example, research needs to be conducted on edge materials, design and fastening requirements. Roofs, roofing materials, and installation practices are a top priority for the research agenda at the new IBHS Research Center, under construction in Chester County, South Carolina.

Commercial Roofing Materials

Below is a list of some of the more commonly used commercial roofing materials. While some are also used in residential properties (these are noted), single ply, modified bitumen, built-up roof (BUR) and Ethylene Propylene Diene Monomer (EPDM) are typically used only on commercial buildings.



- **Asphalt Shingle**—This is the most common type of shingle used on residential and commercial buildings. Reinforced with organic material, wood fibers or fiber glass, asphalt shingles may last from 20 to 30 years. Laminated shingles come in a variety of colors and textures that give this shingle the appearance of more expensive shake or slate tiles. Laminated shingles can last between 25 and 50 years.
- **Built-Up Roof (BUR)**—Appropriately named, a built-up roof is created by layering multiple plies of roof felts laminated together with bitumen. The roof felts can consist of bitumen-saturated felt, coated felt, polyester felt, or other fabrics. A surface component is generally applied to protect the roof from the elements; this can be asphalt, aggregate (gravel or slag), emulsion or a granule-surfaced cap sheet.
- **Ethylene Propylene Diene Monomer (EPDM)**—One of the most common roofing materials for low-slope roofs, EPDM, is a rubber material created by ethylene and propylene. EPDM is inexpensive relative to other roofing materials, easy to install and comparatively cleaner to work with than BUR. When properly installed, EPDM should last between 12 and 25 years depending on factors such as environmental conditions, proper drainage, and foot traffic.
- **Metal Roofing**—Standing seam, steel, aluminum metal tie, and copper are some of the metal roofing materials used on commercial roofing projects. Usually, metal roofing lasts between 30 and 50 years, and copper may last up to 100 years. Most metal roofing is more reasonably priced than slate or tile roofing, with the exception of copper. Metal roofing can withstand extreme weather but may dent in hailstorms, although a new granulated coating is offered to prevent this outcome.
- **Modified Bitumen**—Recommended for roofs with a slope of not less than ¼" per horizontal foot to achieve positive drainage, modified bitumen is asphalt that has been modified to maintain plastic or rubber-like properties (depending on the modifier – most often atactic polypropylene (APP) or styrene-butadiene-styrene (SBS). Modified bitumen sheets can be laid on a smooth surface, mineral granules, aluminum, copper, or under certain installation techniques, gravel or slag aggregates. When layered with built-up roof materials, modified bitumen can increase roof performance on residential and commercial applications.
- **Single Ply Roofing** —The class of commercial roofing membranes commonly described as "single ply" consists of flexible sheets of compounded synthetic materials that are manufactured in a factory to strict quality control requirements. Ballast is used in some instances over the membrane for flat roofs. If the slope is greater than 2" in 12", this system may not be appropriate. An alternative is the fully adhered system, in which the membrane is attached to the substrate using a specified adhesive. Depending on the membrane, the adhesive may be solvent- or water-based, or asphalt. The finished surface of an adhered roof is smooth.
- **Slate Shingles**—Slate shingles are heavy and harder to install. Though they are easily breakable, they can add beauty to any home or commercial building. A slate roof can last from 45 to 70 years, and some say it will last over 100 years if installed properly. These colorful and rich shingles will add a high price to a structure, costing as much as 400 percent more than other materials.
- **Wood Shakes**—Most roof shakes are made of treated wood, such as cedar, which typically last up to 30 years. Installation for wood shingles is very expensive.



- **Tile Roofing**—Tile is frequently made from clay, concrete and rubber and last up to 50 years. Tiles are very heavy, and may require a more significant support structure when designing and building the underlying roof.

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