

Steep- or low-slope?: Some definitions of terms

by Dave Flickinger, RRO

Q: *What are the differences between steep- and low-slope roofing materials?*

A: *The NRCA Roofing and Waterproofing Manual, Fourth Edition, defines steep-slope roofing as "a category of roofing that includes watershedding types of roof coverings installed on slopes exceeding [3-in-12 or 25 percent]." Slopes of 3-in-12 (25 percent) or less are considered to be low-slope. The primary difference between roofing products used in steep- and low-slope applications is how they withstand water infiltration.*



Low-slope roof systems typically are water-impermeable *membrane* roof coverings; the membrane roof system is waterproof and does not require an underlayment to perform successfully. These membrane roof systems include built-up, modified bitumen and single-ply applications, as well as sprayed polyurethane foam and some metal roof panel systems.

Although low-slope membrane roof systems are designed to be water-impermeable, ponded water can be detrimental to their performances. It is important that positive drainage is achieved when designing a new roof system. Specifying a standard 1/8- or 1/4-of-an-inch-per-foot (1 or 2 percent) slope will not necessarily ensure complete drainage over a roof system's total surface area.

Provisions for all loading deflections of the deck that may occur also should be considered carefully. These include provisions for deck deflection caused by water, ice or snow at rooftop penetrations and building/wall junctions, as well as

the typical deflections experienced at midspan of the roof deck.

Steep-slope roof coverings generally are *watershedding* in nature; the roof covering works with gravity to shed water from each overlapping course. Watershedding materials include asphalt shingles and roll roofing, clay and concrete tile, slate, wood shingles and shakes, and some metal roof panel systems. Also included are the various materials that resemble traditional watershedding coverings, such as fiber-cement products, wood fiber panels and metal shingles.

Because watershedding roof coverings are *not* water-impermeable, they are susceptible to water infiltration by wind-driven rain or snow and ice accumulation. For this reason, underlayments always should be used with these roof coverings. Underlayment requirements increase as the roof's slope decreases because the potential for water infiltration increases.

Regardless of a roof's slope and underlayment requirements, an ice-dam protection membrane (e.g., a self-adhering modified bitumen membrane) also may be required depending on climatic conditions. NRCA suggests an ice-dam protection membrane be installed in locations where the January mean temperature is 30 F (-1 C) or less.

Metal systems

Metal roof panel systems can be used for low- and steep-slope applications. Various seam profiles, metal types and finishes are available that offer a roof designer performance and aesthetic options. Metal roof panel systems are categorized as either structural or architectural and hydrostatic or hydrokinetic.

Structural metal roof systems are capable of spanning structural members (e.g., purlins, joists) without the aid of a solid roof deck and generally do not require underlayments. Structural metal roof systems typically are hydrostatic or water-barrier systems. This means they are designed to resist water entry at seams, laps and

joints under hydrostatic (i.e., standing water) pressure.


Architectural metal roof systems require solid decking and underlayments. They typically are hydrokinetic or watershedding systems (i.e., they move water rapidly over the panels); the seams usually are not watertight.

It should be noted that all structural metal roof systems are not necessarily hydrostatic, nor are all architectural metal roof systems hydrokinetic.

Some architectural metal roof panel systems can be designed to perform on slopes less than 3-in-12 (25 percent). Careful consideration must be given to seam type (e.g., single-locked, double-locked), underlayment and detailing methods when designing architectural metal roof systems for such slopes. A sealant may be required in the seams for the roof system to perform successfully in low-slope situations.

Choosing a covering

Roof slope alone may determine whether a type of roof covering applies to a particular roofing project. Because a roof's slope affects how quickly water is shed, performances of the different types of watershedding roof coverings vary. It is important to consider each roof covering's minimum slope and underlayment requirement before choosing a product.

For a side-by-side comparison of slope and underlayment requirements of various product types, roofing professionals should refer to "Underlayment, drip-edge recommendations for roof coverings," in the March 1996 issue, page R4. 

Each month in this column, one of NRCA's technical services staff members will answer readers' technical questions. If you have a specific question you would like answered in this column, send it to Professional Roofing magazine, 10255 W. Higgins Road, Suite 600, Rosemont, Ill. 60018-5607; or fax (847) 299-1183.