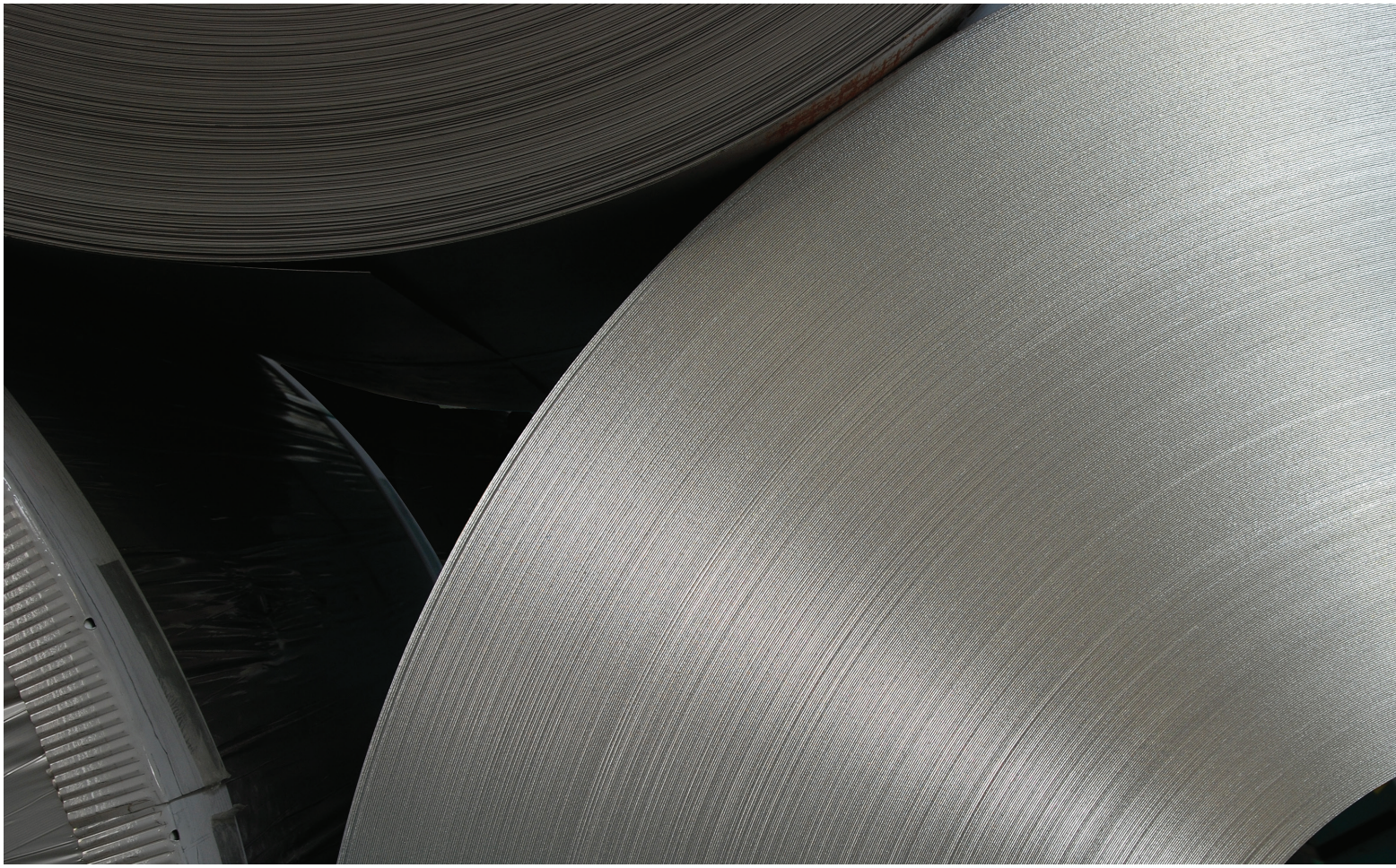


A new standard

Guidelines for synthetic underlayments

by Mark S. Graham

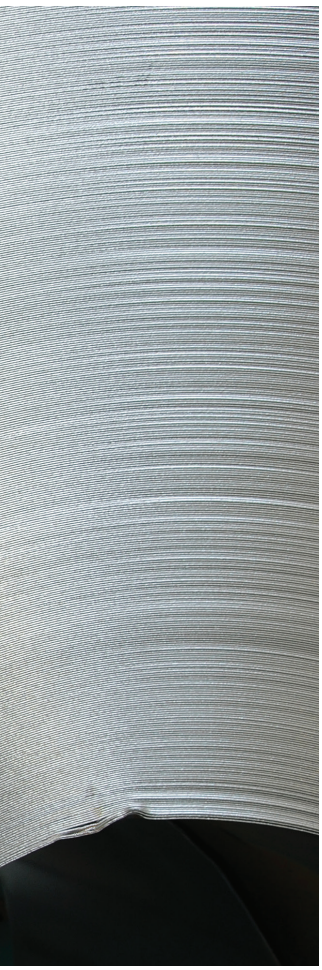
After more than eight years in development, in December 2020 ASTM International published the first U.S. product standard applicable to synthetic, steep-slope underlayment products. If you are involved with the design or installation of steep-slope roof systems, I encourage you to become familiar with this standard and begin to use it when specifying and procuring steep-slope underlayment products.

ASTM D8257

ASTM D8257, "Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing," addresses mechanically attached synthetic underlayment used in steep-slope roof systems.

The standard defines polymeric underlayment as a sheet material primarily composed of polymers for use as a secondary water-shedding layer on steep-slope roofs when installed below a primary roof covering.

The standard's objective is to provide a finished product that will be used as a water-shedding underlayment layer before and after the installation of a primary steep-slope roof covering.



The standard stipulates the synthetic underlayment will be:

- Supplied in roll form
- Uniform in thickness and appearance
- Free of visible defects such as holes, ragged or untrue edges, breaks, cracks, tears and protruding edges of reinforcement
- Designed to have a surface that provides traction and slip resistance to the applicator

A note in the standard indicates though there is no agreed upon test method for determining the slipperiness of installed roofing products, several methods for assessing relative slipperiness of surfaces are available. The standard intends to ensure whatever evaluation method is used, the friction coefficient or resistance to slipping of the surface should be at least equal to that of asphalt-saturated shingle underlayment tested under the same conditions of temperature and wetness.

ASTM D8257's Table 1-Requirements for Polymeric Roof Underlayments provides specific physical requirements for synthetic underlayment. Test requirements, test methods and conditions of acceptance are provided. Unrolling, pliability, water vapor and liquid water transmission, linear dimensional change, tensile and tear strengths, fastener pull-through resistance, hydrostatic resistance, thermal cycling and laboratory-accelerated weathering are included in Table 1. Unrolling, pliability, thermal cycling and laboratory-accelerated weathering testing should exhibit no visible damage after testing.

Tensile strength, tear strength, fastener pull-through resistance and hydrostatic resistance are tested as received and after thermal cycling and after laboratory-accelerated weathering. A note in the standard indicates testing after laboratory-accelerated weathering is intended to simulate the effects solar radiation, heat and moisture have on underlayment during the period an underlayment may be exposed to the elements before the application of the primary roof covering. The 500-hour duration for laboratory weathering included in the standard reportedly is equivalent to about 30 days of field exposure.

Products complying with ASTM D8257 must be plainly marked with the manufacturer's name, brand name and ASTM D8257 designation unless otherwise specified. Rolls should be securely wrapped or banded in a substantial manner to prevent shifting of the material and permit normal handling.

An ASTM D8257-compliant synthetic underlayment product's water vapor transmission value should be provided in the manufacturer's product literature on a product-specific basis.

Implementation

Manufacturers and suppliers of synthetic underlayment products are testing their products based on this new standard, and I expect to see ASTM D8257-compliant products in the marketplace within the next several months.

For additional information about synthetic underlayments, see "High-tech protection," May 2021 issue.

Because of its recent publication, ASTM D8257 is not yet included in most building codes, including the *International Building Code,® 2021 Edition* or *International Residential Code,® 2021 Edition*. A code change proposal adding ASTM D8257 likely will be accepted and first appear in the 2024 I-Codes.

> "A code change proposal adding ASTM D8257 likely will be accepted and first appear in the 2024 I-Codes"

When specifying or using synthetic underlayment products, I encourage you to use products complying with ASTM D8257. You also should be knowledgeable of the specific product's water vaper transmission value (perm rating).

In support of the development of ASTM D8257, NRCA tested several synthetic underlayment products and found some products have relatively high perm ratings while others have low perm ratings. Put another way, some synthetic underlayments are vapor-open, and other products with low perm ratings may function as vapor retarders.

When selecting a synthetic underlayment, designers should seek products with a perm rating commensurate with the designers' assembly designs. From a water vapor transmission standpoint, a synthetic underlayment with a relatively high perm rating should perform similarly to a conventional asphalt-saturated underlayment.

Additional information about underlayment for steep-slope roof systems is included in *The NRCA Roofing Manual: Steep-slope Roof Systems—2021*. Information about water vapor transmission through roofing materials is included in the Condensation and Air-leakage Control section of *The NRCA Roofing Manual: Architectural Metal Flashing and Condensation and Air Leakage Control—2018*.

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Roofing workers take more risks when using robust safety gear

Researchers have found roofing workers with more safety gear in place are more likely to engage in riskier behaviors, making the workers less safe overall, according to popularmechanics.com.

Civil engineering researchers at Virginia Tech, Blacksburg, and Clemson University, Clemson, S.C., suspected roofing workers are experiencing a false sense of security while working with robust safety gear. Their study, which appears in the *Journal of Construction Engineering and Management*, explains it as a documented psychological phenomenon known as risk compensation.

For example, roofing workers may become overly comfortable with safety interventions such as perimeter barriers, leading workers to step closer to a roof's edge than they otherwise typically would.

To test their hypothesis, the researchers set up a first-of-its-kind experiment involving virtual reality headsets. They gathered a group of students with some construction work experience and trained the students about the basics of installing roof shingles.

The researchers placed the student volunteers—who were acting as unskilled roofing workers—in a virtual environment to simulate roofing work. Then, they assigned the students into one of three randomly ordered levels of safety equipment: only personal protective equipment (hard hat, gloves and knee pads) but no fall protection; PPE and a fall-arrest system; and PPE, a fall-arrest system and a perimeter guardrail.

At the higher levels of safety, researchers found "more safety interventions (i.e., higher levels of fall protection) produced a sense of invulnerability among participants. This false sense of security ultimately increased their risk-taking behavior by up to 55%: participants stepped closer to the roof edge, leaned over the edge and spent more time exposing themselves to fall risk."

Risk compensation is a cognitive bias—or systematic error in thinking—that affects everyone and can occur during daily activities. For example, drivers with blind-spot detectors built into their car mirrors may be less prone to checking those spots.

The roofing experiment suggests this cognitive bias may occur in construction. The researchers concluded a new kind of training or monitoring system is necessary to ensure workers are not relying on cognitive biases and jeopardizing their safety.

Which digital construction trends have emerged in 2021?

During the past decade, the construction industry increasingly has adopted new technologies and increased digitization, according to constructionequipmentguide.com. The COVID-19 pandemic accelerated the pace of change in 2020 as more people worked remotely, demand for remote collaboration tools grew and migration to cloud-based programs continued.

Want to watch the full webinar? Go to professionalroofing.net.

During a recent webinar, Ten Construction and Engineering Technology Trends to Watch in 2021, leaders from global software companies Egnyte, Mountain View, Calif., and Bluebeam, Pasadena, Calif., addressed some of the major innovations, trends and technology-related challenges facing the architecture, engineering and construction industries.

The speakers highlighted the following information:

- Advances in cloud computing have enabled companies to leverage large amounts of data generated on projects in new ways.
- Remote collaboration has been essential to keeping industries running. Companies that were slow to adopt technology have been forced to keep up with changes and can see the effectiveness of being able to collaborate remotely.
- Data compatibility and interoperability among technology platforms and software programs pose a significant challenge. Industries are struggling with how to store massive amounts of data generated by a project in a common data format that easily can be accessed during a project's life cycle.
- Data security requires ongoing education for businesses. There is a common misconception that ransomware or cyberattacks are restricted to government entities or high-profile companies, but other industries such as the construction industry also are at risk.
- More applications in design and modeling technologies are generating massive quantities of data, and how the data is obtained and managed is important.
- Increased automation offers the benefits of productivity growth on a job site, which may help offset the construction industry's skilled labor shortage.