Sun Block for Windows

Q: We typically build with lots of windows to capture ocean views, but all the glass also increases the cooling load. Will low-e windows make an appreciable difference, or are there other options we should be considering?

A: As Janet McIlvaine, a research analyst with the Florida Solar Energy Center, explains, coastal sunshine can be brutal. Though it warms the beach, it also warms everything else. When it falls directly on the windows, interior temperatures soar, especially near the windows. To reduce the effect, builders have three basic options: Shade the windows from direct sun, block the heat flow in the window itself with a low-e film or coating, or rely on interior window treatments to keep the summer sun at bay.

Window treatments are the least effective route. They don't keep the heat out (the heat is just contained behind the curtains), and they interfere with views. Since heat always migrates from warmer areas to cooler ones, the heat absorbed at the outside surface of the glass works its way inward and literally jumps off the other side of the glass into the home (or, in a double-pane window, the same process is repeated on the interior pane). Heat easily migrates into the home unless there is a low-e coating or film to stop it.

The "jumping" action characteristic of radiant heat is called *emittance.* It's the capacity of radiant heat to move through space without having to warm the air between two warm surfaces. Low-e (or low-emissivity) coatings prevent this transfer of heat if the coatings are applied to Surface 2 — the

SIMONTON

COOLER ROOMS WITH A VIEW

While windows are desirable for taking in ocean views, solar heat gain through them can make life miserable for occupants. Low-e coatings make summer near the windows bearable, and even pleasant. To maintain good visibility, look for windows with a visible light transmittance factor over 0.50.

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Got a question?

We want to hear from you!

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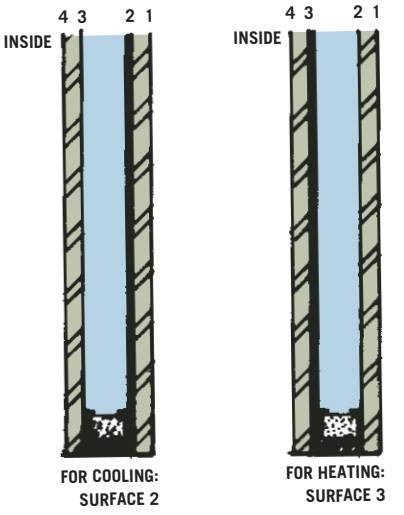
inside surface of the exterior pane of a double-pane window. There, the low-e treatment reflects away the heat absorbed by the exterior glass before it has a chance to radiate across the air space toward the cooler inside pane of glass.

For those climates where there is a significant heating season, a low-e coating on Surface 3 (the outside surface of the interior pane) will render a reverse effect: Heat will be kept in the house. If a window supplier isn't sure which surface the low-e coating is on, it's definitely worth a call to the manufacturer. It can mean the difference for occupants between a comfortable summer vacation and miserable one.

Low-e coatings aren't the only option to keep the heat out, however. If windows are shaded from direct sun, the low-e coatings aren't needed because the sunshine reflected off the beach (or ocean or grass) doesn't contain much heat.



LOW-E FILM PLACEMENT
Reflective low-e coatings are placed on different surfaces for different radiant effects. In cooling climates, the reflective coating should be on Surface 2 to block solar radiation from the interior. In a heating climate, where solar heat gain might be desirable, the coating is placed on Surface 3.

RICK VITULLO

Shading windows is the best defense against heat gain because it prevents the sun's heat from ever getting to the window, and shading reduces glare as well as heat transmission.

Critical Control Joints

Q: According to our EIFS supplier, we should cut through the sheathing to create a control joint at the second-floor band joist to prevent cracking. But we're also required to have a shear wall, which could be compromised by this practice. What do you recommend?

A: According to John Edgar, technical service manager at Sto Corp., a control joint at the floor line in an exterior insulation finish system (EIFS) is used to control cracking (or worse) due to shrinkage. Wood shrinkage is most pronounced at the floor line, where cross-grain shrinkage in floor joists will be the greatest. EIFS is not the only cladding to suffer problems at the rim joist. Problems due to shrinkage have been reported with brick veneer and vinyl siding as well.

With EIFS, a joint is typically left in the

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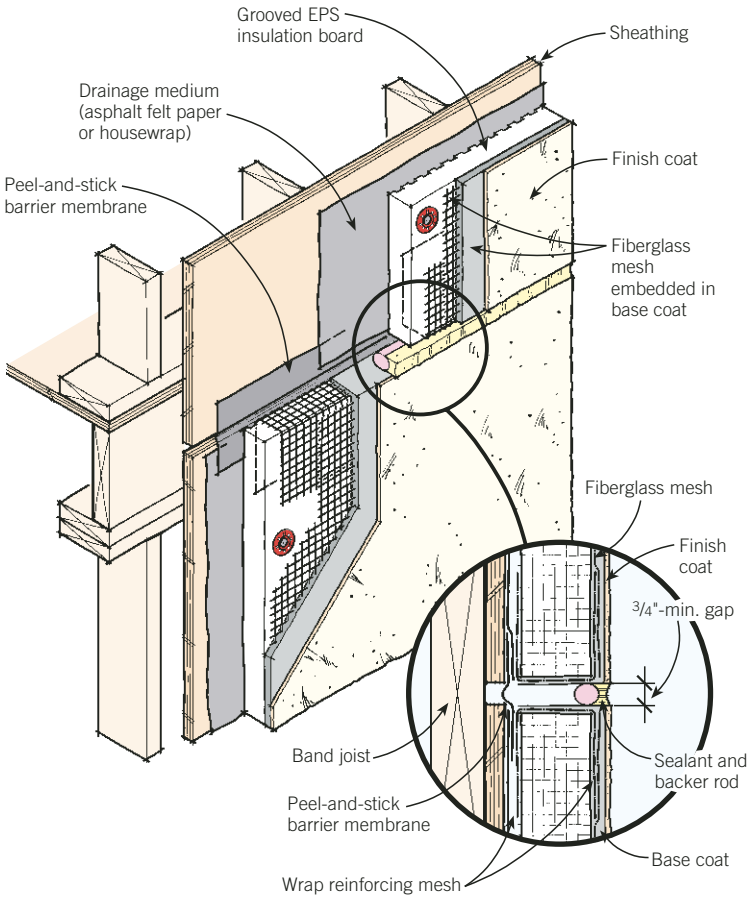
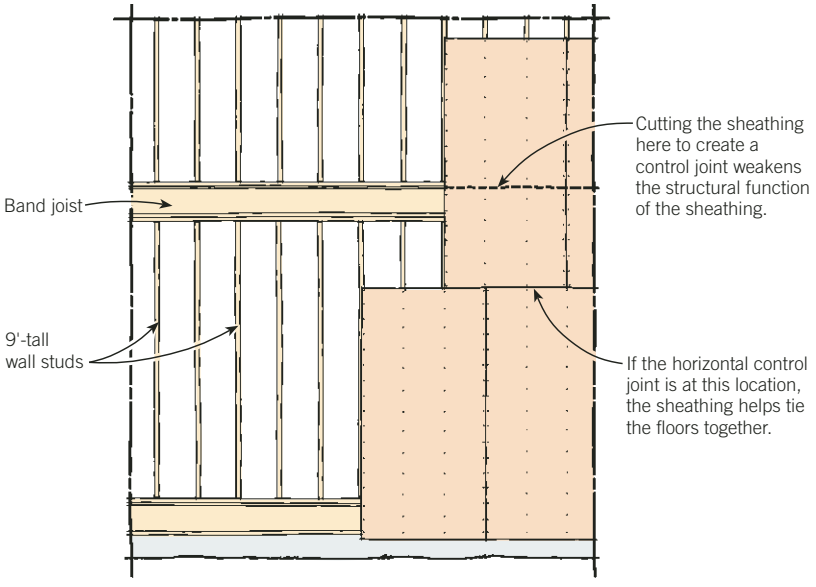
sheathing at the floor line to accommodate the movement, and a flexible joint is detailed in the EIFS, as shown at right. But in a high wind load location, or wherever the first floor has high ceilings, the sheathing spans the band joist and ties the stories together. In these cases, the control joint should be placed at the gap between the wall sheathings where movement is most likely to occur. If the EIFS spans that point without the joint, any compression will at the very least crack the stucco and, in the worst cases, may cause the EPS board to bow or buckle.

To reduce the likelihood of problems, some applicators will insist the problem is not only shrinkage but also settlement of the structure, and they will require that the structure be fully loaded with interior drywall before installing EIFS on wood-frame construction. This may help reduce some movement, but it does not alleviate the wood-shrinkage problems. The only way to alleviate shrinkage is to avoid solid-sawn joists. An engineered floor system, including an engineered rim joist, will help reduce shrinkage and provide the best possible conditions for avoiding problems.

EIFS Movement Joint



EIFS Sheathing Layout



CONTROL-JOINT CONSIDERATIONS

With conventional wood framing, the EPS board in an EIFS system can buckle when floor framing shrinks. To prevent cracking, there should be a 3/4-inch gap between the sheathing and EPS board, located at or above the midline of the band joist (above). However, this standard detail can be problematic for a shear wall that must span the floor line to structurally tie the floors together. In this case, the control joint should be installed at the nearest horizontal joint in the sheathing, even if that is not at the floor line (left).