

(continued from page 134)

permeable exteriors, or even ventilated claddings that are permeable (Figure 7-22, next page).

FOAM SHEATHING

Insulating foam sheathing, applied in the right way, can shed rainwater, block vapor intrusion, slow air intrusion, and insulate the assembly it covers. In climates where high R-values are required, rigid foam can be a cost-effective solution for walls.

To avoid problems, the foam must be thick enough to provide adequate insulating value to ensure that the dew point does not fall inside the wall cavity. The objective is to put enough foam on the wall so its inside surface remains above the dew point for the average temperature of the coldest month of winter, as described in Figure 7-23 (page 143).

Dew Point

Water from the air will condense on building materials when their surface temperature falls below the dew point.

Moisture will only condense on a solid surface. It won't condense in midair and is unlikely to condense in fiberglass, but *is* likely to condense:

- In a heating climate, on the inside surface of the exterior sheathing.
- In a cooling climate, on the back of interior drywall.
- In hot, humid summers, on cold-water pipes.
- In hot, humid summers, on uninsulated basement floors.

The temperature at any point inside a wall can be found if the R-values of the wall insulations are known. The tem-

perature change through the wall is in direct proportion to the R-value, as described in Figure 7-23 (page 143).

MOISTURE-CONTROL PRINCIPLES

A wall assembly must be able to dry by evaporation. The wall and ceiling assemblies shown in Figures 7-5 to 7-8 (pages 127–129) are chosen as good options for particular climates zone, but other options are possible by controlling condensation, bulk water, and air leaks.

Weather Barrier

Wall assemblies need multiple layers of protection against rain, wind and snow. Typically, an exterior cladding sheds most rainwater, while a back-up weather barrier provides a final defense against water that penetrates below the cladding (see *JLC Field Guide, Volume 1*, Chapter 4, “Drainage Plane”).

Housewraps, by themselves, are not enough. All weather barriers must be integrated with flashings, particularly around windows and doors. And while this will then solve the majority of water leaks, it will not solve all the air leakage problems common in homes (see “Air-Sealing Strategies,” pages 144–148).

Reservoir Cladding

Some claddings, such as brick or concrete block, act as reservoir claddings that catch and store water. Reservoir claddings must have air spaces behind them, as well as weep holes and a carefully installed drainage plane, so the cladding can dry out without damaging the structure. If a house with reservoir cladding is air conditioned, its walls should not include an interior vapor retarder.

Rooftop
Heat Gain

Foam
Sheathing

Moisture
Control