Ask Jon Eakes

ROOF INSULATION

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When we talk about insulating roofs we are usually dealing with situations in which there is no attic: either it doesn't exist or it has been converted into heated living space. So, we are talking about cathedral ceilings, flat, and basin-type roofs. Cathedral roofs are slanted and drain like ordinary roofs, flat roofs slope just enough to run water off one edge, and basin roofs slant toward a central drain.The only thing I can say with confidence on this subject is that insulating a cathedral roof on the outside with either Styrofoam or rigid fiberglass panels works quite well, except that you can rarely attain the high ceiling insulation levels recommended for the Canadian climate, nor is it economically feasible unless you are changing the shingles anyway.Any other method of insulating any of the three roof types mentioned above is plagued with controversy and differences of opinions.What we are trying to do here is insulate something that was never designed to accept insulation. Some modern, flat-top houses are being built with a space between the ceiling and the roof so thick that it qualifies as a flat-top or cathedral attic, but most houses are not built this way.There are two specific sections on ventilation that will give you some idea of the problems involved. Search keyword "roof" for the titles "HOW DO I VENTILATE A CATHEDRAL CEILING?" and "SHOULD I ADD VENTILATION TO A FLAT TOP OR BASIN TYPE ROOF?" Should a cathedral ceiling insulated on the inside be treated as a wall (no air space between the insulation and the sheathing) or as an attic (ventilated air space above the insulation)? The same question can be asked of flat-top and basin roofs. Both approaches have their successes and failures and some opinions are written into building codes.Insulation (inside or outside) changes roof and drain temperatures for flat-top and basin roofs. The thermal functioning of these roofs is further complicated by the fact that most of these roofs are found on houses with brick siding and often double-brick walls adjoining another building. Leaking, ice damming, and overflowing are not uncommon complications after insulation.Despite a variety of recommendations in the literature, requirements in various building codes and almost 20 years of experience with high values of insulation, I am not convinced that anybody has yet the definitive answer on how to insulate and ventilate these roofs, especially in the case of renovations of existing structures not specifically designed to deal with the problems. Whatever technique you may opt for, three elements have become clear.-- Seal air leaks like crazy; this may be your only chance to stop condensation problems.-- Provide for a planned heat loss (not an air leak) around the roof drain pipes of flat or basin roofs to keep them above freezing and draining all winter long; ice blockage here can flood your house or collapse your roof. The best technique I've seen for this is an 8" or larger stove pipe wrapped around the drain in the roof space, completely insulated on the outside but enveloping the drain with a channel of conductive heat loss from the ceiling below right up to the roof. The edges around the drain pipe are sealed air tight at the ceiling and at the roof -- preventing any condensation problems.-- Arrange some means of regular inspection into the roof space (well weather-stripped) to be able to spot any trouble before it becomes serious. (I heard of one guy who put a web cam in his attic.) Inspect twice during the coldest part of the winter and once during the spring thaw.

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