

FEATURES



Superinsulation Design Criteria

by Professor Howard M. Faulkner

Most members of the energy efficient design community will agree that the term "superinsulation" lacks accuracy and definition and is somewhat of a misnomer. But it has caught on and we're stuck with it - like it or not.

But what is a superinsulated house? The following description was submitted by Professor Howard Faulkner of the University of Southern Maine.

We encourage Update readers to submit reactions, corrections and/or additions to this description.

Superinsulation Design Criteria

Insulation Levels:

Exterior walls above grade.....	R35 min.	R40+ common
Ceiling	R55 min.	R60-70 common
Floor without heat below	R20 min.	R30 common
Exterior foundation wall to grade	R20 min.	R30 common
Exterior foundation below grade	R10 min.	R20 common
Foundation interior	R20 min.	R30+ common

(Note: There seems to be a trend toward installing high levels of interior foundation wall insulation and omitting exterior insulation.)

Windows:

Area: South facing windows equal to 8-12% of floor area; 2-3% for East/West windows; 1% or less for North Windows. This is very variable and largely dependent upon solar availability, desired views, and other aesthetic considerations.

Type: A low infiltration type window is most common. These include awning, casement and hopper types. Fixed windows are also popular.

Glazing: While double glazing has been and remains popular, recent research suggests that triple and quad pane glazing should be given serious consideration.

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Air-Vapor Barriers:

A continuous air-vapor barrier, placed on the warm side of the insulation, is now recommended by all major organizations including ASHRAE, NBS, NHBS, VA, FHA, FmHA, and NRC Canada. Normally, a 4-6 mil polyethylene or a cross laminated polyethylene product (Tu-Tuf) is used. Considerable care is required during installation to insure proper lapping and sealing (with acoustical sealant) of all joints along a rigid backed member. Likewise, all punctures must be similarly repaired. Frequently, an air barrier (permeable to moisture) such as Dupont Tyvek is used on the exterior as insurance against infiltration and exfiltration.

Indoor Air Quality:

Due to "tight" construction techniques obtained with the use of air/vapor barriers, mechanical methods must be used to insure acceptable indoor air quality. This is most frequently accomplished by the proper installation and operation

of an air-to-air heat exchanger appropriately sized for the building. It is generally agreed that an exchange rate of 0.5 air changes per hour is adequate to control relative humidity and indoor air pollutants.

Back Up Heat:

Generally, superinsulated homes require only 20% or less back-up heat of similar sized traditional homes with R-19 walls and R-30 ceilings. It is not uncommon to have an 1800 square foot heated home that is superinsulated to require less than 20,000 Btu per hour in an 8000 to 10,000 degree day climate. Accordingly, central warm air or hydronic heating systems are rarely used in superinsulated homes. Such homes typically only need approximately 20 feet of electric baseboard heat!

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SUPERINSULATION COMES OF AGE

Bob Corbett and Wally Hansen of Superinsulation Designs, are established leaders in the field of superinsulation (see Houses and Plans, Jul/Aug 1982 issue of Update). They have now officially legitimized the field with the first superinsulation T-shirts, introduced at the superinsulation conference in Minnesota last April. You can get a full color iron-on transfer of the above design by sending \$3.00 plus \$.50 for handling to Superinsulation Designs, Box 3706, Butte, MT 59702.