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Guidelines for Non-vented Roof/Ceiling Assemblies

General:

Where possible provide adequate venting between the insulation and the roof sheathing. For roof configurations that are impossible or impractical to vent (such as a cathedral ceiling with intersecting hips and valleys) observe the following guidelines. In all cases, provide a durable, sealed, continuous air barrier on the conditioned side of the insulation.

Performance Objective:

Maintain the potential condensing surface¹ above the dew point temperature.

Performance Criteria:

Install air-impermeable insulation² in contact with the roof sheathing in order to maintain the condensing surface temperature at or above 45°F.³ The required resistance to heat transfer (R-value) of the air-impermeable insulation is determined according to the 1997 ASHRAE Fundamentals, Section 22.8,⁴ assuming an indoor temperature of 68°F, an outside temperature of 14.5°F,⁵ and interior relative humidity below 45 %.

Conclusion: **(R-value of the air-impermeable insulation) = 60% X (Total R-value)**

In order to minimize condensation within a non-vented roof/ceiling assembly in the St. Paul region, at least 60 % of the installed insulation must be air-impermeable, placed in contact with the roof sheathing.

Note:

Examples of “air-impermeable” insulation include polyurethane spray foam and extruded polystyrene rigid foam. The following are not air-impermeable: fiberglass, rock wool and netted or blown cellulose insulation.

¹ First surface within the building cavity that is susceptible to condensation.

² Air-permeance of not more than .02 L/s m² @ 70 Pa. tested according to ASTM E283.

³ Based on research performed by the [Building Science Corporation](http://www.bscorporation.com) and the [U.S. Department of Energy](http://www.eere.energy.gov).

⁴ Our calculations are available on request.

⁵ Lowest monthly average temperature in the St. Paul region – National Climatic Data Center.