



AN EVALUATION OF PLACEMENT OF RADIANT BARRIERS AND THEIR EFFECTIVENESS IN REDUCING HEAT TRANSFER IN ATTICS

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The tests were conducted to measure the influence of radiant barriers and the effect of different installation procedures on attic heat transfer. The heat transfer was measured for roof deck temperatures of both 120 and 140 degrees F.

For summer weather, radiation of heat is the most significant form of heat transfer in attics. Recent studies have shown the benefits of using radiant heat shields in structures. For example, the Florida Solar Energy Center found that shielding the insulation from the hot roof allowed this regular insulation to perform largely as it was intended by reducing it from radiant heat gain. Their results indicated that this shielding improved the overall thermal resistance by about 50%. Experiments at Texas A & M also showed that use of radiant barriers reduced the overall thermal conductivity of the insulation system.

This test was conducted to study various placements of radiant barriers within the attic as to the relative effectiveness of each.

The table below shows the reduction for the radiant barrier placed on the studs of the attic floor. In each case, the reduction of heat flux was greater when the radiant barrier was placed on the ceiling studs. Also, the reduction in heat flux was greater in the case of sample B because this laminate had both its sides coated with reflective material.

When the radiant barrier is placed on the studs, it not only reduces all the radiation exchange between the roof and the fibrous insulation, but also between the walls and fibrous insulation thereby increasing the resistance of the insulation system. Therefore, the reduction of heat flux is greater when the radiant barrier is placed on the attic floor studs.

CONCLUSIONS

The data indicates the placement of a radiant barrier on the attic studs (or on the top of the insulation) yields highest reduction in heat transfer. Because it is easier and less costly to retrofit an existing home by placing the radiant barrier on the attic floor, this could help the penetration of radiant barriers in the retrofit market.

| Sample Used | Heat Flux | | % Reduction | |
|------------------------------|-----------|-------|-------------|-------|
| | 120 F | 140 F | 120 F | 140 F |
| Base | 3.09 | 4.91 | -0- | -0- |
| A. One sided radiant barrier | 1.81 | 2.65 | 41.1% | 46.0% |
| B. Two sided radiant barrier | 0.89 | 1.07 | 71.2% | 78.2% |