Aluminum Achieves Improved Insulation

The national trend toward air-conditioned homes has been given its biggest boost to date by research findings revealing aluminum - surface insulation "can achieve year-round living comfort at amazingly low cost.

This important development is based on the outcome of two independent research projects sponsored by Aluminum Company of America—one at the National Bureau of Standards, the other at Pennsylvania State University.

Alcoa interpreted the findings to indicate that the proper use of adequate amounts of aluminum-clad insulation best overcomes two main obstacles to central air conditioning: high equipment costs and operating expenses. In most cases, both objections are due largely to inadequate insulation against summer heat, particularly sun heat.

By applying the new research findings, Alcoa engineers found that heating and cooling costs for the average sized house (1,200 square feet) may be as low as $12 per month — provided the house is properly engineered and adequately insulated. This figure is an average for the entire United States. In some locations the cost may be as low as $10, in others it may be $14 or higher.

Prior to the Alcoa-sponsored research program, basic original research dealing with aluminum insulation was lacking. Manufacturers of building insulating materials have been using aluminum foil since the early 1930's, but scientific technical data on this material was not complete.

At the National Bureau of Standards, research men set out to determine the insulating values of aluminum-clad insulation in combination with other insulating products.

This project was conducted by Henry B. Robinson, assistant chief of the Heating and Ventilating Section, the National Bureau's specialist on insulating problems. Participating as a research associate was Dr. Lee A. Cosgrove of Alcoa Research Laboratories.

The Bureau made 154 separate tests. They included the application of insulation in the five basic directions of heat flow: horizontally—as through a wall inward or outward; vertically down—as through flat roof heated by sun; down at 45 degrees—as through gabled or sloped roof heated by sun; vertically up — as through flat roof when inside was warmer than outside; up to 45 degrees—as through gabled or sloped roof when inside was warmer than outside.

Two nationally recognized authorities on thermal properties of materials collaborated on the insulation project at Pennsylvania State University. They are Professor E. R. Queer, director of the Department of Engineering Research, and F. A. Joy, professor of engineering.

Tests were conducted in the university's "Climatometer" — a large chamber in which almost any condition of atmospheric temperature and humidity can be created.

A test house was constructed in the enclosure. The structure was 13 x 14 feet with a ceiling height of eight feet, attic height of two feet for flat roof, and five feet at peak for gable roof. Heat flow meters were placed throughout the building and a series of 31 summer-type tests were run.

Based on the investigations carried on at both the National Bureau of Standards and at Penn State University, the following conclusions can be made:

It is now possible for the first time to calculate precise insulating values for any aluminum-surface insulating materials in any confined space.

It is possible for the first time to calculate precisely the insulating values of reflective surfaces—either alone or in combination with mass insulation—when facing an open attic area.

In addition, it was concluded:

All attics should be ventilated. Aluminum - clad insulation performs best in ventilated attic.

Alluminum-clad insulation performs its greatest service in summer in ventilated attics, either flat roof or gable roof when heat is flowing downward.

ALL MEMBERS OF THE FAMILY enjoy this multi-purpose room. Built for TV viewing, reading, sewing, and relaxing, its bright, cheerful atmosphere is attractive to both parents and children. This room is typical of the kind of family activity center that can be built by putting wasted areas to use. Effective, smart styling is the result of careful choice of furniture and accessories, plus use of modern wall and ceiling materials. Here, Celotex Finish Plank on the walls and Celotex Perforated Tile Board on the ceiling add charm to the interior. Besides providing their own attractive finish—in color and sparkling white—these products help maintain comfortable temperatures in the room. This plank and tile can be painted later to accommodate changes in decoration.

A FINE EXAMPLE of the "Accent" or single wall treatment which is favored by decorators, featuring V-plank plywood paneling, is shown above. These random grooved, one-quarter inch panels are available in woods such as American cherry, walnut or oak, African Samara or Korina and Asiatic Nakora.

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