

FOIL INSULATION FOR METAL BUILDINGS

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From an installer's point of view, foil insulation is a much better material than fiberglass for use in metal buildings—no holes to drill in trusses, wires to string, no problems with insuring the crews arrive ahead of time to run insulation over tops of trusses before the roof is laid down, no itchy mess under clothing. And, best of all, no need for bulky protective wear during hot weather.

An owner or builder has even better reasons to consider foil insulation superior to fiberglass than just the installers' convenience: Foil, installed, costs fifteen to eighteen percent less than fiberglass of comparable R value; foil performs the primary task of insulating a building more efficiently; foil meets fire safety standards better than fiberglass; and foil can look much better after insulation than clumps of fiberglass batting suspended overhead.

Insulation's basic job is to help maintain a set temperature level inside the building despite extreme variations in temperature outside. Since metal structures conduct heat well, insulation is a particularly important component in conserving energy and sustaining a comfort level for workers or temperature-sensitive materials inside. Quality foil insulation, installed properly, meets this task far more reliably than fiberglass.

These are sweeping claims for foil insulation that only a short time ago couldn't have been seriously made. It took major developments in the design and fabrication of foil insulation to make the product really usable. Now, foil should be getting a close, second look.

There are two reasons for foils performance advantages: first, fiberglass installation procedures tend to defeat the very properties that make fiberglass an effective insulator; and second, condensation of moisture, common to metal structures in particular, substantially reduces fiberglass' ability to interrupt the conducting of heat.

Fiberglass works as an insulating material by creating air spaces within its bulk. If the batting is compressed, the fiberglass becomes a conductor instead of an insulator. Increasing the mass of fiberglass insulation doesn't compensate, because its effectiveness diminishes as the mass increases. Fiberglass, as a material, is a relatively good conductor, yet by use of air space slows the transfer of heat—but a substantial thickness of fiberglass will transmit heat through the material itself.

This is partial explanation of why ratings tests on fiberglass rarely match ratings produced after the product is installed in a field location and tested again. The original rating supplied by the manufacturer is based upon a test of one-inch thickness, then extrapolated for three, four, or five inches thickness of the material. However, as explained above, piling on the fiberglass adds very little additional insulation value, so the extrapolation method is invalid, and the R value from the manufacturer is exaggerated. Additional R values are tested at a moderate temperature. As temperature changes, the values change by geometric proportions.

Even if the added thickness worked, frequently the installation method used for fiberglass would still defeat the material's purpose. The most laborious method of installing fiberglass is to drill a series of holes in the roof trusses, then string a network of wires through them to be used in holding bats of insulation in place. Besides being a time consuming process, this method often results in uneven distribution of the material if the roof has much of a pitch to it.

Depending upon the distance between the web of wires and the roofing material, there's a limited amount of space for the batting, usually limiting the insulation to thickness of about three inches of fiberglass. That by itself is typically only sufficient to meet code requirements in very temperate climates. Cramming more fiberglass into the space could compress the batting, thus reducing the air spaces in the material and defeating its purpose. Jamming batting in firmly between the wires and roof also eliminates the air gap between the insulator and the roof, and air by itself is a relatively efficient insulating material. That gap should be left to help increase the efficiency of the insulating product. Another drawback to wiring insulation in place is that codes in some areas don't allow the procedures.

Another method of installing fiberglass is to roll layers of the material over the tops of the trusses before installing the roof. The effect this installation procedure has on fiberglass should be apparent: the subsequent compressing of the material ruins its insulating value. In addition, if the installation crew is behind schedule there will be delays in placing the roof on the building often at a substantial added cost.

To complete the review of fiberglass insulation efficiency problems when used inside metal structures, consider the effect of moisture condensation. Condensation causes an R value loss quite suddenly. An R 13 insulation with only 1 ½ percent moisture content drops to R 8.3.

By contrast, foil insulation properly installed doesn't suffer from any of the problems that have been listed for fiberglass. The key phrase is "properly installed," for like fiberglass, foil insulating products perform their function only if a system of air spaces is created between the layers of insulation materials.

Installation, and some past problems with design that affected proper placement of foil insulation, had been the main concern about the practical use of foil as an insulating medium. The main objections to foil now resolved with new designs on the market for a year or longer, included:

Width of the material – Foil insulation in its early designs, some of which are still available and in some applications function very well, was made in fairly wide sheets. This made the product hard to handle, but more importantly restricted flexibility of application. Foil insulation in this form fits primarily standard widths with less than one inch of tolerance for proper installation.

Installation was no easier in metal buildings than fiberglass. A wide variety of application techniques have been attempted for foil insulation, until now none very satisfactory. Most of the products were attached with wires, some tried glue, and all took an inordinate length of time.

But newer designs have met these problems. That's why its time for metal building contractors and owners to take another look at foil insulation.

We commonly use a foil insulation rated at R 21. The material also performs at the same level in use. Standard widths are 16 inches and 24 inches—but the material can be installed effectively in spaces between 6 inches and 23 inches. We have also, on occasion, ordered custom fabrication to fit much wider spans. All the benefits of foil are present in our installation. Working as we do very often in a desert climate such as California's Conchella Valley, avoiding the need for bulky, hot special clothing results in speed on the job and much happier workmen. We find that installations are made up to thirty percent faster just because we can keep our people on the job longer.

Our clients appreciate the value of that feature because it saves money and fits well with the construction schedule. They also like the attractive finished appearance, and the long-term durability of the material.

Beyond that, effective insulation really does produce visible results. These are the values the metal building owner enjoys daily once the job is done. They are the long-term benefits of using a product that for the short term saves money, can be installed on schedule, and costs less from the onset.