



Facts About Moisture and Fiber Glass Metal Building Insulation

Information from NAIMA

Unlike many other insulation products, fiber glass metal building insulation is often visible to the occupants of the building. Making sure that roofs and walls do not leak, that the product is clean and dry prior to installation, and that condensation is controlled after installation is critical to the insulation performance and to the building's interior aesthetics. Because of performance requirements, fiber glass metal building insulations are most frequently installed with a facing material laminated to the surfaces that may be visible. This facing serves several purposes:

- Provides vapor retarder protection to retard passage of water vapor through the insulation to cold surfaces where condensation can occur
- Protects the insulation from damage
- Provides light reflectivity
- Provides an aesthetic appearance

Fiber glass metal building insulation will provide long service life and optimum performance when a few simple precautions are followed. The insulation should be kept clean and dry prior to installation and applied only to clean and dry surfaces. Care should be taken to protect the insulation from the incursion of water during the installation process. If adequately designed, regular inspection and maintenance of the vapor retarder will protect the integrity of the system after installation.

Q What effect does moisture have on insulation performance?

A Moisture from rain, ground water, humidity or other forms of condensation creates the potential for several problems in metal buildings. First, the presence of water (or ice) in the insulation seriously degrades the thermal performance and can degrade the effective service life of the insulation system. Second, water in contact with metals can contribute to corrosion and degrade the service life of the building. Third, collection of water can lead to dripping, staining, and other undesirable effects such as mold, mildew and odors, which degrade the building's intended service.

Q Should wet insulation be replaced?

A Yes. When fiber glass metal building insulation is exposed to storm waters or flood damage, the wet insulation should be removed and replaced since the water may carry with it any number of unknown contaminants.

Although it is possible for the thermal and acoustical performance of fiber glass insulation to return if the material is allowed to completely dry out, there is no assurance that the drying method used will be effective. There is also no assurance that the forces acting on the wet insulation will not result in loss of thickness, or

Facing Material	Perm Rating*
Vinyl	1.0
FSK	.02
White Metalized Polypropylene Scrim Kraft	.02
Vinyl/Scrim/Foil	.02
Polypropylene Scrim/Foil	.02
Vinyl/Scrim/Metalized Polyester	.02

* Perm ratings can be found in literature provided by the individual manufacturers of vapor retarder facings.

that contaminants in the water will not contribute to corrosion, mold or mildew growth or odors. For these reasons, it is best to err on the side of caution and replace the insulation.

Fiber glass metal building insulations must pass the mold growth test as specified in ASTM C991: Specification for Flexible Glass Insulation in Pre-Engineered Buildings. Clean, dry fiber glass will not support mold or fungus.¹ However, once the insulation – or any product, for that matter – is exposed to dirt and moisture, the possibility for microbial growth (mold or mildew) exists.²

Replacing the wet insulation is recommended to reduce the potential for indoor environmental quality problems and to regain the energy-efficiency and acoustical requirements intended for the building.

Q What are some installation guidelines to protect against condensation?

A Controlling the condensation in a metal building depends on several design, installation and maintenance factors.

1 The insulation must have vapor retarder on the “warm-in-winter” side for the more severe operating conditions. For most buildings, this is the inside surface

for protection in the winter months when the inside ambient air temperature is higher than the outside ambient air temperature. This is a design parameter confirmed during installation.

2 The insulation must be thick enough to maintain the facing surface temperature above the inside ambient air dew point temperature to prevent condensation. This is a design parameter. System thickness for condensation control may be different from the thickness for energy conservation.

3 Seams, joints, damage or punctures in the vapor retarder and penetrations should be sealed to retard the passage of water vapor around the insulation. This is primarily an installation requirement for good workmanship.

4 Ventilation to the outdoors on the cold side of the insulation will help remove moisture that gets past the facing. This is a design consideration.

Q How important is the perm rating of the vapor retarder in controlling condensation?

A The rate at which moisture or water vapor passes through a flat material induced by unit vapor pressure difference is defined as water vapor permeance. One perm is defined as 1.0 grain of water vapor transmitted per hour per square foot per 1.0 inches of mercury vapor pressure difference. The lower the perm rating, the more effective the retarder in controlling moisture vapor transmission. When choosing a vapor retarder, remember that the lower the perm rating means the less water vapor that can pass through the material.

Materials with a perm rating of 1.0 perms or less are considered to be vapor retarders.

Materials rated at .02 perms are recommended where high humidity interior conditions exist. Materials whose perm ratings are greater than 1.0 are not considered to be vapor retarders. General perm ratings for the facings most commonly used on metal building insulation are shown in the table above.

References

1. *Fungal Contamination of HVAC Surfaces: The Role of the Dew Point in Microbial Amplification*, Jerry J. Tulis, and Wayne R. Thomann; Occupational and Environmental Medicine Division, Duke University Medical Center, Durham, N.C., 1997
2. *Ibid.*

About NAIMA

NAIMA is the association for North American manufacturers of fiber glass, rock wool, and slag wool insulation products. Its role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation, and to encourage the safe production and use of these materials.

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