

**Installation Process**



**NFR -1 Facing Retards Water Vapor**



**Poor Quality Insulation Facing**



**PROTECT YOUR BUILDING WITH A LOW PERM RWMSK FACING**

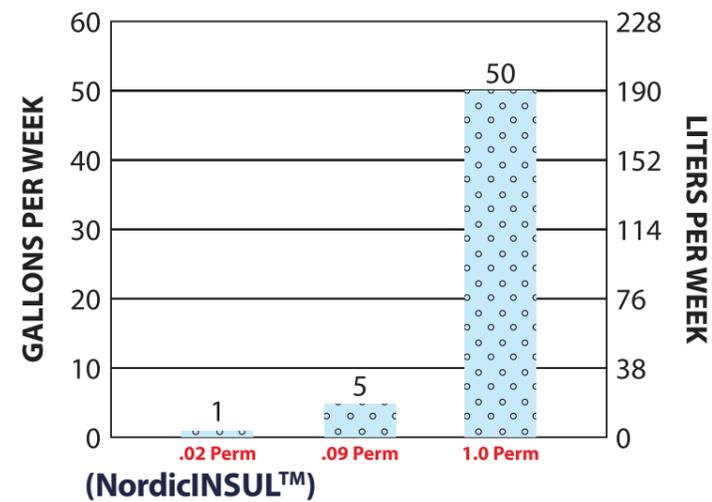
**Avoid future moisture problems by using a low perm NFR -1 facing:**

**Reduces the moisture entering the fiberglass insulation**

**Enables the insulation to perform as designed.**

**Reduces the likelihood of water problems.**

**MOISTURE THAT PASSES THROUGH FACING  
5,000 SQ. METERS**

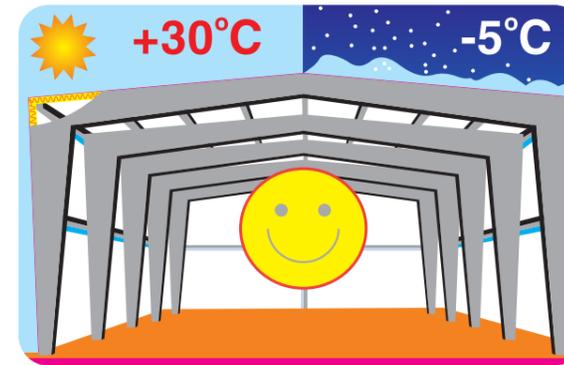


The word "Perm" is used to quantify the rate of water vapor transfer through the facing into the fiberglass and onto the metal skin of the building.

There are three basic perm levels offered by the facing suppliers: .02, .09 and 1.0. Lower perm facings reduce the amount of moisture entering the fiberglass which helps to save energy, reduce condensation and avoid future moisture related problems. Theoretically\*, in a 5,000 square meter building, a .02 perm facing will only allow 1 gallon of water to pass through the facing in one week. This compares to 5 gallons for a facing with a .09 perm and 50 gallons for a facing with a 1.0 perm rating.

\* Test Conditions: ASTM E 96 Procedure A - 73°F (23°C) and 50% RH on one side of the vapor retarder, and 73°F (23°C) and 0% RH on the other side.

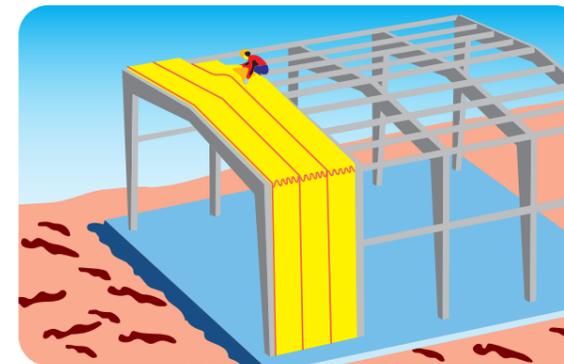
**INSULATION**



**Comfort from hot and cold**



**Saves energy**



**Insulation being installed**



**Attractive appearance**

**DESCRIPTION**

Pre-Engineered Building Insulation (NordicINSUL™) is a highly efficient, lightweight, strong, resilient, and easy to handle flexible blanket insulation composed of fine, stable and uniformly textured inorganic glass fibers bonded together by a non-water soluble and fire-retardant thermosetting and heat resistant resin. It is free from coarse fibers and shot due to its mineral composition.

**APPLICATION**

Pre-Engineered Building Insulation (NordicINSUL™) is manufactured specifically for use in the roofs and side walls of commercial, industrial, residential, agricultural and poultry farms metal building construction. This insulation greatly reduces heat gain or loss through the building envelope. It will not rot, disintegrate or slump.

Pre-Engineered Building Insulation (NordicINSUL™) can be applied directly against steel sheets, over or under steel purlins beneath the exterior cladding sheets.

**Standard Nominal Density**

10-12 kg/m<sup>3</sup> - 0.625-0.75 lbs/ft<sup>3</sup>

**Nominal Thermal Conductivity (K-Values)**  
(ASTM C 518, B.S.874) - For all thicknesses.



Thermal conductivity (K-Values) at 25°C are shown in the following table:

Insulation thickness (mm)	K-Value (W/m.K) at densities			
	10 kg/m <sup>3</sup>	12 kg/m <sup>3</sup>	16 kg/m <sup>3</sup>	20 kg/m <sup>3</sup>
50 to 100	0.042	0.040	0.039	0.036

**Thermal Resistance, "R" value (ASTM C 167)**

Insulation performance can be directly measured in terms of the thermal resistance (R-Values) of the material expressed in m<sup>2</sup> K/W, which is obtained by the equation, R=T/K where T=Thickness in meters and K=Thermal conductivity in W/m.K. Thermal resistance (R-Values\*) at 25°C are shown in the following table:

Insulation thickness (mm)	R-Value (m <sup>2</sup> .K/W) at densities			
	10 kg/m <sup>3</sup>	12 kg/m <sup>3</sup>	16 kg/m <sup>3</sup>	20 kg/m <sup>3</sup>
50	1.190	1.250	1.282	1.389
100	2.381	2.500	2.564	2.778

\* The higher the R-Value, the better the insulation.

**Thermal Conduction, "C" - Value**  
(ASTM C 518, ASTM C 177).

$$C = \frac{1}{R} = W/m^2 \cdot ^\circ C \text{ or } Btu/hr.ft^2 \cdot ^\circ F.$$

It is the ability of the product to conduct heat.  
**Thermal Transmittance (U-Value)**

$$U = \frac{1}{R_T}$$

Insulation thickness (mm)	U-Value	
	Roof (W/m <sup>2</sup> .K)	Wall (W/m <sup>2</sup> .K)
50	0.642	0.678
100	0.364	0.375

## PERFORMANCE & PHYSICAL CHARACTERISTICS

### Working Temperature limitations (ASTM C 411)

-4°C to +260°C. At excessive temperatures, a limited migration of binder may occur in the insulation in contact with the hot surface. This in no way impairs the performance of the insulation.

### Alkalinity (ASTM C 871)

pH 9

### Corrosiveness (ASTM C 665)

Chemically inert. Will not cause or accelerate corrosion of steel, stainless steel, copper or aluminium, due to its particular inorganic and mineral composition. **NFR -1** Facing has no metal content, thus it does NOT promote any corrosion when in direct contact with the steel Purlins/Beams/Cladding.

### Mold Growth (ASTM D 2020, UL 181, ASTM C 991)

Does not breed or sustain mold, fungus, bacteria or rodents. Non-toxic, rot proof, odourless and non hygroscopic.

### Moisture Absorption (ASTM D-07 B, ASTM C 553)

Moisture absorption is less than one percent by weight when tested in accordance with ASTM C 553, BS 2972 or BS 6676. The fiberglass insulation does not absorb moisture from the ambient air nor water by capillary action. Only water pressure will wet the insulation, which will quickly dry out due to the material's open cell structure.

### Vapor Permeability (ASTM E 96 A)

0.02

### Compressive Strength

PCF AT 10% DEFORMATION 5

PCF AT 25% DEFORMATION 10

### Fire Properties

B.S 476 PART 4 – Non combustible

B.S 476 PART 5 – Ignitability

B.S 476 PART 6 – Fire propagation

B.S 476 PART 7 – Surface spread of flame

Class "0" fire rating to the building regulations section E15.

### Sound Transmission Loss in dB

#### Metal Building Walls

Construction Type	Octave Band Center Frequencies, Hz						
	125	250	500	1000	2000	4000	NRC
Metal building wall + 2" insulation	11	15	16	29	31	37	24
Metal building wall + 4" insulation	11	17	21	34	35	42	27

### Overall Heat Transmission Coefficient:

Insulation thickness	Manufactures data for uncompressed insulation			MBMA/TMA test values**			
	Actual	Theoretical		Insulation compressed over girts and purlins, fasteners on 12" centers		Insulation compressed over girts and purlins, fasteners on 6" centers	
Inches	"K"	"R"	"U"	"R"	"U"	"R"	"U"
2	0.28	7.14	.14	5.23	.17	4.64	.19
4	0.28	14.29	.07	7.60	.12	6.45	.14

### Maintenance

Pre-Engineered Building Insulation (**NordicINSUL™**) has a high resistance to accidental damage from knocks and handling during installation and maintenance. Dimensionally stable under varying conditions of temperature and humidity, rot-proof, odourless, non-hygroscopic and will not sustain vermin or fungus due to its inorganic and mineral composition.

The product will maintain its thermal properties throughout the lifetime of the construction and will not age. Nordic is non-toxic and not hazardous to health.

### Storage

To avoid moisture in the building construction,

**NordicINSUL™** products which are stored outside, must be kept dry.

**NordicINSUL™** reserves the right to alter product specifications without prior notice, as part of its policy of continued development and improvement. The choice of **NordicINSUL™** materials and methods of fixing are the decision of the specifier, consultant or contractor. For further information or advice on specification of **NordicINSUL™** products, contact your local sales office.

### USA – Technology

**NordicINSUL™** utilizes the manufacturing specifications and technology of (OCF), Toledo, Ohio, U.S.A.



## FACING: NFR -1

**NFR -1 NordicINSUL** is designed and factory laminated to a choice of functional finishes to provide attractive interiors, abuse resistance, and assistance in the control of moisture or vapor condensation. **NordicINSUL** is available with a factory-applied Reinforced White Metalized Scrim Kraft facing.

The use of the proper facing helps to preserve the inherent fire safety of metal Buildings.

**NFR -1** Facing brighten the building interiors due to its high light reflectance, reduce the cost of interior lighting, contribute to an effective vapor barrier and to the control of condensation and dripping moisture.

A 50mm (2 inch) stapling and taping overlap flange on one side or both sides of these facings is available.

Construction of the vapor barrier shall be:

Film thickness ....1.5 mil white metalized.

Adhesive .... Flame retardant.

Reinforcing .... Tri-directional fiberglass yarn.

Backing .... 12# natural kraft.

Wire mesh is not required under the insulation.

**NFR -1** Facing has no metal content, thus it does NOT promote any corrosion when in direct contact with the steel Purlins/Beams/Cladding.

### Puncture Resistance (ASTM D 781)

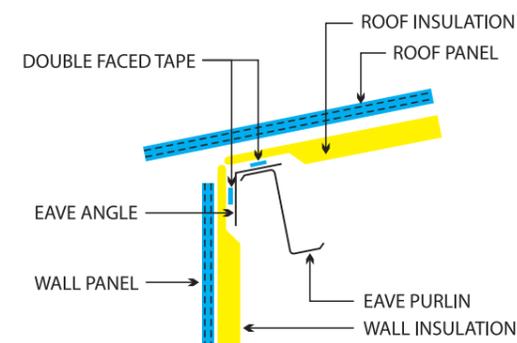
**NFR -1** 25 UNITS

### Surface Burning Characteristics

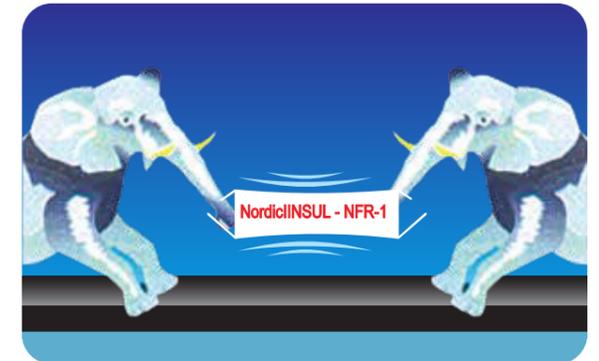
(UL 723, ASTM E 84, ASTM E 136)

Base glass fiber is non-combustible when tested to ASTM E 84.

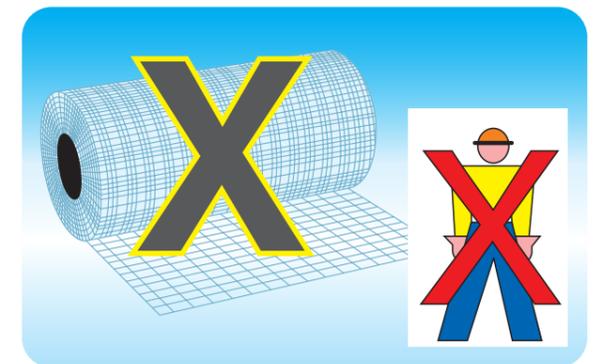
FACING	FLAME-SPREAD	SMOKE-DEVELOPED	FUEL-CONTRIBUTED
NFR -1	20	30	0



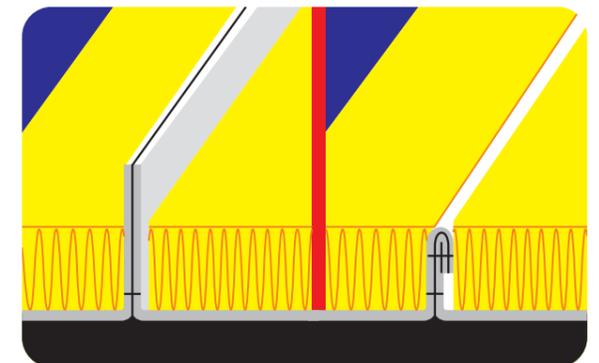
**INSULATION DETAIL AT EAVE**



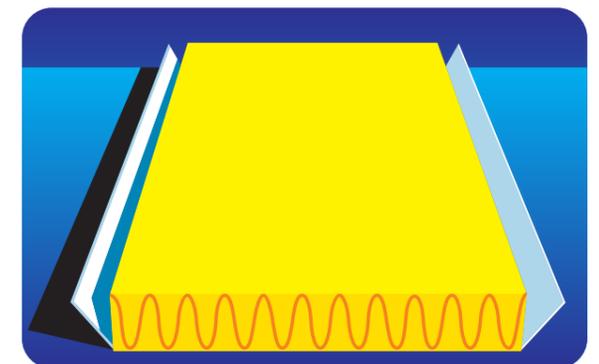
**Very strong facing**



**No wire mesh needed**



**Rolling and stapling a tab**



**Facing wider than insulation**