KNAUF INSULATION
it's time to save energy

Data Sheet | CI-IB-DS 06-15

Insulation Board

with ECOSE® Technology

with ECOSE® TECHNOLOGY

Insulation Board *with ECOSE® Technology*

Description
Knauf Insulation Insulation Board is a thermal and acoustical insulation product bonded with ECOSE® Technology. It is available plain or with a factory-applied FSK facing, PSK (metalized polypropylene-scrim-kraft) or all-service jacket (ASJ).

ECOSE® Technology
ECOSE® Technology is a revolutionary binder chemistry that enhances the sustainability of our products. The "binder" is the bond that holds our glass mineral wool product together and gives the product its shape and brown color. ECOSE® Technology is a plant-based, sustainable chemistry that replaces the phenol/formaldehyde (PF) binder traditionally used in glass mineral wool products. Products using ECOSE® Technology are formaldehyde-free and have reduced global warming potential when compared to our products of the past.

Application
Knauf Insulation Insulation Board is a versatile product for thermal and acoustical applications such as: heating and air conditioning ducts, power and process equipment, boiler and stack installations, metal and masonry walls, wall and roof panel systems, curtain wall assemblies and cavity walls.

Features and Benefits
- Excellent thermal efficiency results in lower operating costs
- Lightweight, easy to handle and fabricate
- Fast, easy installation lowers labor costs
- Low emitting for indoor air quality considerations
- Excellent acoustical properties effectively reduce noise
- FSK, PSK, and ASJ+ vapor-retardant facings provide a neat finished appearance

Sustainability
- Carbon negative: meaning Knauf Insulation insulation products used for thermal insulating purposes recover the energy that it took to make them in just hours or a few days, depending on the application. Once installed, the product continues to save energy and reduce carbon generation as long as it is in place.
- Glass mineral wool insulation with ECOSE® Technology contains three key ingredients:
  - Sand, one of the world's most abundant resources
  - A minimum of 50% recycled content and UL Environment verification every 6 months
  - ECOSE® Technology which reduces binder embodied energy by up to 70%
    - It reduces its Global Warming Potential (GWP) by approximately 4%, a significant reduction in our carbon footprint

Specification Compliance
In U.S.:
- UL/ULC Classified (FSK, ASJ)
- ASTM C 612
  – Type IA (1.6, 2.25, 3.0, 4.25, 6.0 pcf) (26, 36, 48, 68, 96 kg/m3)
  – Type IB (3.0, 4.25, 6.0 pcf) (48, 68, 96 kg/m3)
- ASTM C 795
- MIL-I-24244C
- NRC Reg. Guide1.36. (Certification needs to be specified at time of order)
- ASTM C 1136 (facings)
  – Type I, II, III, IV (ASJ)
  – Type II, IV (FSK, PSK)
- California Title 24
- HH-B-100B; Type I (ASJ facing), Type II (FSK, PSK facings)
- HH-I-558C
  – Form A, Class 1 (1.6, 2.25, 3.0, 4.25, 6.0 pcf) (26, 36, 48, 68, 96 kg/m3)
  – Form A, Class 2 (3.0, 4.25, 6.0 pcf) (48, 68, 96 kg/m3)
- NFPA 90A and 90B

In Canada:
- CAN/ULC S102-M88
- CGSB 51-GP-10M
- CGSB 51-GP-52M (facings)

Indoor Air Quality
- UL Environment certified
- UL Environment GREENGUARD Gold certified
- UL Environment validated to be formaldehyde free
- This product complies with Oregon Revised Statute 453.085 and contains less than 0.10% decabromdiphenyl ether (DecaBDE) by mass.
- Tested and certified to meet all requirements of EUCEB

Technical Data
Surface Burning Characteristics
(UL Classified)
- Unfaced or composite (insulation, facing and adhesive) does not exceed 25 Flame Spread, 50 Smoke Developed when tested in acordance with UL 723, CAN/ULC S102-M88, ASTM E 84, NFPA 90A and 90B and NFPA 255.

Temperature Range (ASTM C 411)
- Operating temperatures from 0°F to 450°F (-18°C to 232°C)

Corrosiveness (ASTM C 665)
- Will not accelerate corrosion of aluminum, steel or copper.

Corrosion (ASTM C 1617)
- The corrosion rate in mils/yr will not exceed that of the 5 ppm chloride solution.

Puncture Resistance
(TAPPI Test T803) (Beach Units)
- FSK, PSK Facings: 25
- ASJ facing: 55
- ASJ+ facing: 120

Water Vapor Transmission
(ASTM E 96, Procedure A)
- FSK, PSK and ASJ+ vapor retarders have a maximum vapor transmission rate of .02 perms.

Water Vapor Sorption (ASTM C 1104)
- Less than 5% by weight when exposed to air at 120°F (49°C) and 95% humidity for 96 hours

Shrinkage (ASTM C 356)
- Less than 0.3% linear shrinkage

Resists Microbial Growth
(ASTM C 1338, G21)
- Does not promote or support the growth of mold, fungi or bacteria

Sound Absorption Coefficients (ASTM C 423, Type A Mounting)

Type	Facing	Thickness	Octave Band Center Frequency (cycles/sec.)						
			125	250	500	1000	2000	4000	NRC
1.6 PCF (26 kg/m³)	Plain	1½" (38 mm)	.19	.44	.86	.98	1.00	1.02	.80
		2" (51 mm)	.31	.57	.96	1.04	1.03	1.03	.90
		2½" (64 mm)	.43	.82	1.12	1.07	1.04	1.03	1.00
		3" (76 mm)	.47	.92	1.17	1.06	1.06	1.04	1.05
2.25 PCF (36 kg/m³)	Plain	1" (25 mm)	.05	.24	.59	.86	.97	1.00	.65
		1½" (38 mm)	.17	.49	.93	1.03	1.03	.99	.85
		2" (51 mm)	.26	.62	1.05	1.07	1.04	1.05	.95
	FSK	1" (25 mm)	.14	.69	.81	.99	.55	.27	.75
		2" (51 mm)	.63	.76	1.11	.75	.42	.22	.75
3.0 PCF (48 kg/m³)	Plain	1" (25 mm)	.08	.23	.62	.88	.96	.99	.65
		1½" (38 mm)	.09	.39	.89	1.03	1.06	1.01	.85
		2" (51 mm)	.29	.65	1.11	1.13	1.06	1.03	1.00
		3" (76 mm)	.54	1.01	1.18	1.07	1.07	1.04	1.10
		4" (102 mm)	.95	1.11	1.17	1.07	1.07	1.06	1.10
	FSK	1" (25 mm)	.21	.63	.84	.93	.51	.22	.75
		1½" (38 mm)	.45	.60	.99	.73	.53	.27	.70
		2" (51 mm)	.67	.77	.93	.74	.47	.28	.75
	ASJ	1" (25 mm)	.15	.71	.65	.82	.41	.16	.65
		1½" (38 mm)	.42	.55	.91	.69	.40	.23	.65
		2" (51 mm)	.75	.71	.80	.66	.41	.24	.65
4.25 PCF (68 kg/m³)	Plain	1" (25 mm)	.06	.24	.69	.99	1.05	1.02	.75
	ASJ	2½" (64 mm)	.75	.63	.63	.62	.41	.25	.55
6.0 PCF (96 kg/m³)	Plain	1" (25 mm)	.05	.26	.77	1.04	1.04	1.03	.80
		1½" (38 mm)	.13	.58	1.01	1.05	1.00	1.01	.90
		2" (51 mm)	.32	.81	1.08	1.06	1.03	1.04	1.00
	FSK	1" (25 mm)	.23	.65	.39	.48	.47	.32	.50
		1½" (38 mm)	.61	.47	.78	.61	.51	.35	.60
		2" (51 mm)	.77	.50	.72	.58	.53	.41	.60
	ASJ	1½" (38 mm)	.60	.46	.62	.48	.47	.31	.50
		2" (51 mm)	.77	.44	.60	.50	.41	.30	.50

Forms Available*			
Density (PCF)	**Thickness**	**R-Value**	**(R-SI)**
1.6 (26 kg/m³)	1 1/2" (38 mm)	6.3	(1.1)
	2" (51 mm)	8.3	(1.5)
	3" (76 mm)	12.5	(2.2)
2.25 (36 kg/m³)	1" (25 mm)	4.3	(0.8)
	1 1/2" (38 mm)	6.5	(1.1)
	2" (51 mm)	8.7	(1.5)
	3" (76 mm)	13.0	(2.3)
	4" (102 mm)	17.4	(3.1)
3.0 (48 kg/m³)	1" (25 mm)	4.3	(0.8)
	1 1/2" (38 mm)	6.5	(1.1)
	2" (51 mm)	8.7	(1.5)
	2 1/2" (64 mm)	10.9	(1.9)
	3" (76 mm)	13.0	(2.3)
4.25† (68 kg/m³)	1" (25 mm)	4.3	(0.8)
	1 1/2" (38 mm)	6.5	(1.1)
	2" (51 mm)	8.7	(1.5)
	2 1/2" (64 mm)	10.9	(1.9)
6.0† (96 kg/m³)	1" (76 mm)	4.5	(0.8)
	1 1/2" (89 mm)	6.8	(1.2)
	2" (102 mm)	9.1	(1.6)

* Available in widths of 24" (610 mm) and 48" (1219 mm) and lengths from 36" to 120" (915 mm-3048 mm).

† Cartons only.

Application & Specification Guidelines

Storage

- Protect material from water damage or other abuse. Cartons are not designed for outside storage. Vacuum packaged material can be stored outside if care is taken not to puncture the poly bag.

Preparation

- Apply the product on clean, dry surfaces. Metal ducts must be sealed before application. Prescore rigid insulation board where necessary to conform to curved surfaces.

Application

GENERAL:

- All insulation joints must be firmly butted. Insulation can be secured with mechanical fasteners or banded. Minimum compression is to be used to assure firm fit and still maintain thermal performance.
- Vapor retarders should overlap a minimum of 2" (51 mm) at all seams, and be sealed with appropriate pressure sensitive tape or mastic. When applying pressure sensitive tapes, the tape must be firmly rubbed with a proper sealing tool to make sure the closure is secure. Follow tape manufacturer's recommendations.
- Fasteners shall be located a maximum of 3" (76 mm) from each edge and spaced no greater than 12" (457 mm) on center.
- Where vapor retarder performance is necessary, all penetrations and facing damage shall be repaired with tapes or mastic with a minimum of 2" (51 mm) overlap. Tapes should be applied using a sealing tool and moving pressure. Use on ducts, plenums, vessels, tanks and equipment operating at temperatures of 450°F (232°C) or less.
- Tapes and mastics (dry) should have a UL 723 rating of 25 flame spread, 50 smoke developed.

DUCTS AND PLENUMS:

- Use of 3.0 pcf (48 kg/m3) insulation board in concealed areas is recommended.
- Use of 6.0 pcf (96 kg/m3) insulation board in exposed areas and outdoor applications is recommended.

VESSELS, TANKS AND EQUIPMENT:

- For irregular surfaces, use 1.6 pcf (26 kg/m3) insulation board and band with minimum compression.

- For outdoor application, Knauf Insulation Board must be covered with appropriate jacketing, mastic or other vapor retarder. All exposed surfaces must be protected.
- Apply jacketing, mastics and other vapor retarders in accordance with manufacturer's instructions.

Precaution

- During initial heat-up to operating temperatures above 350°F (177°C), a slight odor and some smoke may be given off as a portion of the bonding material used in the insulation begins to undergo a controlled decomposition.
- If natural convection is not adequate in confined areas, forced ventilation should be provided in order to protect against any harmful fumes and vapors that might be generated.

Caution

Glass mineral wool may cause temporary skin irritation. Wear long-sleeved, loose-fitting clothing, head covering, gloves and eye protection when handling and applying material. Wash with soap and warm water after handling. Wash work clothes separately and rinse washer. A disposable mask designed for nuisance type dusts should be used where sensitivity to dust and airborne particles may cause irritation to the nose or throat. Vacuum packaging Knauf Insulation products will reduce some mechanical properties of the insulation. By ordering vacuum packaged products, the customer acknowledges these reduced properties and assumes responsibility for the fitness for use in their application.

Glass Mineral Wool and Mold

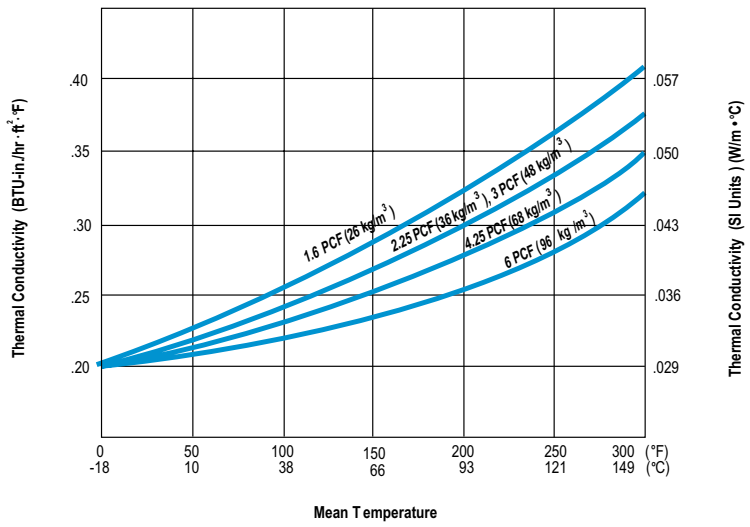
Glass mineral wool insulation will not sustain mold growth. However, mold can grow on almost any material when it becomes wet and contaminated. Carefully inspect any insulation that has been exposed to water. If it shows any sign of mold it must be discarded. If the material is wet but shows no evidence of mold, it should be dried rapidly and thoroughly. If it shows signs of facing degradation from wetting, it should be replaced.

Notes

The chemical and physical properties of Knauf Insulation Insulation Board with ECOSE® Technology represent typical average values determined in accordance with accepted test methods. The data is subject to normal manufacturing variations. The data is supplied as a technical service and is subject to change without notice. References to numerical flame spread ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions.

Check with your Knauf Insulation territory manager to assure information is current.

Thermal Efficiency (ASTM C 177)



Mean Temperature		1.6 PCF		3.0 PCF		6.0 PCF	
		k	k(SI)	k	k(SI)	k	k(SI)
75°F	(24°C)	.24	.035	.23	.033	.22	.032
100°F	(38°C)	.25	.036	.24	.035	.23	.033
200°F	(93°C)	.33	.048	.29	.042	.27	.039
300°F	(149°C)	.42	.061	.37	.053	.34	.049

KNAUF INSULATION
it's time to save energy

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Versions of this product have surface burning characteristics that are classified by Underwriters Laboratories and therefore subject to auditing for fire performance compliance.

This product has been tested and is certified to meet the EUCEB requirements.

LEED Eligible Product

Use of this product may help building projects meet green building standards as set by the Leadership in Energy and Environmental Design (LEED) Green Building Rating System.

MR Credit 4.1 - 4.2 Recycled Content
MR Credit 5.1 - 5.2 Regional Materials

UL Environment GREENGUARD Gold

Knauf Insulation achieved UL Environment GREENGUARD Gold Certification.

UL Environment GREENGUARD Certification Program

Products are certified to UL Environment GREENGUARD standards for low chemical emissions into indoor air during product usage. For more information, visit ul.com/gg.

This product is covered by one or more U.S. and/or other patents. See patent www.knaufinsulation.us/patents