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KNAUF INSULATION
Insulation Board

Description
Knauf Insulation Board is a thermal and acoustical insulation product made from inorganic glass fibers preformed into boards bonded by a thermosetting resin. It is available plain, with a factory-applied FSK facing, PSK facing or all-service jacket (ASJ).

Application
Knauf 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
Energy Conservation
- Excellent thermal efficiency results in lower operating costs.

Low-Cost Installation
- Lightweight, easy to handle and fabricate.
- Fast, easy installation lowers labor costs.

Noise Reduction
- Excellent acoustical properties effectively reduce noise.

Appearance
- FSK, PSK and ASJ vapor-retardant facings provide a pleasing appearance.

Specification Compliance
In U.S.:
- ASTM C 612;
  - Type IA (1.6, 2.25, 3.0, 4.25, 6.0 pcf) (26, 36, 48, 68, 96 kg/m^3)
  - Type IB (3.0, 4.25, 6.0 pcf) (48, 68, 96 kg/m^3)
- ASTM C 795
- 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/m^3)
  - Form A, Class 2 (3.0, 4.25, 6.0 pcf) (48, 68, 96 kg/m^3)
- MIL-I-24244C
- NFPA 90A and 90B
- NRC Reg. Guide 1.36

In Canada:
- CAN 4-S102
- CGSB 51-GP-10M
- CGSB 51-GP-52M (facings)

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 accordance with ASTM E 84, CAN/ULC S102-M88, NFPA 90A and 90B, NFPA 255 and UL 723 (except PSK: ASTM E 84 and UL723 only).

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.
- Meets the stress corrosion requirements of ASTM C 795, MIL-I-24244C and NRC 1.36.

Puncture Resistance (TAPPI Test T803) (Beach Units)
- FSK, PSK facings: 25
- ASJ facing: 50

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.

Microbial Growth (ASTM C 1338, G21, G22)
- Does not promote or support the growth of mold, fungi or bacteria.

Application and Specification Guidelines
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.

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 polybag.

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 adhesive, 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" (305 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 3.0 pcf (48 kg/m^3) insulation board in concealed areas.
- Use 6.0 pcf (96 kg/m^3) insulation board in exposed areas.
- Insulation Board is not designed to be exposed to the airstream.

VESSELS, TANKS AND EQUIPMENT:
- For irregular surfaces, use 1.6 pcf (26 kg/m^3) 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.

Caution
Fiber glass 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.

Fiber Glass and Mold
Fiber glass insulation will not sustain mold growth. However, mold can grow on almost any material when it becomes wet and contaminated with organic materials. 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 Board 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 sales representative to assure information is current.

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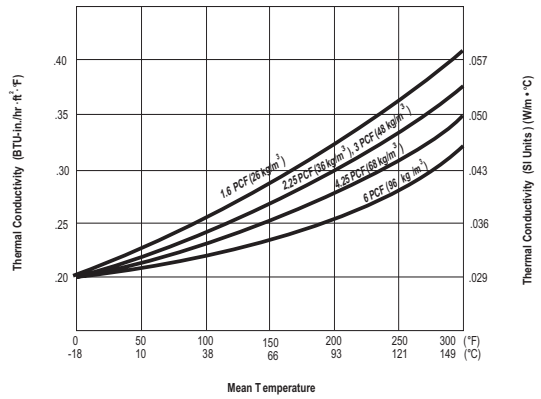
Insulation Board

Submittal Date _____

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

Type	Facing	Thickness		1/3 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

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

Forms Available*

Density (PCF)	Thickness		R-Value	(R-SI)
1.6 (26 kg/m³)	1½"	(38 mm)	6.3	(1.1)
	2"	(51 mm)	8.3	(1.5)
	2½"	(64 mm)	10.4	(1.8)
	3"	(76 mm)	12.5	(2.2)
	3½"	(89 mm)	14.6	(2.6)
	4"	(102 mm)	16.7	(2.9)
2.25 (36 kg/m³)	1"	(25 mm)	4.3	(0.8)
	1½"	(38 mm)	6.5	(1.1)
	2"	(51 mm)	8.7	(1.5)
	2½"	(64 mm)	10.9	(1.9)
	3"	(76 mm)	13.0	(2.3)
	3½"	(89 mm)	15.2	(2.7)
	4"	(102 mm)	17.4	(3.1)
3.0 (48 kg/m³)	1"	(25 mm)	4.3	(0.8)
	1½"	(38 mm)	6.5	(1.1)
	2"	(51 mm)	8.7	(1.5)
	2½"	(64 mm)	10.9	(1.9)
	3"	(76 mm)	13.0	(2.3)
	3½"	(89 mm)	15.2	(2.7)
	4"	(102 mm)	17.4	(3.1)
4.25 (68 kg/m³)	1"	(25 mm)	4.3	(0.8)
	1½"	(38 mm)	6.5	(1.1)
	2"	(51 mm)	8.7	(1.5)
	2½"	(64 mm)	10.9	(1.9)
6.0 (96 kg/m³)	1"	(76 mm)	4.4	(0.8)
	1½"	(89 mm)	6.7	(1.2)
	2"	(102 mm)	8.9	(1.6)

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