



Data Sheet

February 2014

Insulation Board with ECOSE[®] Technology

with **ECOSE[®]**
TECHNOLOGY

Insulation Board with ECOSE® Technology

Description

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

ASJ+ is the newest generation all-service jacket composed of aluminum foil, reinforced with a glass scrim bonded to a kraft paper interleaving with an outer film layer leaving no paper exposed.

The ASJ+ provides a Professional finished appearance — dimple and wrinkle resistant

- Cleanable with a wet cloth and soapy water
- Moisture resistant to intermittent, short duration liquid water exposure, such as precipitation during construction phase
- ASJ+ has substantially less degradation and discoloration when exposed to UV.

Application

Knauf Insulation Board with ECOSE Technology 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

Free of Phenol-formaldehyde

Knauf Insulation with Ecosse Technology is totally free from phenol and formaldehyde.

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

Indoor Air Quality Excellence

- Knauf Insulation achieved GREENGUARD GOLD Certification and is verified to be formaldehyde free. Products are certified to GREENGUARD standards for low chemical emissions into indoor air during product usage. Knauf Insulation has achieved a UL Environment

claim validation for over 50% post-consumer recycled glass content in our insulation products.

Sustainability

- Carbon negative: meaning Knauf 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.
- Glasswool insulation with ECOSE Technology contains three primary ingredients:
 - Sand, one of the world's most abundant and renewable resources
 - A minimum 50% recycled post-consumer glass content and UL Environment verification every 6 months
 - ECOSE Technology which reduces binder embodied energy by up to 70%
- It is anticipated to reduce its Global Warming Potential (GWP) by approximately 4%, a significant reduction in our carbon footprint

Noise Reduction

- Excellent acoustical properties effectively reduce noise

Appearance

- FSK and ASJ+ vapor-retardant facings provide a neat finished appearance

Conformity to Standards

Knauf Insulation Board complies with following standards.

American Standards:

ASTM C167, 168, 177, 303, 356, 411, 423, 518, 612(Type I,II & III), 665 (cl. 13.8 & 13.9), 1045, 1101/1101M, 1104/1104M, 1136(type I & II), 1135; ASTM E 84, 96, 136, 795.

UL 723, NFPA 255, NAIMA Standards, ASHRAE 90.1 requirements.

British Standards:

BS476 (part 4, 6 & 7), 13162, 822, 823, 824, 825, 826, 1602, 1608, 1604, 1609.

ISO Standards:

ISO 1716, 1182

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, NFPA 90A and 90B, NFPA 255 and UL 723

Temperature Range (ASTM C 411)

- Operating temperatures from 0°F to 450°F (-18°C to 232°C)

Corrosiveness (ASTM C 665 cl.13.8)

- Will not accelerate corrosion of aluminum, steel or copper

Water Vapor Transmission (ASTM E 96, Procedure A)

- FSK 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

Application & Specification Guidelines

Storage

- Protect material from water damage or other abuse.

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" (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.
- Insulation Board is not designed to be exposed to the airstream.

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

Glasswool 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.

Glasswool and Mold

Glasswool 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.

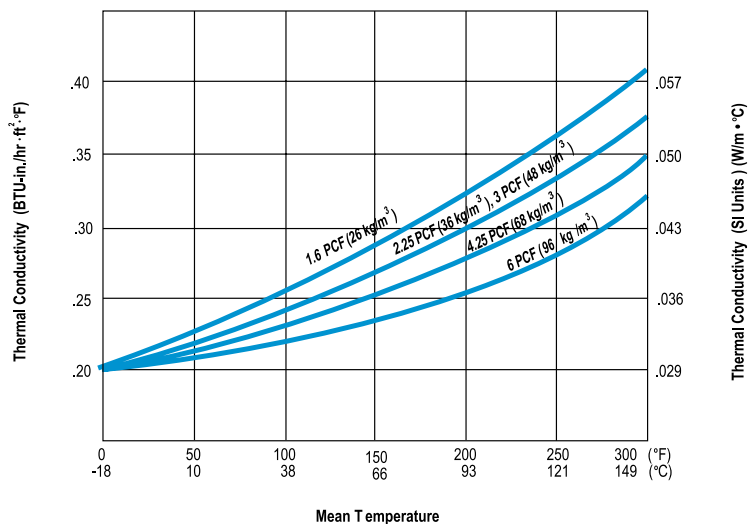
ECOSE Technology

ECOSE Technology is a revolutionary binder chemistry that makes Knauf Insulation products even more sustainable than ever. It features rapidly renewable bio-based materials rather than non-renewable petroleum-based chemicals traditionally used in fiberglass insulation products. ECOSE Technology reduces binder embodied energy and contains no phenol, formaldehyde, acrylics, artificial colors or UREA.

Notes

The chemical and physical properties of Knauf 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 sales representative 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

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/m ³)	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/m ³)	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/m ³)	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/m ³)	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/m ³)	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

Standard Dimensions *		
Thickness	Width	Length
mm	m	m
25	0.4, 0.6, 1.0, 1.2	1.0, 1.2, 2.4
40	"	"
50	"	"
75	"	"
100	"	"

*Non-standard sizes may be available on request

Nominal Density*		Thermal conductivity values in W/mK for below mean Temperatures in accordance with ASTM C518					
kg/m ³	lbs/ft ³	0°C	10°C	25°C	50°C	75°C	100°C
24	1.5	0.031	0.032	0.035	0.039	0.043	0.047
32	2	0.030	0.031	0.033	0.037	0.040	0.044
36	2.25	0.029	0.030	0.032	0.036	0.039	0.043
48	3	0.029	0.030	0.031	0.035	0.037	0.041
64	4	0.031	0.033	0.033	0.037	0.040	0.043
80	5	0.031	0.033	0.035	0.037	0.040	0.043
96	6	0.031	0.033	0.035	0.037	0.040	0.043
120	7.5	0.031	0.033	0.035	0.037	0.040	0.043

*Other densities may be available on request

Nominal Density*		Thermal conductivity values in Btu.in/ft ² .h.F for below mean Temperatures in accordance with ASTM C518					
kg/m ³	lbs/ft ³	32°F	50°F	77°F	122°F	167°F	212°F
24	1.5	0.21	0.22	0.24	0.27	0.30	0.33
32	2	0.20	0.22	0.23	0.25	0.27	0.30
36	2.25	0.20	0.21	0.22	0.25	0.27	0.30
48	3	0.20	0.21	0.22	0.24	0.26	0.29
64	4	0.21	0.23	0.23	0.25	0.27	0.30
80	5	0.21	0.23	0.24	0.26	0.28	0.30
96	6	0.21	0.23	0.24	0.26	0.28	0.30
120	7.5	0.21	0.23	0.24	0.26	0.28	0.30

*Other densities may be available on request

These are typical values subject to normal manufacturing and testing variances

Thermal Resistance (m ² .K/W) at 25°C mean Temperature									
Thickness (mm)	Density (kg/m ³)								
	24	32	36	48	64	80	96	100	120
25	0.71	0.76	0.78	0.81	0.78	0.72	0.71	0.71	0.7
40	1.14	1.21	1.25	1.29	1.25	1.14	1.14	1.14	1.14
50	1.43	1.52	1.56	1.61	1.56	1.43	1.43	1.43	1.43
75	2.14	2.27	2.34	2.42	2.34	2.14	2.14	2.14	2.14
100	2.85	3.03	3.13	3.23	3.12	2.86	2.86	2.86	2.86

Thermal Resistance (ft ² .h.F/Btu) at 77°F mean Temperature									
Thickness (inch)	Density (lb/ft ³)								
	1.5	2	2.25	3	4	5	6	6.25	7.5
1	4.16	4.34	4.54	4.65	4.51	4.16	4.16	4.16	4.16
1.5	6.25	6.52	6.82	6.98	6.76	6.25	6.25	6.25	6.25
2	8.33	8.69	9.09	9.31	9.02	8.33	8.33	8.33	8.33
3	12.5	13.04	13.63	13.96	13.52	12.5	12.5	12.5	12.5
4	16.66	17.39	18.18	18.61	18.03	16.66	16.66	16.66	16.66

These are typical values subject to normal manufacturing and testing variances

Properties of Knauf Glasswool with ECOSE®

Phenol-formaldehyde free

Superior in Thermal and Acoustical properties

Excellent fire safety

Environmentally friendly. Produced out of renewable and naturally occurring materials

Dimensionally stable

No sagging or settling

Complies with international standards

KNAUF INSULATION

it's time to save energy



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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.

Credit 4.1 - 4.2 Recycled Content

Credit 5.1 - 5.2 Regional Materials



Knauf Insulation Board with ECOSE® Technology products are certified for indoor air quality as low emitting products by the GREENGUARD Environmental Institute to both the GREENGUARD Indoor Air Quality Certification ProgramSM and the more stringent GREENGUARD Children & SchoolsSM standard and are verified to be formaldehyde free.

www.greenguard.org

The GREENGUARD Indoor Air Quality Certified Mark is a registered certification mark used under license through the GREENGUARD Environmental Institute.

Memberships

Emirates Green Building Council (EGBC)
MASDAR (The Future Build)



Our Product Listing and Certification

UL (Underwriters Laboratory)

DCL (Dubai Central Laboratory)

ISO 9001, ISO 14001, OHSAS 18001 Accreditation

