KNAUF INSULATION
it's time to save energy

Knauf Data Sheet | PE-DS-1e 07-10

Earthwool™ 1000° Pipe Insulation

with ECOSE® TECHNOLOGY

Facts at a glance

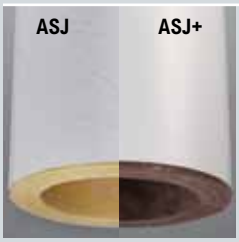
- The Knauf Insulation rotary manufacturing process produces insulation with concentric inside diameters and consistent wall thicknesses.

- ASJ+ is cleanable with a wet cloth and soapy water.

- Earthwool 1000° Pipe offers an extended temperature range—for all applications from 0° to 1000°F.

- ASJ+ is moisture resistant to intermittent, short duration liquid water exposure, such as precipitation during construction phase. Earthwool 1000° Pipe Insulation with ASJ+ is not intended for unprotected outdoor use.

- Earthwool 1000° Pipe's superior compressive strength allows for fast installation and a neat finished appearance.



- ASJ+ will provide a professional finished appearance — dimple and wrinkle resistant.

- Knauf's "wind-up" forming mandrel process prevents gaps and inconsistent densities, while making it easy to cleanly notch out sections.

- Size, wall thickness and Proto 25/50 rated PVC fitting cover identification are printed on the jacket.

- ECOSE Technology bio-based binder eliminates non-renewable petroleum-based ingredients. No formaldehyde, no phenol, no acrylics.
- Earthwool contains 40% post-consumer recycled bottle glass.

- Durability: UV light and puncture resistance.
  - ASJ+ meets ASTM C 1136 Type I, II, III, IV and meets VIII based on the 85% better puncture resistance (Mullen Burst).
  - ASJ+ has substantially less degradation and discoloration after exposure to UV light than traditional ASJ. Earthwool 1000° Pipe Insulation with ASJ+ is not intended for unprotected outdoor use.

Earthwool™ 1000° Pipe Insulation

Description

Knauf Insulation Earthwool™ 1000° Pipe Insulation is a molded, heavy-density, one-piece insulation made from inorganic glass fibers bonded with ECOSE® Technology. It is produced in 3' lengths with or without a factory-applied jacket.

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. A matching ASJ+ butt strip is furnished in the carton for each section. The jacket is white, and the longitudinal lap of the jacket has a self-sealing adhesive.

Earthwool

Earthwool is the new benchmark that stands apart for its genuine sustainability, unsurpassed performance and consistently high product quality.

ECOSE Technology

ECOSE Technology is a revolutionary binder based on rapidly renewable bio-based materials rather than non-renewable petroleum-based chemicals such as phenol, formaldehyde or acrylics. ECOSE Technology reduces Knauf Insulation's binder embodied energy and contains no phenol, formaldehyde, acrylics or artificial colors found in traditional fiber glass insulation.

Application

Earthwool 1000° Pipe Insulation is used to insulate iron and copper piping in industrial applications and in commercial and institutional buildings. Earthwool 1000° Pipe Insulation is suitable for hot, cold, concealed and exposed piping systems operating at temperatures from 0°F-1000°F (-18°C to 538°C). Additional weather protection is needed outdoors.

Features and Benefits

Energy Conservation

- Offers excellent resistance to heat loss or gain, which saves energy and lowers operating costs.
- A low thermal conductivity of .23 at 75°F (24°C).

Low-Cost Installation

- Available with self-sealing lap, which eliminates need for staples, additional material and tools.
- Fast, easy installation reduces labor costs.

Condensation Control

- Installed properly, the foil vapor retarder and pressure-sensitive lap assure a positive vapor seal.

Easy Size Identification

- Pipe size, wall thickness and Proto 25/50 Rated PVC fitting cover size are printed in a repeat pattern along the longitudinal lap.
- Easy identification at job site.
- Simplifies restocking.

ASJ+

- 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.
- ASJ+ meets ASTM C1136 Type I, II, III, IV, and meets VIII based on the 85% better puncture resistance of ASJ+ (Mullen Burst).
- Excellent SSL adhesion.

Indoor Air Quality

- Certified for indoor air quality as a low emitting product by The GREENGUARD Environmental Institute to both the GREENGUARD Certification Program℠ and the more stringent GREENGUARD Children and Schools℠ standard.

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.
- Earthwool fiber glass insulation contains three primary ingredients:
  - Sand, one of the world's most abundant and renewable resources
  - 40% post-consumer recycled bottle glass
  - 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

Specification Compliance

In U.S.:

- ASTM C 547; Type I, Type IV
- ASTM C 585
- ASTM C 1136 (jackets); Type I, II, III, IV,VIII
- HH-I-558C; Form D, Type III, Class 12; Class 13 (to 1000°F, 538°C)
- GREENGUARD Certification
- GREENGUARD Children & Schools℠ Certification
- NFPA 90A and 90B
- USCG 164.109/4/0 (plain, unjacketed only)

In Canada:

- CAN/ULC S102-M88
- CCG F1-304 (plain only)
- CGSB 51-GP-9M
- CGSB 51-GP-52M (jacket)

Technical Data - Earthwool 1000° Pipe Insulation

Surface Burning Characteristics

- Does not exceed 25 Flame Spread, 50 Smoke Developed when tested in accordance with ASTM E 84, CAN/ULC S102-M88, NFPA 255 and UL 723.

Temperature Range

- Pipe operating temperatures from 0°F to 1000°F (-18°C to 538°C) at a maximum recommended thickness of 6".

Corrosiveness (ASTM C 665)

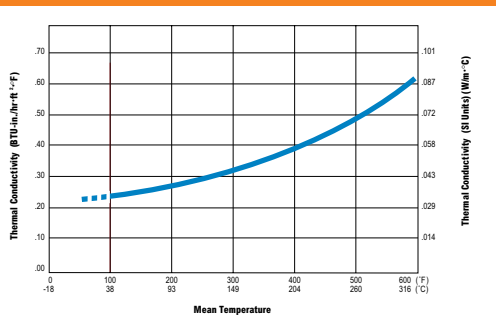
- Does not accelerate corrosion on steel, copper or aluminum.

Corrosion (ASTM C 1617)

- The corrosion rate in mils/yr will not exceed that of 1 ppm chloride solution.

Thermal Efficiency (ASTM C 335)

Mean Temperature	k	k (SI)
75°F (24°C)	.23	.033
100°F (38°C)	.24	.035
200°F (93°C)	.28	.040
300°F (149°C)	.34	.049
400°F (204°C)	.42	.061
500°F (260°C)	.51	.074
600°F (316°C)	.62	.089



Minimum Pipe Insulation (In.)[a] (to meet ASHRAE 90.1 Requirements)

Insulation Conductivity			Nominal Pipe Diameter (in.)					
Fluid Design Operating Temperature Range, °F	Conductivity Range BTU-in./ (hr·ft²·°F)	Mean Temperature Rating, °F	Runouts[b] up to 2	1 & less	1 ¼ to 2	2 ½ to 4	5 & 6	8 & up
Heating Systems (Steam, Steam Condensate and Hot Water)								
Above 350	32-34	250	1½	2½	2½	3	3½	3½
251-350	29-31	200	1½	2	2½	2½	3½	3½
201-250	27-30	150	1	1½	1½	2	2	3½
141-200	25-29	125	½	1½	1½	1½	1½	1½
105-140	24-28	100	½	1	1	1	1½	1½
Domestic and Service Hot Water Systems[c]								
105 and Greater	24-28	100	½	1	1	1½	1½	1½
Cooling Systems (Chilled Water, Brine, Refrigerant)[d]								
40-55	23-27	75	½	½	½	1	1	1
Below 40	23-27	75	1	1	1½	1½	1½	1½

a For minimum thicknesses of alternative insulation types, see 9.4.8.2, ASHRAE 90.1.
b Runouts to individual terminal units not exceeding 12 ft. in length.
c Applies to recirculating sections of service or domestic hot water systems and first 8 ft. from storage tank for non-recirculating systems.
d The required minimum thicknesses do not consider water vapor transmission and condensation. Additional insulation, vapor retarders, or both, may be required to limit water vapor transmission and condensation.

Alkalinity (ASTM C 871)
- Less than 0.6% as Na_2O.
- pH between 7.5 and 10.0.

Microbial Growth (ASTM C 1338)
- Does not promote microbial growth.

Water Vapor Sorption (ASTM C 1104)
- Less than 0.2% by volume.

Linear Shrinkage (ASTM C 356)
- Negligible.

Technical Data - ASJ+

Specification Compliance
- ASTM C 1136 (jackets); Type I, II, III, IV, VIII

Water Vapor Transmission (ASTM E 96, Procedure A)
- Jacket has a water vapor permeance of .02 perms or less.

Water Vapor Sorption (ASTM C 1104)
- Less than 0.2% by volume.

Product Forms amd Sizes

Produced in 3' (914 mm) sections:
- For iron pipe from ½" to 24" nominal pipe size (15 mm to 610 mm).
- For copper tube from ⅝" to 6 ⅛" (16 mm to 156 mm).
- Wall thicknesses from ½" to 6" (13 mm to 152 mm) in single layer (for most sizes).
- All insulation inner and outer diameters comply with ASTM C 585.

Packaging
- Four convenient carton sizes for easy ordering, inventory tracking and storage.
- Reinforced carton handles for strength and easy lifting.
- Bar-coded cartons for accurate shipments and tracking.
- Full product range stocked at distributors for fast availability.

Precautions

Hot Pipe
- May be installed while the system is in operation, at all temperatures up to 1000°F (538°C).

- Knauf Insulation recommends, for insulation thicknesses greater than 6" (152 mm) the temperature must be increased from 500°F (260°C) to maximum temperature at a rate not exceeding 100°F (56°C) per hour.
- 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.
- Care must also be taken when using sealants, solvents or flammable adhesive during installation.
- A maximum of 6" (152 mm) wall thickness is recommended.

Cold Pipe

- Use a continuous vapor retarder on piping operating below ambient temperatures.
- Seal all joints, surfaces, seams and fittings to prevent condensation.
- On below freezing applications, and in high-abuse areas, the ASJ+ jacket shall be protected with a PVC vapor retarding outer jacket. In addition, exposed ends of insulation shall be sealed with vapor barrier mastic installed per the mastic manufacturer's instructions. Vapor seals at butt joints shall be applied at every fourth pipe section joint and at each fitting to isolate any water incursion.
- On chilled water systems operating in high humidity conditions, it is recommended that the same guidelines be followed as listed above for below freezing applications.
- Exterior hanger supports are recommended.

Outside Application

- Do not expose pipe insulation to weather. It must be covered with appropriate jacketing, mastic or vapor retardant adhesives.
- All exposed surfaces must be protected. Proto® Indoor/Outdoor PVC Jacketing is recommended. See Knauf Guide Specifications for recommended PVC jacketing application guidelines.
- Apply jacketing, mastics or vapor retardant adhesives per manufacturer's instructions. For metallic jackets, factory-applied condensate retarders are recommended.

ASJ+ SSL

- Keep adhesive and contact surfaces free from dirt and water, and seal immediately once adhesive is exposed.
- Apply when ambient and insulation temperatures are between 20°F and 130°F (-6.7°C and 54°C).
- If stored below 20°F or above 130°F, allow insulation cartons to stand within recommended temperature range for 24 hours prior to application.
- Do not store product below -20°F (-29°C) or above 150°F (66°C).
- When using Knauf Insulation's SSL closure system, make sure the longitudinal and circumferential joints are properly sealed by rubbing the closure firmly with a squeegee. Use of staples is not recommended.
- When using Earthwool 1000° Pipe Insulation, the surface temperature of the insulation should be between -20°F and 150°F (-29°C and 66°C) during the life of the insulation.

Fittings and Hangers

- Use Proto 25/50 Rated (ASTM E 84) PVC Fitting Covers, applying PVC fittings per Proto's Data Sheet.
- Fittings should be insulated to same thickness as the adjoining insulation.
- Apply fittings per manufacturer's instructions.
- When required by specification, a hard insert of sufficient length should be used to avoid compression of the insulation.

Additional Precautions

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. Use a disposable mask/respirator designed for nuisance-type dusts where sensitivity to dust and airborne particles may cause irritation to the nose or throat.

Application Guidelines

Storage

- Protect insulation from water damage or other abuse, welding sparks and open flame.
- Cartons are not designed for outside storage.

Preparation

- Apply only on clean, dry surfaces.
- Pipe or vessel should be tested and released before insulation is applied.

General Guidelines

- All sections should be firmly butted.
- Seal circumferential joint with a minimum 3" (76 mm) wide butt strip.
- Jackets, coating and adhesives should have a comparable F.H.C. rating.
- ASJ+ may be painted. As with traditional ASJ, Knauf Insulation does not encourage the painting of ASJ+ because the application of any paint may change the surface burning characteristics and will void the Knauf Insulation Limited Warranty. Where painting is necessary use common water, oil, or solvent-based paints. All paints should be tested for compatibility and adhesion before use.
- All piping should have continuous insulation.
- Position longitudinal lap downward to avoid dirt and moisture infiltration.
- Do not expose pipe insulation to excessive vibration or physical abuse.
- Faced insulation should not have a facing temperature above 150°F (66°C).

Recommended Thicknesses (ASHRAE 90.1-1989)

The minimum thicknesses are based on ASHRAE 90.1-1989 standards and do not necessarily represent the Economic Thickness of Insulation or the thickness required for proper condensation control. Rather, they serve as minimum recommendations for commercial applications. For recommended Economic Thickness, install according to Knauf Insulation or NAIMA 3E programs or as specified.

Fiber Glass and Mold

Fiber glass insulation will not sustain mold growth. However, mold can grow on almost any material

KNAUF INSULATION
it's time to save energy

Knauf Insulation GmbH
One Knauf Drive
Shelbyville, IN 46176

Sales and Marketing	(800) 825-4434, ext. 8283
Technical Support	(800) 825-4434, ext. 8212
Fax	(317) 398-3675
Information	info.us@knaufinsulation.com
World Wide Web	www.knaufinsulation.us

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 Earthwool 1000° Pipe Insulation 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.

U.S. GREEN BUILDING COUNCIL MEMBER

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

Children & Schools GREENGUARD® Indoor Air Quality Certified

Knauf Earthwool 1000° Pipe Insulation with ECOSE® Technology products are certified for indoor air quality by The GREENGUARD Environmental Institute™, to both the GREENGUARD Certification Program℠ and the more stringent GREENGUARD For Children and Schools℠ Standard. www. greenguard.org

The GREENGUARD INDOOR AIR QUALITY CERTIFIED Mark is a registered certification mark used under license through the GREENGUARD Environmental Institute.