Earthwool™ Redi-Klad® 1000° Pipe Insulation

Submittal Date _____

KNAUF INSULATION
it's time to save energy

Description
Knauf Insulation Earthwool™ Redi-Klad® 1000° Pipe Insulation is a multi-purpose, molded, heavy-density, one-piece fiber glass insulation bonded with ECOSE® Technology. Redi-Klad comes with a factory applied 5-ply weather and abuse resistant jacketing with self-sealing lap. Redi-Klad is designed for indoor or outdoor installation on mechanical piping systems with operating temperatures ranging from 0°F to 1000°F (-18°C to 538°C). Properly installed, Redi-Klad jacket provides a zero permeability rating. Earthwool Redi-Klad is produced in convenient 3' lengths with a matching 4" butt strip furnished for each 3' section. The installed product offers a finished appearance comparable to embossed aluminum.

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, more sustainable binder made from rapidly renewable bio-based materials, rather than non-renewable petroleum-based chemicals traditionally used in fiber glass insulation products. ECOSE Technology reduces Knauf Insulation's binder embodied energy and does not contain phenol, formaldehyde, acrylics or artificial colors.

Application
Knauf Insulation Earthwool Redi-Klad 1000° Pipe Insulation is designed for indoor and outdoor installation on industrial and commercial mechanical systems piping. Typical applications include, but are not limited to steam, condensate, process, chilled, and domestic water piping for new or retro-fit power generation, petro-chemical, pulp and paper, institutional, and educational construction projects, operating at temperatures from 0°F (-18°C) to 1000°F (538°C).

Features & 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 a self-closure tape, which eliminates need for banding, screws and caulk.
- Lightweight and easy to handle.
- Low maintenance costs.
- No off-site fabrication required.
- Safe installation.
- Fast, easy installation reduces installed costs versus standard aluminum jacketing systems.

Zero Permeability
- Properly installed, Redi-Klad jacket provides a zero perm vapor barrier.

Easy Size Identification
- Pipe size, wall thickness and Proto PVC fitting cover size are printed along the longitudinal seam.
- Easy identification at job site.
- Simplifies restocking.
- During application, print is covered by the closure tape for a neat finished appearance.

Specification Compliance Fiber Glass Pipe Insulation
In U.S.:
- ASTM C 547; Type I, Type IV
- ASTM C 585
- ASTM C 795
- HH-I-558C; Form D, Type III, Class 12; Class 13 (to 1000°F, 538°C) Replaced by ASTM C 592
- MIL-I-PRF-22344E (except pH requirements)
- MIL-I-24244D
- NFPA 90A and 90B
- NRC Reg. Guide 1.36 (certification needs to be specified at time of order)

Venture Clad Jacket and Tape
In U.S.:
- MEA 447-06-M (City of New York Department of Buildings)

Technical Data—Fiber Glass Pipe Insulation
Surface Burning Characteristics
- UL Classified.
- 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).

Corrosiveness (ASTM C 665)
- No greater than sterile cotton.

Stress Corrosion
- Complies with ASTM C 795, MIL-I-24244D and NRC 1.36. (certification needs to be specified at time of order)

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—Venture Clad Jacket and Tape
Surface Burning Characteristics
- UL/ULC listed.
- Does not exceed 25 Flame Spread, 50 Smoke Developed when tested in accordance with UL 723.

Surface Temperature Range
- Maximum temperature continuous use 300°F (149°C).
- Application temperature -10°F to 300°F (-23°C to 149°C).

Water Vapor Permeability (ASTM E 96-05)
- Zero-perm.

Puncture Resistance (ASTM D 1000)
- 35.4 kg, 189.3 N.

Tear Strength (ASTM D 624)
- 4.3 lb., 19.4 N.

Thickness
- 14.5 mils (0.0145")

Tensile (PSTC-31)
- 68 lb./inch width, 306 N (31 kg)/25 mm

Redi-Klad Product Forms and Sizes
Produced in 3' (914 mm) sections:
- For iron pipe from 2" to 24" nominal pipe size (51 mm to 610 mm).
- For copper tube from 2⅛" to 6⅛" (54 mm to 156 mm).
- Wall thicknesses from 1" to 6" (39 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.

Precautions
Hot Pipe
- May be installed while the system is in operation, at all temperatures up to 1000°F (538°C).
- Knauf 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 during initial start-up.
- 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
- Redi-Klad jacket acts as a continuous vapor retarder on piping operating below ambient temperatures.
- Seal all joints, surfaces, seams and fittings to prevent condensation.
- Exposed ends of insulation shall be sealed with vapor barrier mastic installed per the mastic manufacturer's instructions. Vapor seals at the butt joint 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.

Redi-Klad
- Keep adhesive and contact surfaces free from dirt and water, and seal immediately once adhesive is exposed. Redi-Klad Pipe Insulation should be installed in dry conditions with no moisture present.
- Apply when ambient and insulation surface temperatures are between 0°F and 130°F (-18°C and 54°C).
- If stored below 0°F or above 130°F, allow insulation cartons to stand within recommended temperature range for 24 hours prior to application.

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- Do not store product below -20°F (-29°C) or above 150°F (66°C).
- When using Knauf Insulation's Redi-Klad closure system, make sure the longitudinal and circumferential joints are properly sealed by rubbing the closure firmly with a squeegee.
- When using Redi-Klad 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 metal or PVC fitting covers. For below ambient piping systems, caution should be taken to prevent punctures, tears, or rips in Redi-Klad vapor barrier. Additionally, all fitting insulation surfaces must have independent, field applied vapor barriers. Prior to installing fitting insulation, all exposed ends of pipe insulation sections must be vapor sealed.
- 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 4" (102 mm) wide butt strip.
- All piping should have continuous insulation.
- Position longitudinal lap at top to minimize dirt and moisture accumulation.
- Do not expose pipe insulation to excessive vibration or physical abuse.
- Insulation thickness must be adequate to assure 300°F (149°C) exterior surface temperature maximum.

Recommended Thicknesses

ASHRAE 90.1-2007

The minimum thicknesses are based on ASHRAE 90.1-2007 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 Plus programs or as specified.

Fiber Glass and Mold

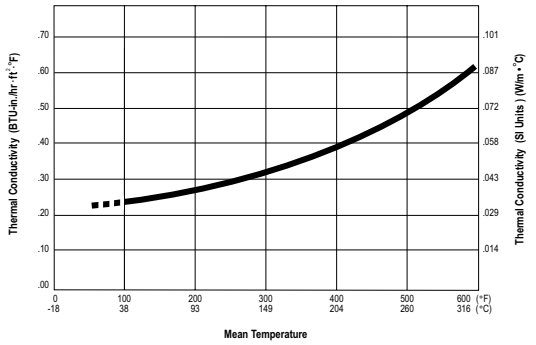
Fiber glass insulation will not sustain mold growth. However, mold can grow on almost any material when it becomes wet and contaminated with organic materials. Carefully inspect any insulation that has been exposed to water. If it shows any sign of mold it must be discarded. If the material is wet but 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 Earthwool Redi-Klad 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.

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