

KIMMCO CLEAN LINER (KCL)



www.kimmco.com

KIMMCO

means insulation!

Company Profile

KIMMCO (Kuwait Insulating Material Manufacturing Co.), a subsidiary of Alghanim Industries, was established in Kuwait in 1977. It has become a leading insulation solution provider in the Middle East, Africa, and Asia.

As a licensee of Saint-Gobain Isover, the world leader in fiberglass insulation, KIMMCO provides insulation solutions for HVAC, buildings (including roofs, walls, floors, and metal structures) and technical/industrial applications. With an annual production capacity of 35,000 MT, KIMMCO is ISO 9001, ISO 14001 and OHSAS 18001 certified, and is compliant with ISO, ASTM, DIN, BS and other international standards.

KIMMCO products are used in private, commercial, government and industrial projects for floors, walls, roofs, air-conditioning and piping, as well as process and petrochemical industries. KIMMCO also provides stonewool insulation products manufactured by its subsidiary, Rockwool India Ltd. KIMMCO insulation products contribute to green building and sustainability project requirements to achieve points for LEED and ESTIDAMA certification.

In 2014, the Alghanim Insulation Group announced the construction of its state-of-the-art, stonewool plant in Yanbu, Al-Sinaiyah, Saudi Arabia. A joint venture with Saint-Gobain

International, the plant will have an annual capacity of 64,000 MT.

KIMMCO has supplied products to prestigious projects in the region such as the Dubai Metro, Burj Khalifa, Princess Nora University and Kuwait's Al Hamra Tower, to name a few. In addition, KIMMCO is one of the approved vendors for the impressive Masdar City in Abu Dhabi.

With a strong commitment to the environment, as well as to the health and safety of the surrounding communities, KIMMCO actively collaborates with international environmental organizations and is compliant with best-in-class international environmental standards.

KIMMCO's COMMITMENT

KIMMCO's commitment to achieve green building and sustainability goes well beyond certifications, standards and testing. KIMMCO believes it is uniquely positioned, as an insulation manufacturer, to offer products that help protect and preserve the environment.

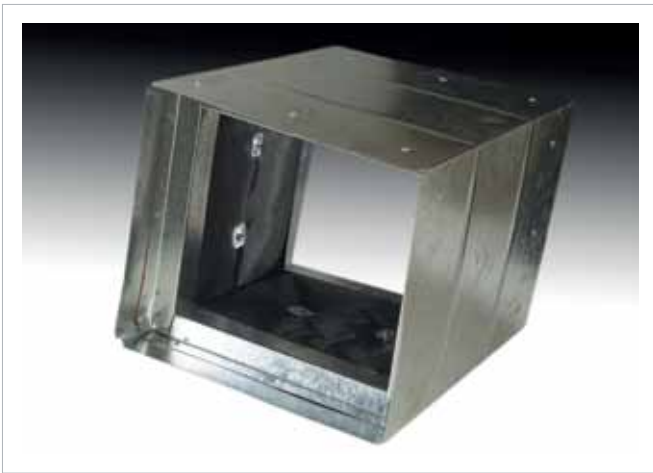
Through on-going efforts to provide innovative, eco-friendly and energy-efficient insulation solutions, KIMMCO has achieved its goal of becoming the regional leader in environmentally-friendly building solutions.



KIMMCO Clean Liner (KCL)

APPLICATIONS

KIMMCO Clean Liner is used to line air conditioning ducts, walls and/or ceilings of acoustically sensitive areas to provide efficient sound insulation for any variety of structure, and/or sensitive facilities as home theaters or studios, curtain walls.



DESCRIPTION

KIMMCO Clean Liner is a highly efficient acoustic material, produced from strong resilient glass fibers firmly bounded together with a thermosetting resin. It can be supplied with **self-seal**.

Standard Dimensions

| Thickness (mm) | Width (m) | Length (m) | |
|----------------|-----------|------------|-------|
| | | Roll | Board |
| 15 | 1.2 | 20 | 1 |
| 25 | 1.2 | 20 | 1 |
| 40 | 1.2 | 20 | 1 |
| 50 | 1.2 | 20 | 1 |

Other dimensions available.

Nominal Density

| KCL | kg/m ³ | Lbs/ft ³ |
|-----|-------------------|---------------------|
| 24 | 24 | 1.5 |
| 32 | 32 | 2.0 |
| 48 | 48 | 3.0 |
| 60 | 60 | 3.75 |
| 72 | 72 | 4.5 |

Other densities available

Facings

KIMMCO Clean Liner is faced with a black, strong, durable, dimensionally stable woven glass fabric.

FIBER MIGRATION

KIMMCO Clean Liner achieves zero fiber migration.



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Combustibility

Base fibers are non combustible when tested in accordance with BS 476 (part 4), ASTM E136.

No Corrosion

Does not cause or accelerate corrosion of steel, copper or aluminum.

Thermal Performance

Tested in accordance with ASTM C518.

| Mean Temperature | Thermal Conductivity in W/m.K for the following densities in kg/m ³ | | | | |
|------------------|--|--------|--------|--------|--------|
| °C | KCL 24 | KCL 32 | KCL 48 | KCL 60 | KCL 72 |
| 0 | 0.031 | 0.030 | 0.029 | 0.030 | 0.031 |
| 10 | 0.032 | 0.031 | 0.030 | 0.031 | 0.033 |
| 25 | 0.035 | 0.033 | 0.031 | 0.032 | 0.035 |
| 50 | 0.039 | 0.037 | 0.035 | 0.036 | 0.037 |
| 75 | 0.043 | 0.040 | 0.037 | 0.038 | 0.040 |
| 100 | 0.047 | 0.044 | 0.041 | 0.042 | 0.043 |

| Mean Temperature | Thermal Conductivity in BTU.in/ft ² h.F for the densities in lbs/ft ³ | | | | |
|------------------|---|--------|--------|--------|--------|
| °F | KCL 24 | KCL 32 | KCL 48 | KCL 60 | KCL 72 |
| 32 | 0.21 | 0.20 | 0.20 | 0.21 | 0.21 |
| 50 | 0.22 | 0.21 | 0.21 | 0.22 | 0.23 |
| 77 | 0.24 | 0.23 | 0.22 | 0.23 | 0.24 |
| 122 | 0.27 | 0.25 | 0.24 | 0.25 | 0.26 |
| 167 | 0.30 | 0.27 | 0.26 | 0.26 | 0.28 |
| 212 | 0.33 | 0.30 | 0.29 | 0.29 | 0.30 |

Acoustical Performances

KIMMCO Clean Liner is especially designed to provide exceptional sound absorption to acoustically sensitive environments and/or equipments as air-conditioning equipments, auditoriums, theatres, studios, acoustical building assemblies, curtain walls.

| Product Type | Thickness (mm) | Absorption Coefficient of one-third octave band center frequencies (Hz) | | | | | | |
|--------------|----------------|---|------|------|-------|-------|-------|------|
| | | 125 | 250 | 500 | 1,000 | 2,000 | 4,000 | NRC |
| KCL 24 | 25 | 0.25 | 0.39 | 0.76 | 1.00 | 0.98 | 0.68 | 0.80 |
| | 50 | 0.34 | 0.93 | 1.09 | 1.05 | 1.01 | 1.01 | 1.00 |
| KCL 32 | 25 | 0.16 | 0.58 | 0.99 | 1.07 | 0.97 | 0.80 | 0.90 |
| | 50 | 0.37 | 0.92 | 1.04 | 1.14 | 1.03 | 1.01 | 1.05 |
| | 75 | 0.57 | 1.07 | 1.16 | 1.07 | 1.01 | 0.94 | 1.10 |
| KCL 48 | 25 | 0.08 | 0.34 | 0.83 | 1.04 | 1.07 | 0.91 | 0.80 |
| | 50 | 0.38 | 0.93 | 1.16 | 1.01 | 0.95 | 0.89 | 1.00 |
| | 75 | 0.66 | 1.05 | 1.19 | 1.02 | 0.95 | 0.81 | 1.05 |
| KCL 60 | 25 | 0.12 | 0.39 | 0.87 | 1.06 | 1.08 | 1.00 | 0.85 |
| | 50 | 0.25 | 1.04 | 1.24 | 1.05 | 1.06 | 1.11 | 1.10 |

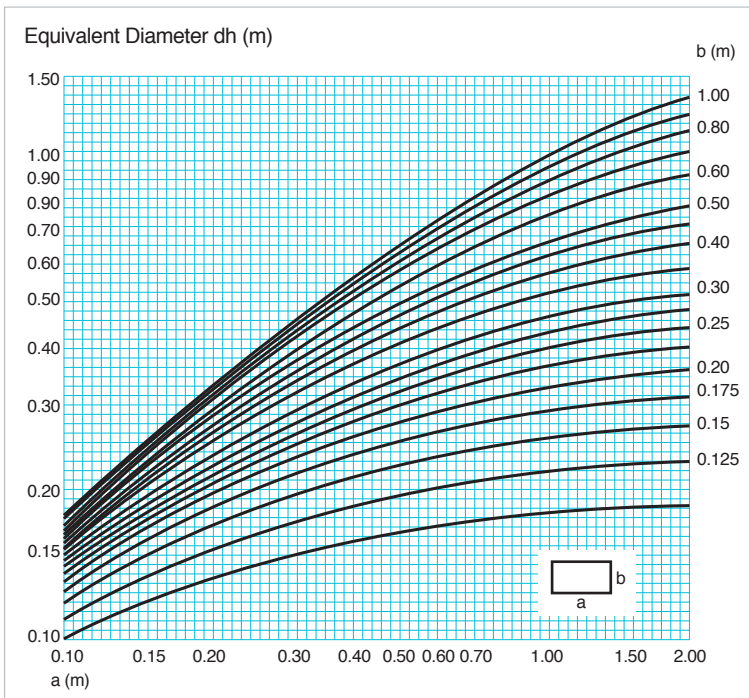
Test in accordance with ASTM C423 using Type A mounting as per ASTM E795. These are typical values subject to normal manufacturing and testing variances.

Physical Performances

| Properties | Performances | Test method |
|---|--|--|
| Operating temperature limits | Maximum 230 °C | ASTM C411 |
| Surface burning characteristics (Fire hazard classification) | Flame spread not over 25 Smoke developed not over 50 | NFPA 255, UL 723, ASTM E84 |
| Fire classification | Class 1 Class 0 | BS 476 parts 7 BS 476 parts 6 and 7 |
| Water vapor absorption | Not greater than 1% by volume | ASTM C1104 |
| Fungi resistance Bacteria resistance | Does not breed or promote growth | ASTM C1071 |
| Air velocity rating Air eroding rating | 21.3 m/s (4,200 ft/minute) Nil at 53.3 m/s (10,500 ft/minute) | UL 181 |

PRESSURE LOSSES

Equivalent Diameter $dh = \frac{2(a \times b) \text{ mm}}{a + b}$



CONFORMITY TO STANDARDS

KIMMCO Clean Liner complies with the following standards:

American Standards

ASTM C167, 168, 411, 423, 518, 665§ 13.8 & 13.9, 1071, 1101/1101M.1335, 1338; E 84, 336, 477, 795, 1376 UL 181, 723

F.H. HH-1-545B

NFPA 255, NFPA 90A & 90B

NAIMA Standards

SMACNA Standards

British Standards

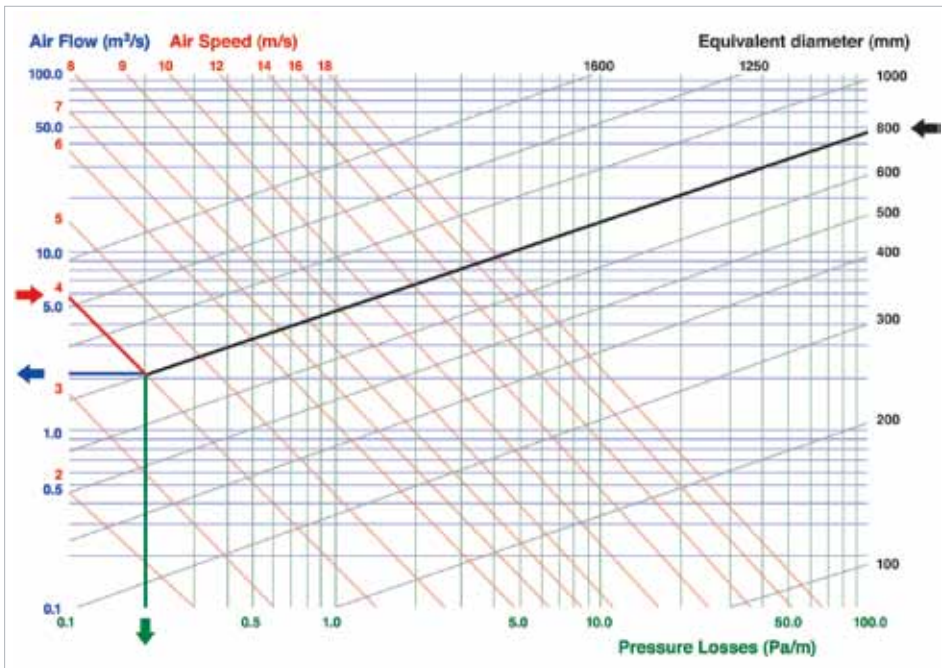
BS 476 (parts 4,6 & 7), 478, 2972, 3533, 3958 (part 5), 5643, 5720

German Standards

DIN 18165, 52612

ISO

354, 8301, 8302, 9229, 9291



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Conversion Factors

Reference: ASTM E380

| | | | | | | |
|-----------------------|---|---------------------------------------|-----------------------------------|--------------------------|-------------------------------|---------------------|
| Length | 1 in | = 25,4 mm | | | | |
| | 1 ft | = 0,3048 m | | | | |
| Area | 1 in ² | = 645,16 mm ² | | | | |
| | 1 ft ² | = 0,0929 m ² | | | | |
| Volume | 1 in ³ | = 16387 mm ³ | | | | |
| | 1 ft ³ | = 0,0283 m ³ | | | | |
| | 1 UK gallon (liquid) | = 4,546 liter | | | | |
| | 1 US gallon (liquid) | = 3,785 liter | | | | |
| Mass | 1 ounce (av) | = 28,3 g | | | | |
| | 1 gr (grain) | = 0,0648 g | | | | |
| | 1 lb | = 0,4536 kg | | | | |
| Density | 1 lb/ft ³ /pcf | = 16,018 kg/m ³ | | | | |
| Force | 1 lbf | = 0,4536 kPa | | | | |
| | 1 lbf | = 0,00445 kN | | | | |
| | 1 kPa | = 0,00981 kN | | | | |
| Temperature | °F = 9/5°C + 32 | °C = 5/9 (°F - 32) | | | | |
| | °F = 9/5 (°K - 273) + 32 | | | | | |
| | °C = °K - 273 | | | | | |
| Permeability | 1 perm (grain/ft ² h inHg) | = 0,028 gram mm/m ² h mmHg | | | | |
| | 1 perm (grain/ft ² h inHg) | = 0,00021 gram/Nh | | | | |
| | 1 perm in (grain in/ft ² h inHg) | = 17 gram mm/m ² h mmHg | | | | |
| | 1 perm in (grain in/ft ² h inHg) | = 0,0007 gram/m h mmHg | | | | |
| | 1 perm in (grain in/ft ² h inHg) | = 0,000005 m/Nh | | | | |
| | 1 gram/m h mmHg | = 0,0075 gram m/Nh | | | | |
| | 1 m ² /h mmH ₂ O | = 0,1 m ⁴ /Nh | | | | |
| Energy | | Btu | kcal | KJ | kWh | |
| | 1 Btu | 1 | 0,252 | 1,055 | 0,000029307 | |
| | 1 kcal | 3,968 | 1 | 4,187 | 0,001163 | |
| | 1 kJ | 0,9478 | 0,2398 | 1 | 0,000278 | |
| | 1 kWh | 3410 | 860 | 3600 | 1 | |
| Heat flow | 1 Btu/ft h | = 0,8268 kcal/m | | | | |
| | 1 Btu/ft h | = 0,9615 W/m | | | | |
| | 1 kcal/m h | = 1,163 W/m | | | | |
| | 1 Btu/ft ² h | = 2,712 kcal/m ² h | | | | |
| | 1 Btu/ft ² h | = 3,155 W/m ² | | | | |
| | 1 kcal/m h | = 1,163 W/m ² | | | | |
| Thermal Conductivity | | Btu/ft.h °F | Btu in/ft².h °F | kcal/m.h.K | W/m.K | |
| | 1 Btu/ft.h °F | 1 | 12 | 1,4882 | 1,7307 | |
| | 1 Btu in/ft ² .h °F | 0.0833 | 1 | 0,124 | 0,1442 | |
| | 1 kcal/m.h.k. | 0.672 | 8,064 | 1 | 1,163 | |
| 1 W/m.K | 0.578 | 6,933 | 0,860 | 1 | | |
| Thermal Conductance | | Btu/ft².h °F | kcal/m².h.K | W/m².K | | |
| | 1 Btu/ft.h °F | 1 | 4,882 | 5,678 | | |
| | 1 kcal/m ² .h.k. | 0,00142 | 1 | 1,163 | | |
| 1 W/m ² .K | 0,00122 | 0,860 | 1 | | | |
| Pressure | | lbf/in² | lbf/ft² | mm of water | kPa = KN/m² | Torr = mm Hg |
| | 1 lbf/in ² | 1 | 144 | 703 | 6,895 | 51,71 |
| | 1 lbf/ft ² (psf) | 0,00694 | 1 | 4,882 | 0,04788 | 0,36 |
| | 1 mm of water | 0,00142 | 0,2048 | 1 | 0,00981 | 0,0736 |
| | 1 kPa = 1 kN/m ² | 0,145 | 20,885 | 102 | 1 | 7,50 |
| | 1 Torr = 1 mm Hg | 0,0193 | 2,78 | 13,59 | 0,133 | 1 |

Commitment to Quality

Properties of KIMMCO Glasswool Products

- Excellent thermal performance
- Superior acoustic performance
- Excellent fire safety
- Environmentally friendly: made from abundantly available, non-strategic materials like sand and up to 80% recycled glass.
- Suitable for a wide variety of applications (flexible, semi-rigid, rigid and extra-rigid)
- Address a variety of performance requirements (wide range of facing materials)
- Easy to cut and install, minimum wastage on site
- Comparatively light weight
- Dimensionally stable
- No sagging or settling
- Complies with international standards

Our Commitment to Quality

Our Glasswool products are manufactured under license of Saint-Gobain ISOVER, a leading insulation provider headquartered in France.

Further, we have a strong commitment to quality, as recognized by our certification by international bodies such as ISO.

Our Commitment to the Environment

KIMMCO was selected as the sole insulation supplier and official collaborator with MASDAR city, the world's first zero-carbon, zero-waste city, in Abu Dhabi. We have a strong commitment to the environment, health and safety of our people, and surrounding communities, and actively collaborate with local and international environmental agencies.

Further, KIMMCO Glasswool products help developers achieve green building rating certifications such as LEED, Estidama and QSAS.

Further, we are members of the following industry associations:

- Emirates Green Building Council (EGBC)
- Qatar Green Building Council (QGBC)
- Singapore Green Building Council (SGBC)
- MASDAR (The Future Build)
- Middle East Minerwool Insulation Manufacturers Association (MEMIMA)

Our Product Listing & Certification

- CE
- UL
- BV
- ABS
- DCL (Dubai Central Laboratory)



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