

THERMOBREAK[®]

THERMAL & ACOUSTIC INSULATION FOR RAILWAY VEHICLES



THERMOBREAK[®] RT
THERMOBREAK[®] AcoustiPlus

Physically crosslinked polyolefin foam for thermal and acoustic insulation in railway vehicles.

Meets the highest Fire and Smoke classification in major International Standards EN 45545-2 (HL3), NFPA 130, BS 6853 and TB/T 3237.

SEKISUI

FOAM
INTERNATIONAL
Global Foam Solutions

PHYSICALLY
CROSSLINKED
SEKISUI TECHNOLOGY



Enhancing passenger comfort and safety

Effective thermal and acoustic insulation maintains a balanced interior environment by protecting passengers from noise and exterior temperature extremes. Thermal insulation of the rail car and HVAC system provides improved energy efficiency thus reducing loads and energy consumption.

These key factors highlight the importance of insulation in enhancing passenger comfort and safety whilst at the same time reducing environmental impact.

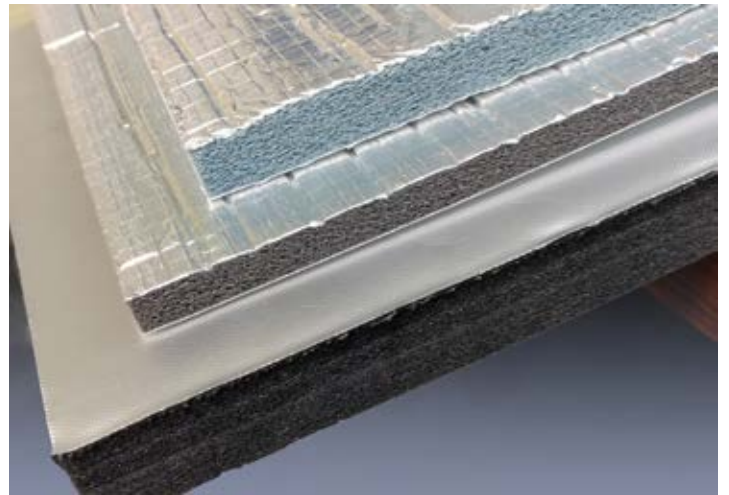
Thermobreak® RT and **Thermobreak® AcoustiPlus** are innovative, fibre-free insulation materials specifically designed for the railway and HVAC transportation equipment market.

Thermobreak® RT and Thermobreak® AcoustiPlus are manufactured from physically crosslinked polyolefin foam, invented and commercialised by the Sekisui Chemical group.

Today Sekisui Chemical is the largest polyolefin foam manufacturer in the world with multiple manufacturing facilities throughout Europe, USA, Asia and Australia, employing over 23,000 people. All foam manufacturing facilities are ISO 9001 and ISO 14001 accredited.

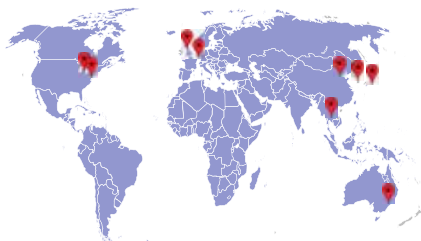
Sekisui Chemical is committed to a corporate policy that recognises the utmost importance of our living environment. Our responsibility to the environment during the development of products and in all of our manufacturing processes is of highest priority.

Originally developed in Australia, Thermobreak® is widely used by leading railway builders and HVAC equipment manufacturers and has been supplied to numerous railway projects globally for over 20 years.



Thermobreak® RT is the first closed cell insulation product to achieve HL3 level up to 25mm thickness.

SEKISUI



THERMOBREAK[®] RT

Insulation for Railway Vehicles

Technically Superior Thermal Insulation

Our unique physically crosslinked technology results in a smaller and more evenly distributed closed cell structure. Cell structure directly affects thermal conductivity and vapour permeability. Both are key factors in short and long-term insulation performance. Coupled with low emissivity reinforced aluminium foil facing, Thermobreak[®] RT offers superior insulation performance and durability compared to any other flexible insulation.

- > Class leading thermal conductivity
- > Very lightweight
- > Flexible, fibre-free and easy to fabricate
- > Optional adhesive backing for faster application

| | | | |
|---------------------------------------|---|--|---|
| Thermal Conductivity (k) | 0.030 W/mK @ 10°C 0.032 W/mK @ 23° C | 0.208 BTU.in/h.ft ² @ 50° F 0.221 BTU.in/h.ft ² @ 73° F | Superior thermal performance at lower thicknesses |
| Vapour Permeability | 2.3 X 10 ⁻¹⁵ Kg/ Pa.s.m | 0.002 perm-inch | Relatively constant k value over a 10 year period |
| Permeability Resistance factor | μ > 80,000 | | Optimum resistance to vapour transmission |
| Density (foam core) | 25 Kg/m ³ | 1.5 lb/ft ² | Low density ensures minimum weight |

Fire & Smoke Safety

Thermobreak[®] RT range offers the highest fire and smoke ratings to meet most major National and International Standards

- > EN 45545-2 (HL3 up to 25mm [1"])
- > PRIIA-NFPA 130
- > BS 6853 (Cat 1a, 1b)
- > TB/T 3237

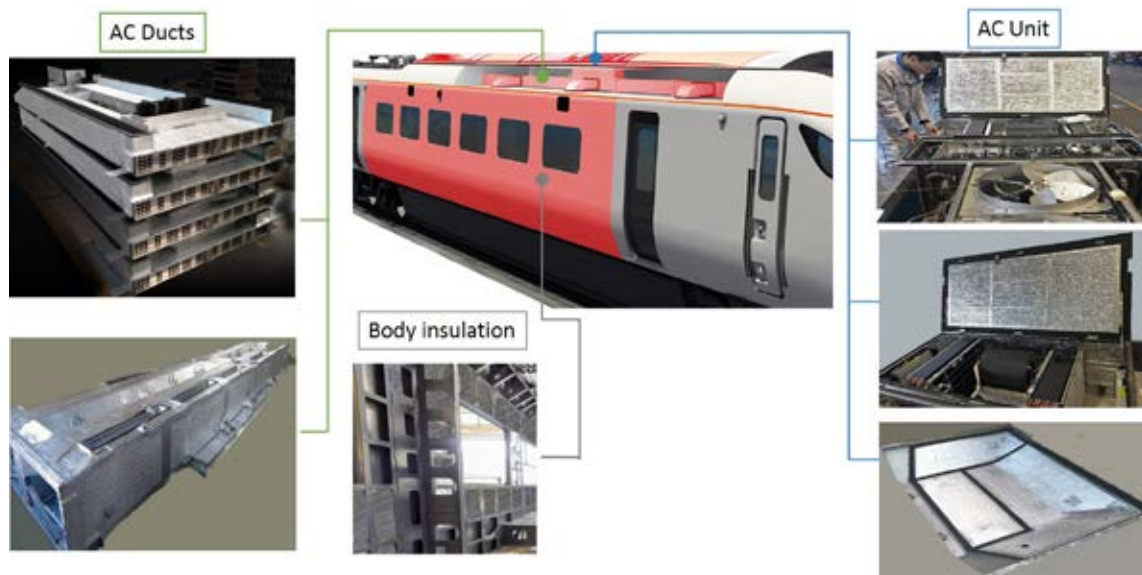
Environmental and Health & Safety

Thermobreak[®] RT is manufactured to ISO 14001 environmental Standards and supports environmental initiatives and directives

- > Compliance to REACH directives
- > Compliant to RoHS directive
- > Zero ODP (Montreal Protocol)
- > Zero PVC, zero formaldehyde
- > Resistance to mould growth
- > Low GWP

Application Areas

Major applications include duct insulation, AC insulation and body/wall insulation.



Thermobreak[®] RT Product Range

| | |
|----------------|--|
| RT | Standard product. Reinforced aluminium foil. Meets EN 45545-2 (HL3), NFPA 130, BS 6853 (1b) |
| RT-LSH | Enhanced Fire and Smoke properties. Heavy duty facing. Meets BS 6853 (1a) |
| RT Tube | Prefomed tubes with reinforced aluminium foil. Meets EN 45545-2 (HL3), NFPA 130, BS 6853 (1b) |
| <i>Options</i> | Thermobreak is available with a factory applied adhesive backing designed to withstand 100° C [212° F] |

RT

RT-LSH

RT TUBE

Size Availability

Rolls also available for non adhesive backed product. Other sizes available on request

Thermobreak RT & RT-LSH

| Sheets | | | Tubes | | |
|-----------------|--------------|-----------|----------------|------------|------------|
| Width | 1200 mm | 47" | ID | 5 ~ 250 mm | 1/4" ~ 10" |
| Length | 2000 mm | 78" | Wall thickness | 5 ~ 50 mm | 1/4" ~ 2" |
| Thickness range | 3 mm ~ 50 mm | 1/8" ~ 2" | Length | 2000 mm | 78" |

Technical Data

Material: Physically crosslinked closed cell polyolefin foam with factory applied reinforced aluminium foil.
Optional pressure sensitive, high temperature adhesive backing

| | | |
|--|--|-----------------------------|
| Density (foam core only): | 25kg/m ³ | 1.5 lb / ft ² |
| Thermal Conductivity: | 0.032 W/m/°K (@ 23° C | 0.208 BTU.in /h.ft2 @ 73° F |
| Water Vapour Permeability (ASTM E96): | 2.3 x 10 ⁻¹⁵ kg/(Pa.s.m) (0.0084 mg.m/N.h) | 0.002 perm-inch |
| Water Vapour Permeance: | 1.95 x 10 ⁻⁴ g/MN.s | 0.0034 perm 1/2" thickness |
| Permeability Resistance Factor: | μ > 80,000 | |
| Water Absorption by Volume (JIS K6767): | <0.1% v/v (0.00038g/cm ²) | <0.1% v/v |
| Resistance to Fungi (ASTM G21): | Zero Growth | |
| Ozone Resistance: | Excellent | |
| UV Resistance: | Excellent | |
| Operating Temperature: | -80° C ~ +100° C | -112° F ~ 212° F |

Fire & Smoke Behaviour

Thermobreak® RT

| Test Method | Description | Result | Tested thickness |
|-------------------------|-----------------------|--------------------------------------|--------------------------|
| ISO 5658 Part 2 | Flame Spread | COMPLIES (EN 45545-2 R1, HL3 RATING) | 5 ~ 25 mm [1/4" ~ 1"] |
| ISO 5659 Part 2 | Smoke Toxicity | COMPLIES (EN 45545-2 R1, HL3 RATING) | |
| | Smoke Density | COMPLIES (EN 45545-2 R1, HL3 RATING) | |
| ISO 5660 Part 1 | Heat Release Rate | COMPLIES (EN 45545-2 R1, HL3 RATING) | 12 mm [1/2"] |
| ASTM E162 | Surface Flammability | COMPLIES (PRIIA/NFPA 130) | |
| ASTM E662 | Smoke Density | COMPLIES (PRIIA/NFPA 130) | |
| ASTM E1354 | Heat Release Rate | COMPLIES (PRIIA) | |
| BSS 7239 (Boeing) | Smoke Toxicity | COMPLIES (PRIIA) | 12 mm [1/2"] |
| BS 476 Parts 6 & 7 | Class 0 | COMPLIES (BS 6853, CLASS 1b RATING) | |
| BS 6853 Annex B2 | Smoke Toxicity | COMPLIES (BS 6853, CLASS 1b RATING) | |
| BS 6853 Annex D8.4 | Smoke Density | COMPLIES (BS 6853, CLASS 1b RATING) | 20 mm [3/4"] |
| GB/T 2406.2 | Oxygen Index | COMPLIES (TB/T 3237-2010) | |
| UIC 564-2-1991 | Combustion Resistance | COMPLIES (TB/T 3237-2010) | |
| GB/T 8323.2-2008 | Smoke Density | COMPLIES (TB/T 3237-2010) | |
| TB/T 3237-2010 Part 4.4 | Smoke Toxicity | COMPLIES (TB/T 3237-2010) | |

Thermobreak® RT-LSH

| Test | Description | Result | Thickness |
|--------------------|----------------|-------------------------------------|---------------|
| BS 476 Parts 6 & 7 | Class 0 | COMPLIES (BS 6853, CLASS 1a RATING) | 25 mm [1"] |
| BS 6853 Annex B2 | Smoke Toxicity | COMPLIES (BS 6853, CLASS 1a RATING) | |
| BS 6853 Annex D8.4 | Smoke Density | COMPLIES (BS 6853, CLASS 1a RATING) | |

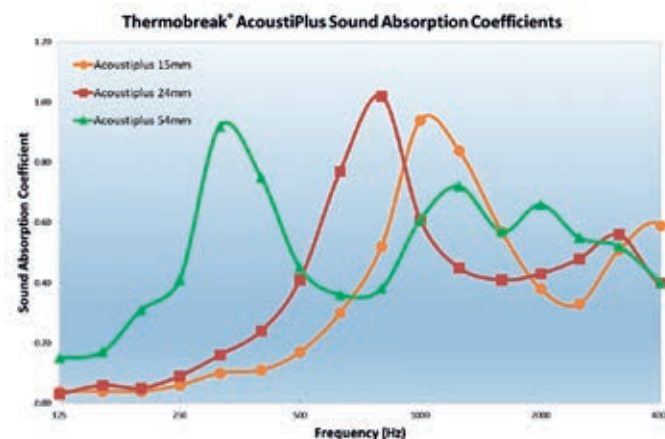
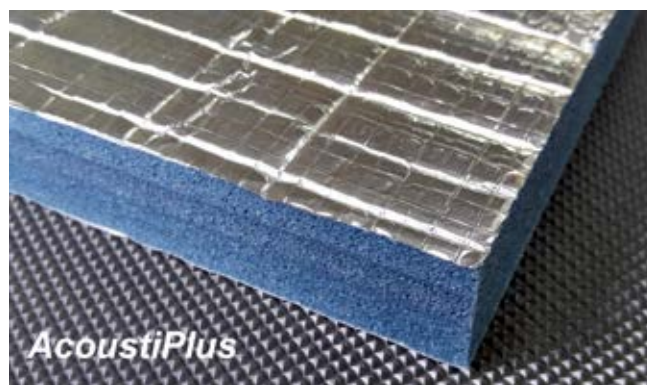
THERMOBREAK® AcoustiPlus

New Generation Acoustic Liner

The new generation lightweight acoustic material made from physically crosslinked polyolefin foam with partially open cell structure to enhance sound absorption, whilst maintaining the advantages of closed cell structure. It provides both sound and thermal insulation. It provides excellent sound absorption properties whilst offering:

- > Fibre free insulation
- > Meets major railway Fire & Smoke Standards
 - EN 45545-2 (HL3)
 - NFPA 130
 - DIN 5510-2
 - BS 476 Class 0
- > Lightweight and flexible
- > Water absorption resistance
- > Anti-microbial to ASTM G21
- > Optional adhesive backing
- > Easy to fabricate

Thermobreak® AcoustiPlus is ideal for wall and body insulation, duct insulation, AC insulation, floor insulation, as well as areas where noise absorption is required to enhance passenger comfort.



Technical Data

Material: Physically (irradiation) crosslinked partially open cell polyolefin foam with factory applied reinforced aluminium foil and optional pressure sensitive adhesive backing

| | | |
|---|--|---|
| Density (foam core only): | 25kg/m ³ | 1.5 lb / ft ² |
| Thermal Conductivity (ASTM C518): | 0.036 W/m/°K @ 23° C | 0.249 BTU.in /h.ft ² @ 73° F |
| Resistance to Fungi (ASTM G21): | Zero Growth | |
| Noise Reduction Coefficient (ISO 354): | 0.30 (10 mm thickness) 0.40 (15 mm thickness) 0.40 (24 mm thickness) | |
| Operating Temperature Range: | -80° C ~ +100° C | -112° F ~ 212° F |
| Maximum Recommended Design Air Velocity: | 20.3 m/s | 4000 fpm |

Fire & Smoke Behaviour

Thermobreak® AcoustiPlus

| Test Method | Description | Result | Tested thickness |
|-------------------------|----------------------|---|------------------|
| ISO 5658 Part 2 | Flame Spread | COMPLIES (EN 45545-2 R1, HL3 RATING) | 25 mm [1"] |
| ISO 5659 Part 2 | Smoke Toxicity | COMPLIES (EN 45545-2 R1, HL3 RATING) | |
| | Smoke Density | COMPLIES (EN 45545-2 R1, HL3 RATING) | |
| ISO 5660 Part 1 | Heat Release Rate | COMPLIES (EN 45545-2 R1, HL3 RATING) | 25 mm [1"] |
| ASTM E162 | Surface Flammability | COMPLIES (PRIIA/NFPA 130) | |
| ASTM E662 | Smoke Density | COMPLIES (PRIIA/NFPA 130) | |
| ASTM E1354 | Heat Release Rate | COMPLIES (PRIIA) | |
| BSS 7239 (Boeing) | Smoke Toxicity | COMPLIES (PRIIA) | |
| BS 476 Parts 6 & 7 | Class 0 | CLASS 0 | 25 mm [1"] |
| DIN 54837 | Burning Test | COMPLIES (DIN 5510:2) Classification S4, SR2, ST2 | 15 mm [5/8"] |
| DIN EN ISO 5659-2: 2013 | Smoke Toxicity | COMPLIES (DIN 5510:2) Classification S4, SR2, ST2 | 15 mm [5/8"] |

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**FOAM
INTERNATIONAL**

Global Foam Solutions

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