

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.

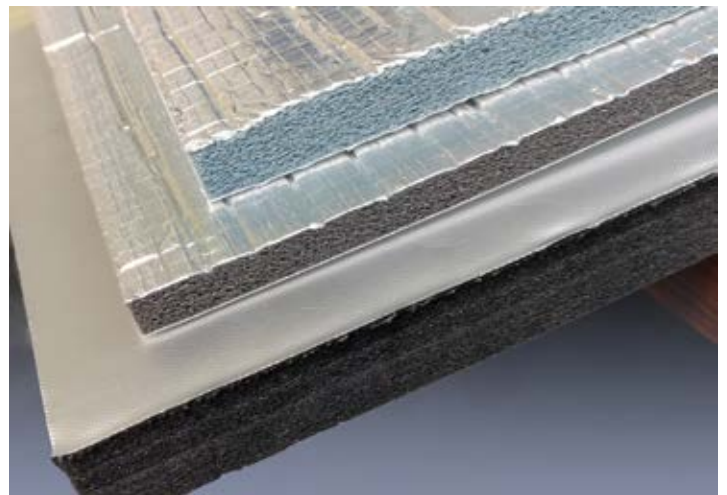
Thermobreak® RT and **Thermobreak® AcoustiPlus** are innovative, fibre-free insulation materials specifically designed for the railway and HVAC transportation equipment market.

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.



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.ft² @ 50° F 0.221 BTU.in/h.ft² @ 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/m³	1.5 lb/ft²	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

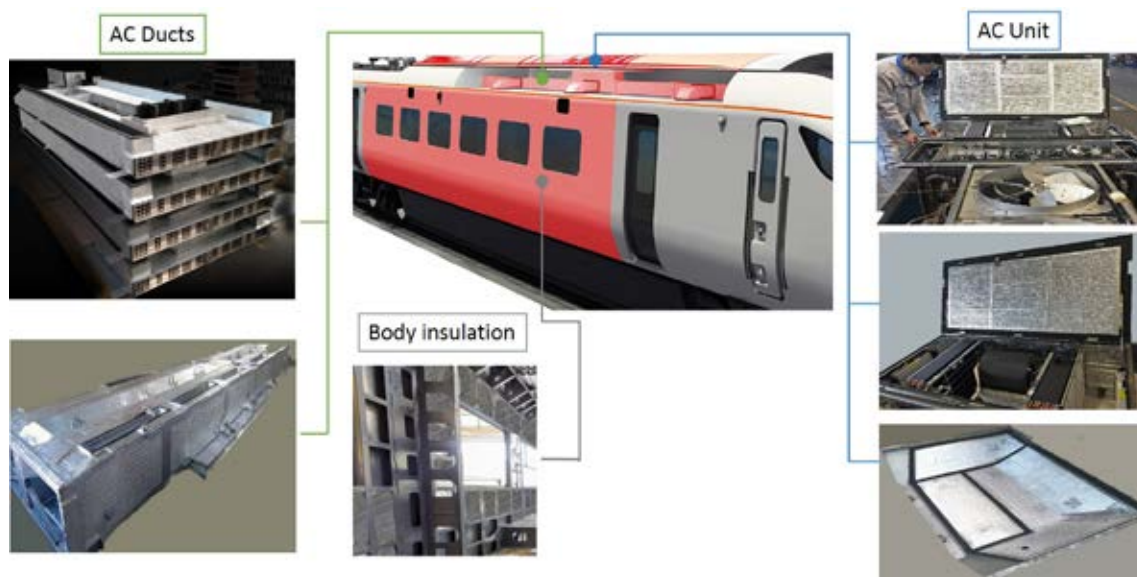
Environmental and Health & Safety

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

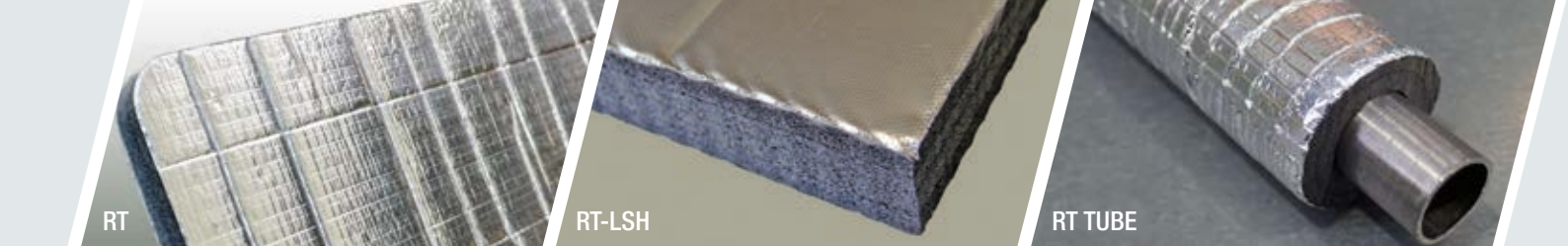
Application Areas

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	Preformed 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]



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 ½" 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 Ib RATING)	
BS 6853 Annex B2	Smoke Toxicity	COMPLIES (BS 6853, CLASS Ib RATING)	
BS 6853 Annex D8.4	Smoke Density	COMPLIES (BS 6853, CLASS Ib 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 Ia RATING)	25 mm [1"]
BS 6853 Annex B2	Smoke Toxicity	COMPLIES (BS 6853, CLASS Ia RATING)	
BS 6853 Annex D8.4	Smoke Density	COMPLIES (BS 6853, CLASS Ia RATING)	

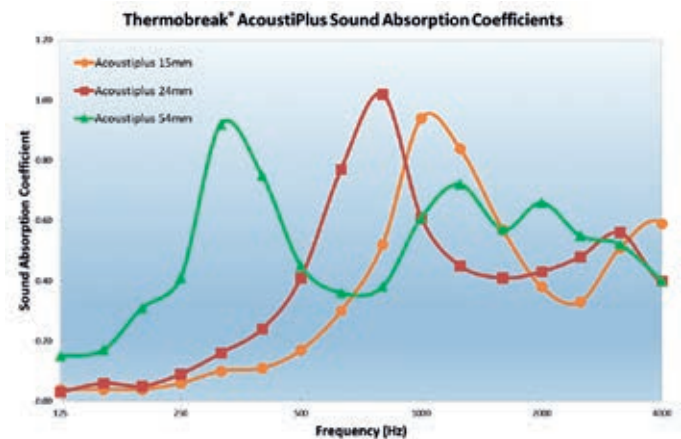
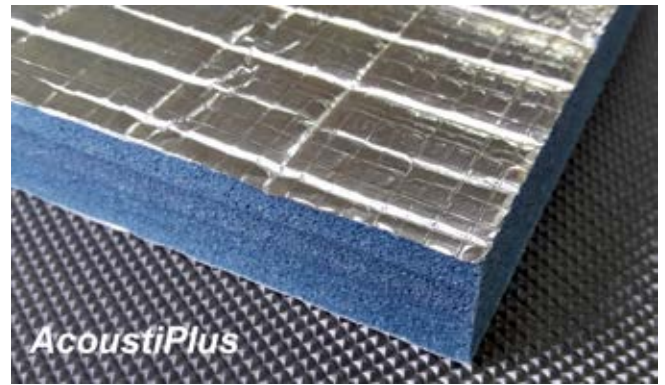
THERMOBREAK® AcoustiPlus

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.ft2 @ 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)	25 mm [1"]
BS 476 Parts 6 & 7	Class 0	CLASS 0	
DIN 54837	Burning Test	COMPLIES (DIN 5510:2) Classification S4, SR2, ST2	
DIN EN ISO 5659-2: 2013	Smoke Toxicity	COMPLIES (DIN 5510:2) Classification S4, SR2, ST2	15 mm [5/8"]

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