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Insulation solutions for Railway

A complete insulation offer

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Meeting Modern Mobility Demands with HIGH-PERFORMANCE INSULATION

Across every continent, **railway transport is on the rise.** World dynamics and passenger habits are changing: public transport, such as trains, metros, trams, is increasingly preferred over individual cars and short flights, especially **high-speed trains,** which combine efficiency with a high level of comfort.

But higher speeds bring new technical challenges. Modern rolling stock must address **noise and vibration**, both inside and outside the vehicle, while also becoming **more energy-efficient, compact, and lightweight.**

At the same time, passenger expectations are evolving. Today's travelers are more demanding and seek a truly comfortable onboard experience, especially on long-distance routes where trains become temporary offices and living spaces. Working on a laptop, joining online meetings, or simply relaxing during several hours of travel requires an environment that feels calm and controlled. Comfort now means quiet interiors and a well-balanced temperature throughout the journey. For manufacturers, this translates into high-performance acoustic and thermal insulation solutions that ensure reduced noise levels and stable cabin climates, creating the conditions for productivity and well-being on board.

In this context, **insulation becomes a key factor of success.** It enables manufacturers and operators to deliver on performance, safety, and passenger comfort, while meeting stringent regulations and sustainability goals.

INSULATION FOR RAILWAY AT A GLANCE:

- **Thermal performance:** ensuring stable interior temperatures, improving comfort, and reducing energy consumption.
- **Acoustic insulation:** minimizing noise for a smoother travel experience.
- **Fire behaviour:** protecting lives by meeting the highest safety standards.

The Challenges of Railway Insulation...
AND HOW ISOVER & KAIMANN SOLVE THEM

The railway industry faces demanding technical challenges: with Isover and Kaimann, every challenge has a proven insulation solution.

VIBRATION AND MOVEMENT STRESS

Rail vehicles are exposed to continuous vibrations from tracks, engines, and braking systems. Over time, this can degrade standard insulation materials. **Isover and Kaimann solutions are designed with exceptional mechanical resilience**, maintaining their integrity and performance even under dynamic loads, ensuring long-term comfort and protection.

STRICT FIRE SAFETY STANDARDS

Passenger safety is non-negotiable. Railway insulation must meet the most demanding regulations, including for instance the European **EN 45545** standard. Our **Isover and Kaimann portfolio includes fully compliant solutions** that limit fire propagation and guarantee low smoke emission, and safe evacuation conditions, while still delivering thermal and acoustic comfort. There are some areas in the train that requires specific fire resistance, and Isover can provide dedicated products to integrate in a complete installation.

WEIGHT CONSTRAINTS

Every kilogram matters in rail design. Reducing vehicle weight improves energy efficiency, lowers operating costs, and reduces wear on tracks. **Isover glasswool, ULTIMATE™ mineral wool and Kaimann elastomeric foam provide insulation with high thermal and acoustic performance at low density**. Together, they help wagon manufacturers meet strict weight targets and enhance sustainability.

COMPACT INSTALLATION SPACES

Rail vehicles offer limited space for technical systems, making flexible and easy-to-install insulation essential. Our products are available in rolls, slabs, and foam solutions, ensuring efficient installation in **floors, walls, ducts**, and other confined areas — without compromising performance.

Kaimann elastomeric foam combines flexibility with precision. Through its dedicated **custom-cutting service,** insulation can be shaped to exact dimensions and adapted to **complex geometries,** enabling perfect fitting even in tight or irregular spaces. This makes it the ideal solution where space is limited and installation time matters.

DURABILITY OVER DECADES OF SERVICE

Rail vehicles often operate for 30+ years, demanding insulation that lasts as long as the train itself. **Isover and Kaimann products are proven in the field** to retain their thermal, acoustic, and mechanical performance over decades.

Proven in the field: Isover insulation dismantled after 25 years of continuous service inside a train showed its properties remained fully intact: clear evidence of long-term resilience!*

*Figures of the study available on demand

FIRE RESISTANCE

Assesses how an entire system, walls, doors, or floors, maintains integrity and insulation performance during fire exposure.

Fire resistance ensures compartmentalization, preventing flames from spreading between adjacent zones and keeping escape routes safe.

For instance, a classification of EI = 15 means that the system maintains its structural integrity and insulation for 15 minutes under fire conditions.

To ensure the required fire resistance, some insulation products are more suitable than others for integration into ducts, walls, and floors. These products are identified with a red dot on the following pages. However, we recommend contacting our experts to determine the most suitable configuration for your specific needs.

This fire resistance property is mandatory in some areas on board, such as conductor cabin or electrical cabinet.

Isover & Kaimann
A COMPLETE INSULATION OFFER

Our portfolio covers all key areas of railway vehicles:

- **Walls, partitions and ceilings**
- **Floors**
- **HVAC systems**
- **Fire Barrier zones**
- **Water tanks**

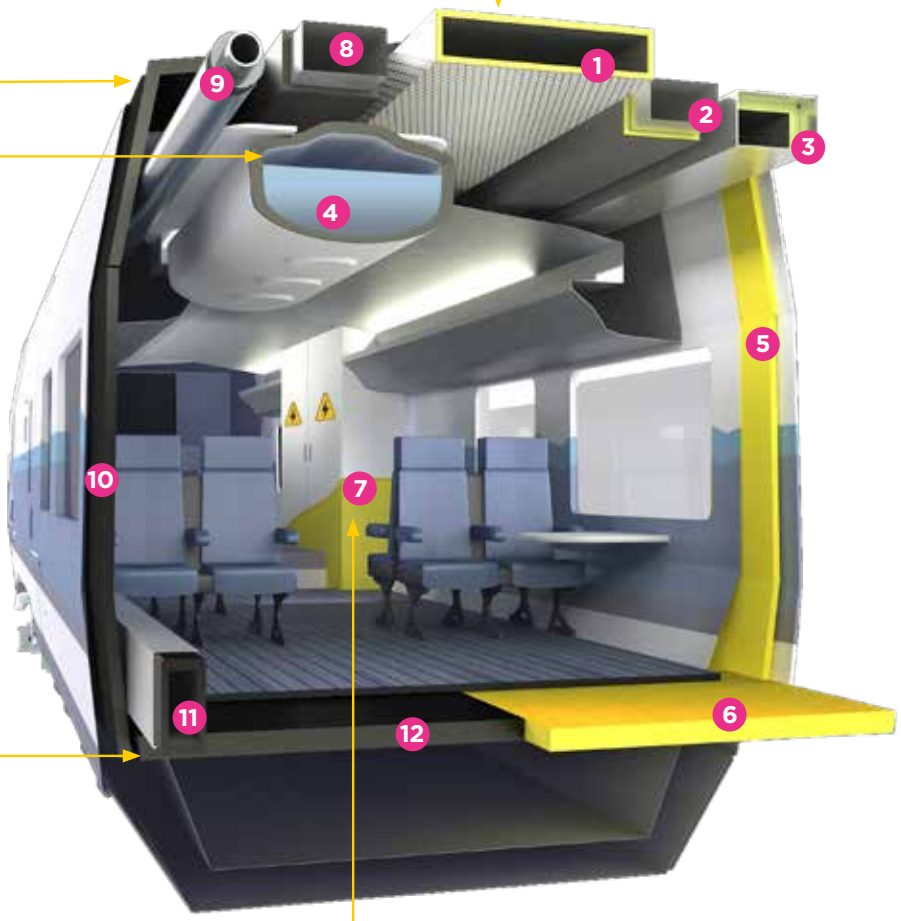
- Fire resistance
- Moisture resistance
- Dust-free
- Customized high-precision cuts possible on demand
- Lightweight solutions
- Strong mechanical resistance
- Flexibility

HVAC systems

- 1 TRAIN CLIMAVER®
- 2 U Protect Roll
  Glass wool FK/G-H
- 3 CLIMLINER range, TRAIN LINER dB Thin
- 8 Kaiflex railPROTECT, Kaiflex railLSLT
- 9 Kaiflex railLSLT
- 11 Kaiflex railPROTECT, Kaiflex railLSLT

Walls, partitions and ceilings

- 5 TRAIN COMFORT range, ULTIMATE™ FK/AGF
- 10 Kaiflex railPROTECT, Kaiflex railLSLT



Water tank

- 4 Kaiflex railPROTECT
  Kaiflex railLSLT

Floors

- 12 Kaiflex railPROTECT
- 6 SW TECH Slab range
  U TECH Slab

Fire Barrier zones

- 7 ULTIMATE™
- 7 SW TECH Slab

OUR INSULATION OFFER AT A GLANCE

For many applications, several insulation solutions may be possible depending on the required performance: fire classification, acoustic absorption, weight constraints, mechanical resistance, or installation methods.

Application	Product	Material	Fire Behaviour EN 45545	Facing	Performance benefits
HVAC	**CLIMLINER Range**	Glass Wool	HL3	Glass veil or Glass fabric	🟣🟢
	Glass wool FK/G-H	HL3	HL3	Glass veil or Glass fabric	🟣🟢
	Kaiflex railLSLT	FEF	HL2	Unfaced	🔵⚫⚪🟣🟢
	Kaiflex railPROTECT	FEF	HL3	Aluminium	🔵⚫⚪🟣🟢
	TRAIN CLIMAVER®	Glass Wool	HL3	Glass fabric or kraft-aluminium	🟣🟢
	TRAIN LINER dB Thin	Glass Wool	HL3	Fabric or Glass veil	🟣🟢
	U Protect Roll	ULTIMATE™	HL3	Aluminium	🔴🟣🟢
Walls, partitions and ceilings	**Kaiflex railLSLT**	FEF	HL2	Unfaced	🔵⚫⚪🟣🟢
	TRAIN COMFORT	Glass Wool	HL3	Aluminium or glass fabric	🟣🟢
	ULTIMATE™ FK/AGF	ULTIMATE™	HL3	Aluminium	🔴🟣🟢
Floors	**Kaiflex railPROTECT**	FEF	HL3	Aluminium	🔵⚫⚪🟣🟢
	SW TECH Slab range	Stone Wool	HL3	Unfaced*	🔴🟠
	U TECH Slab	ULTIMATE™	HL3	Unfaced*	🟠🟣
Fire Barrier zones	**SW TECH Slab**	Stone Wool	HL3	Unfaced*	🔴🟠
	ULTIMATE™ range	ULTIMATE™	HL3	Different facings possibles	🔴🟣
Water tank	**Kaiflex railLSLT**	FEF	HL2	Unfaced	🔵⚫⚪🟣🟢
	Kaiflex railPROTECT	FEF	HL3	Aluminium	🔵⚫⚪🟣🟢

*facings available on demand

- 🔴 Fire resistance
- 🔵 Moisture resistance
- ⚪ Dust-free
- ⚫ Customized high-precision cuts possible on demand
- 🟣 Lightweight solutions
- 🟠 Strong mechanical resistance
- 🟢 Flexibility

ISOVER
FIRE COMPETENCE CENTER

To help manufacturers and operators navigate fire safety challenges, Isover offers a dedicated Fire Competence Center, providing:

- **Technical guidance on fire regulations and material selection**
- **Preliminary fire testing to assess new insulation configurations**
- **Tailored solutions for complex fire safety projects**

UNDERSTANDING FIRE PERFORMANCE

Two key aspects define insulation fire behavior:

1. REACTION TO FIRE

Describes how a material behaves when exposed to flames, including ignitability, flame spread, heat release, smoke emission, and toxicity.
These properties are tested on individual materials such as slabs or rolls and are critical to prevent fire escalation and ensure safe evacuation.

2. FIRE RESISTANCE

Assesses how an entire system, walls, doors, or floors, maintains integrity and insulation performance during fire exposure.
Fire resistance ensures compartmentalization, preventing flames from spreading and keeping escape routes safe.
For instance, a classification of EI = 15 means that the system maintains its structural integrity and insulation for 15 minutes under fire conditions.

EN 45545: THE EUROPEAN BENCHMARK

- **Defines fire safety standards for all railway vehicles across Europe.**
- **Classifies materials into hazard levels HL1–HL3, with HL3 as the most demanding.**
- **Tests key criteria: flame spread, smoke density, and toxic gas emissions.**

MINERAL WOOL: THE STAR PERFORMER IN FIRE PROTECTION

Isover mineral wool is non-combustible by nature, setting the benchmark for railway fire safety. Its inherent properties make it the preferred choice for manufacturers and operators who demand reliability, compliance, and long-term performance.

Why Isover Mineral Wool Excels

- **Non-combustible and HL3 compliant → meets the highest European fire-safety standards (EN 45545).**
- **Low smoke and no toxic gas release → ensuring safer evacuation conditions.**
- **Stable under radiant heat and flame exposure → performance maintained even in extreme conditions.**
- **No contribution to fire growth or toxic hazards → for uncompromising passenger safety.**
- **Isover mineral wool meets HL3 compliance → ensuring maximum passenger safety and full regulatory conformity.**

KAIMANN FLEXIBLE ELASTOMERIC FOAM (FEF): CONTROLLED FIRE BEHAVIOUR FOR SAFE EVACUATION

Kaimann flexible elastomeric foam (FEF) insulation solutions are specifically designed to support passenger safety in fire scenarios by focusing on controlled fire behaviour and smoke management. While organic by nature, Kaimann FEF materials are engineered to significantly limit flame spread and smoke development and, above all, to avoid the release of toxic fumes that could compromise evacuation.

Kaimann FEF products contribute to a safer evacuation environment by reducing smoke opacity and toxicity, helping passengers and staff to exit the vehicle quickly and safely.

This makes Kaimann FEF insulation an ideal complement to mineral wool solutions in railway applications where flexibility, condensation control, and reliable fire performance must go hand in hand.

Circularity
AND RECYCLABILITY

Isover mineral wool supports a circular economy through the use of recycled raw materials and dedicated recycling services. Both glass wool and stone wool are fully recyclable. Glass wool is produced mainly from recycled glass (cullet), with an average recycled content of around 60% worldwide, peaking to 80-90% in some countries. Our stone wool is made of up to 50% recycled content. This significantly reduces energy consumption, CO_2 emissions and the use of virgin resources.

Through its recycling services, Isover collects pre- and post-consumer mineral wool waste and reintroduces it into the manufacturing process as a valuable raw material.
Today, recycling solutions are available in 11 European countries, helping customers reduce construction waste and improve the environmental footprint of their projects.

DESIGNED FOR HEALTH AND SAFETY

Isover mineral wool fibres are biosoluble, meaning they dissolve naturally in the body and are rapidly eliminated from the lungs. This ensures that fibres do not persist in the human body.

Isover mineral wool is certified by EUCEB, an independent European body that confirms compliance with strict health and safety criteria through regular testing and third party audits. As a result, Isover mineral wool can be used safely throughout its lifecycle.

The value
OF SPECIFICATION

A PARTNER FOR RAILWAY PROJECTS

Our teams combine deep technical expertise, railway market knowledge, and a comprehensive insulation portfolio.

Rather than simply supplying products, we support you in defining the best insulation strategy for your train design.

Our experts help you navigate our wide portfolio to identify the most efficient and reliable solution for your project.

Working with our specification teams provides several advantages:

- **Tailored technical recommendations based on your project requirements**
- **Optimization of system performance (fire, acoustic, thermal and mechanical)**
- **Compliance with railway regulations and standards**
- **Selection of the most suitable solution within a broad portfolio**
- **Time savings during design and engineering phases**

By integrating insulation solutions early in the design process, we help ensure coherent system performance and easier implementation during production.

Let’s define the right solution together

Every railway project is unique. To ensure the best performance and compliance, we encourage you to contact our specification experts.

They will guide you in selecting the most appropriate insulation solutions for your specific application.

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