



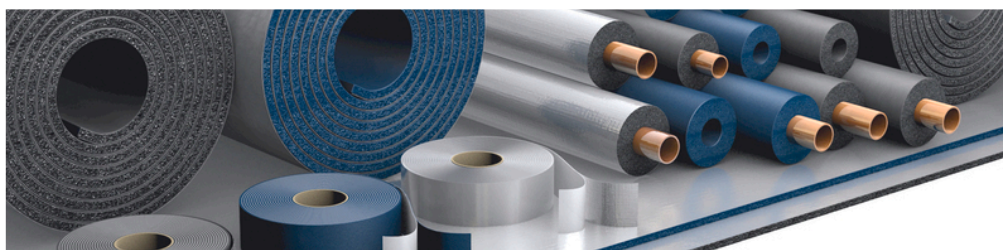
INSTALL IT. TRAVEL SAFELY.

ArmaFlex Rail SD

First FEF insulation that meets HL2
according EN45545-2

- // High performance insulation meeting the highest standards in rail applications
- // Easy to apply
- // Stops water vapour transmission
- // Build-in with Microban technology
- // Fibre and dust free

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 **armacell**[®]
ArmaFlex[®]

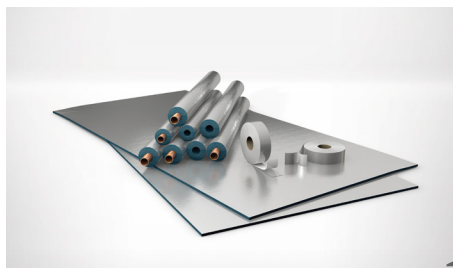
ArmaFlex Rail

// ArmaFlex Rail SD



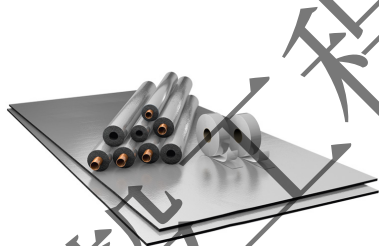
- Extremely low smoke density and superior fire behaviour
- Built-in Microban® antimicrobial protection reduces mould and bacteria growth
- Complies with most international railway standards for insulation materials
 - EN 45545 – HL2, R1
 - NFPA 130
 - DIN 5510-2
 - GOST 12.1.044-89
 - United Nations ECE R-118 p. 6-8

// ArmaFlex Rail SD-C



- With Microban® antimicrobial product protection
- Excellent mechanical protection and high degree of stability under exposure to ultraviolet light
- Wash-down waterproof and easy to clean
- Meets highest hazard level requirements
 - EN 45545 – HL3, R1

// ArmaFlex Rail ZH-C



- Halogen-free insulation reduces toxicity and corrosive effects on people and equipment
- Resistant to UV, salt water and chemicals
- Wash-down waterproof and easy to clean
- The revolutionary insulation product has a factory-applied, silver-metallic look, reinforced coating for increased hygienic requirements
 - EN 45545 – HL3, R1

// ArmaFlex Rail ZH



- The protective halogen-free insulation to reduce corrosive effects and smoke toxicity in a fire
- Low smoke density, superior fire behaviour
- Fibre- and dust-free material provides low thermal conductivity
- High-tech insulation with built-in fire protection for railway vehicles
 - EN 45545 – HL2, R1

送客車用



EN 45545

HAZARD LEVEL OF A VEHICLE

Fire safety requirements are part of the European Directive on the interoperability of the trans-European high-speed rail system. The seven-parts standard EN 45545 'Railway applications - Fire protection on railway vehicles' has been developed to harmonize classifications and fire testing.

EN 45545 introduces a new concept – the hazard level of a vehicle (HL). This is obtained by combining the operation and design categories of the vehicle.

EN 45545-2 classifies all material on board in groups which have to fulfil specific requirement sets which often includes several test methods. The most important fire tests used in EN 45545-2 are the flame propagation, the cone calorimeter and the smoke and toxicity tests. For requirement set R1 they are all based on radiant panels with heat fluxes 50 kW/m².

	N: Standard vehicles	A: Vehicles of automatic train, no emergency trained staff on board	D: Double decked vehicles	S: Sleeping / couchette vehicles	
1: No underground lines.	HL1	HL1	HL1	HL2	
2: Regular use of underground sections and tunnels. Fast evacuation possible.	HL2	HL2	HL2	HL2	
3: Regular use of underground sections and tunnels. Slow evacuation possible.	HL2	HL2	HL2	HL3	HL1 e.g. tramway
4: Regular use of underground sections and tunnels (incl. Euro-Tunnel). No evacuation possible.	HL3	HL3	HL3	HL3	HL2 e.g. TGV, TER, RER, subway HL3 e.g. subway, metro, couchette wagon

NATIONAL STANDARDS REPLACED BY EN 45545-2

Country	Standard	European Standard	Testing Standard
Great Britain	BS 476-6/7	EN 45545-2	Spread of flame ISO 5658-2
France	NF 16 101 NF 16 102	Railway application	Heat release, smoke production and mass loss rate ISO 5660
Germany	DIN 5510	Fire protection on railway vehicles	
Italy	UNI CEI 11170	Requirements for fire behaviour of materials and components	Smoke optical density and toxicity EN ISO 5659-2
Poland	PN-K-02511		

TECHNICAL DATA - ARMAFLEX RAIL SD

Brief description	Highly flexible, closed-cell insulation foam with improved fire retardant properties, low smoke generation and in-built Microban antimicrobial protection for railway vehicles.
Additional material information	The pressure-sensitive adhesive coating is based on modified acrylate basis with mesh structure and covered with polyethylene foil. Traces of silicon can be found on the protection paper/foil used to protect self-adhesive closures.
Product colour range	Dark blue
Applications	Insulation/protection for air ducts, pipes, vessels, equipments (including elbows, fittings, flanges, etc.) of air-conditioning/refrigeration and plumbing systems to prevent condensation and save energy in rail cars. Also, the product can be placed in different areas of the train such as thermal insulation for walls, ceiling, partitions, etc.
Remarks	ArmaFlex Rail SD is not designed for transparent insulation applications (exposed to sun light) and is not UV stable. In this case, we recommend the use of ArmaFlex Rail SD-C.

Property	Value / Assessment		Standard / Test method
Temperature range			
Service temperature	Min. °C	Max. °C ¹	EN 14304, EN 14706, EN 14707
	-50	110	
Thermal conductivity			
Declared thermal conductivity	Øm	0°C	EN 12667, EN ISO 8497, EN ISO 13787
	λd ≤ [W/(m·K)]	0.04	
	Formula	λ=[40 + 0,1·Øm + 0,0009 · Øm²]/1000	
Transportation			
Reaction to fire - hazard level	Tape and sheets 3 mm: HL 1,2,3 acc. R1, R7 Sheets and tubes 6-25 mm: HL 1,2 acc. R1; HL 1,2,3 acc. R7		EN 45545-2
Burning behaviour of materials for use in motor vehicles	Burning behaviour for the use in motor vehicles (ECE Regulations) Passed Annex 6,7,8,9		ECE R-118
NFPA 130 American fire test to railway components	3-13 mm ls≤ 25 Ds(4,0) ≤100		ASTM E162, ASTM E662
Fire performance			
Practical fire behaviour	Self-extinguishing, does not drip, does not spread flames		
Resistance to water vapour			
Water vapour diffusion resistance factor	μ > 5.000		EN 13469, EN 12086
Physical attributes			
Dimensions and tolerances	In accordance with EN 14304, table 1;		EN 13467, EN 822, EN 823
Weather and UV resistance			
UV resistance	Protection against UV-radiation is necessary, see TB 142		
Health and environment			
Fungal growth	No fungal growth according to tests		ASTM G21
Additional features	SCCP, MCCP-free		
Other technical features			
Shelf life	Self-adhesive tapes, self-adhesive sheets: 1 year		
Storage	Can be stored in dry, clean rooms at normal relative humidity (50% to 70%) and ambient temperature (0 °C – 35 °C).		

¹+85 °C, for products with a self-adhesive layer.

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SERVICE AND TECHNICAL INFORMATION AVAILABLE 24/7

At Armacell, we do everything we can to ensure your project runs smoothly. This is why the information about the Armacell services you benefit from is available 24/7 from Armacell.com website as well as from our planning tools (BIM, specification documents, ArmaWin, as well as our sustainable building policy)



DEDICATED LOCAL CONTACTS

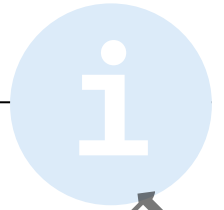
We aim to create open lines of communication with our customers. From on-site trainings and webinars by our Armacell technical experts advising on project planning and safety instructions to our local dedicated sales and customer services, your local Armacell dedicated team is working in partnership with you to achieve more together.



DIGITAL INFORMATION FLOWS

From order to delivery, we also provide you with digital information flows such as EDI and other well-known data formats that are widely used in the construction sector worldwide.

LOGISTICS



OUR STANDARD LOGISTICS SERVICES INCLUDE

- // Material ordered will be shipped from our facilities within 48 hours after order confirmation
- // Full truck loads and full pallets (not mixed – 1 SKU per pallet)
- // List prices in this document are based on Ex Works
- // Container loading with standard goods
- // Customs clearance (including documentation) for standard deliveries outside EU
- // Dangerous goods process for road freight

WE GO BEYOND STANDARD SERVICES AND ALSO PROPOSE YOU ADDITIONAL SERVICES*

OPIMISED PACKAGING

- Edge protection
- Strapping
- Doubled stretching
- Reinforced cardboard with extra layer
- Additional warning tape

LABELLING

- Extra label for transport instructions

EXTRA DELIVERY SERVICES

- Just in time delivery
- Delivery with lifting platform for partial or complete load
- Express and direct shipments
- Booking a delivery time slot via your EDP system
- Forklift truck for unloading at construction site
- Air and sea freight deliveries
- Dangerous goods shipment process for air and sea freight



To mitigate cost increases and reduce waste generation, we also propose a pallet return service* by which pallets can be handed at Armacell collection points.

* Please contact your local Customer Service Centre to see which of these services apply to your country.

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ABOUT ARMACELL

As the inventor of flexible foam for equipment insulation and a leading provider of engineered foams, Armacell develops innovative and safe thermal and mechanical solutions that create sustainable value for its customers. Armacell's products significantly contribute to global energy efficiency making a difference around the world every day. With more than 3,300 employees and 25 production plants in 19 countries, the company operates two main businesses, Advanced Insulation and Engineered Foams. Armacell focuses on insulation materials for technical equipment, high-performance foams for acoustic and lightweight applications, recycled PET products, next-generation aerogel technology and passive fire protection systems.

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