

BÜFA®-Firestop Railway Guide EN 45545-2

**Fire Retardant Composite Systems
Proven Solutions for open and closed Processes**





Understanding EN 45545-2

The European Standard for Railway Applications – Fire Retardance in Railway

Purpose of the Standard

Fire Retardant Requirements for railway vehicles to improve passenger safety, especially in tunnel scenarios.

Fire, Smoke & Toxicity

Assessment of:

- Spread of flame
- Heat release
- Smoke density and toxicity

Hazard Levels

- HL1: Standard Requirements
- HL2: Enhanced Requirements
- HL3: Highest Requirements

Key Material Requirement Sets

- R1: Interior Components
- R7/R17: Exterior Components

Why BÜFA?

We simplify Railway Fire Retardancy:

- 20+ years of Fire Retardant Expertise
- In-house development, manufacturing and fire testing
- EN 45545-2 expertise and validated railway systems
- Know-how in open and closed mould processes
- Sustainable Systems
- Machine Technology Integration
- Europe-wide Technical Support

The BÜFA Group:



Incorporation 1883



770 Employees



17 Locations



3 Business Divisions



Joe Mardoukh: Expert in Fire Retardancy

Joe Mardoukh is the Market Segment Manager for Fire Retardant Products at BÜFA Composite Systems. As a passionate chemical and polymer engineer, he has extensive expertise in the manufacturing industry.

As a Fire Retardant Expert, he has in-depth expert knowledge and can provide specialist advice and tailor-made solutions. Joe Mardoukh is available for a no-obligation personal consultation.

You can reach him on
+49 4402 975-395
or by email to
joe.mardoukh@buefa.de

Railway Applications Overview

Outstanding Mechanical Properties
and Maximum Fire Retardancy

Roof-Covering



Side-Protection
Door and
Window-Frames



Front-Masks



Interior-Panels



Seat Shells



Toilet Cabins



Driver-Desks

Overview of Fire Retardant Products

We have a complete range of Fire Retardant Products
to support your projects.

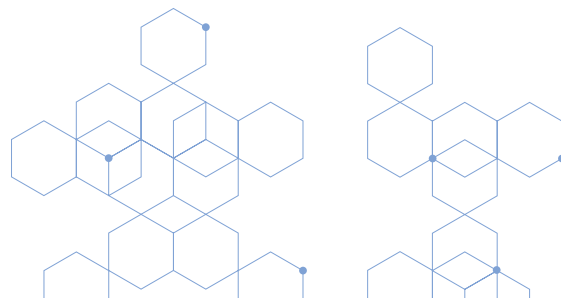


Individual Product Overview

BÜFA®-Firestop Product	Main Application	Product Description
Gelcoat		
BÜFA®-Firestop-Gelcoat-S 285	Spray	Spray-quality, intumescent gelcoat with excellent fire-retardant properties
BÜFA®-Firestop-Gelcoat-S 320	Spray	Spray-quality, intumescent gelcoat with outstanding fire-retardant properties
Resin		
BÜFA®-Firestop 8175-W-1	Spray/Hand Lamination	ATH-filled, DCPD-based, preaccelerated
BÜFA®-Firestop S 405	Spray/Hand Lamination	ATH-filled, rPET-based, preaccelerated
BÜFA®-Firestop S 570	Hand Lamination	ATH-filled, OP-based, preaccelerated
BÜFA®-Firestop S 400	Vacuum Infusion	Fire Retardant liquid fillers, rPET-based, preaccelerated
BÜFA®-Firestop S 425	Vacuum Infusion	Fire Retardant liquid fillers, DCPD-based, preaccelerated
BÜFA®-Firestop S 440	Vacuum Infusion	Fire Retardant liquid fillers, VE-based, preaccelerated
BÜFA®-Firestop S 520	RTM	ATH-filled, DCPD-based, preaccelerated, standard
BÜFA®-Firestop S 585	RTM	ATH-filled, VE-based, preaccelerated, class A
BÜFA®-Firestop S 910 Foaming Resin	RTM	Unfilled, OP-based
BÜFA®-Firestop 5001-T-1	Pultrusion	Unfilled, non-preaccelerated

BÜFA Firestop Systems & Certificates

BÜFA®-Firestop System	Main Application	EN 45545-2 Certificate	Results with Paint
BÜFA®-Firestop GC S 285 + BÜFA®-Firestop 8175-W-1	Hand Lamination	HL 2 (R1, R7, R17)	Yes
BÜFA®-Firestop GC S 285 + BÜFA®-Firestop S 425	Vacuum Infusion	HL 2 (R1, R7, R17)	Yes
BÜFA®-Firestop GC S 285 + BÜFA®-Firestop S 440	Vacuum Infusion	HL 2 (R1, R7, R17)	Yes
BÜFA®-Firestop GC S 285 + BÜFA®-Firestop S 520	RTM	HL 2 (R1, R7, R17)	Yes
BÜFA®-Firestop GC S 285 + BÜFA®-Firestop S 585	RTM	HL 2 (R1, R7, R17)	Yes
BÜFA®-Firestop GC S 285 + BÜFA®-Firestop S 910 Foaming Resin	RTM	HL 2 (R1, R7, R17)	No
BÜFA®-Firestop GC S 320 + BÜFA®-Firestop 8175-W-1	Hand Lamination	HL 3 (R1, R7, R17)	Yes
BÜFA®-Firestop GC S 320 + BÜFA®-Firestop S 405	Hand Lamination	HL 3 (R1, R7, R17)	No
BÜFA®-Firestop GC S 320 + BÜFA®-Firestop S 400	Vacuum Infusion	HL 3 (R1, R7, R17)	No
BÜFA®-Firestop GC S 320 + BÜFA®-Firestop S 425	Vacuum Infusion	HL 3 (R1, R7, R17)	Yes
BÜFA®-Firestop GC S 320 + BÜFA®-Firestop S 520	RTM	HL 3 (R1, R7, R17)	Yes



Brochure
Fire Retardant



Sustainable Fire Retardancy

Gelcoat – One for all Requirements

NEW

BÜFA®-Firestop-Gelcoat-S 320: One Gelcoat for all Requirements!

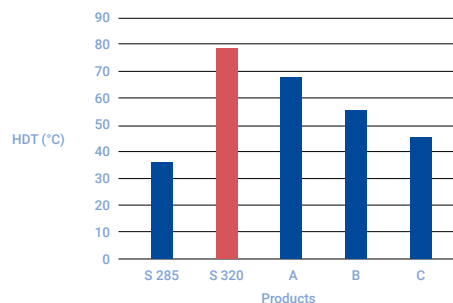
With the new BÜFA®-Firestop-Gelcoat-S 320, fire protection has never been easier: whether with or without paint - this intumescent gelcoat meets the highest requirements of EN 45545-2 HL3. In combination with proven resins such as BÜFA®-Firestop 8175-W-1 or S 425, the result is the safest system in its class. It is also sustainable and future-proof because it is free from styrene, melamine and halogens.

Brochure
Gelcoat S320

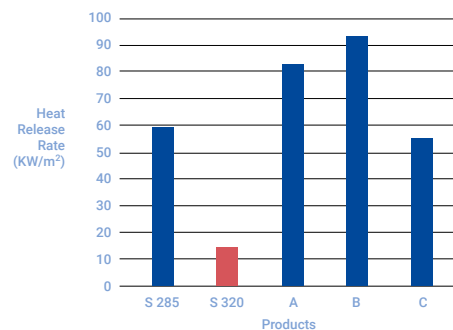


Fire Retardant Laminate

Benchmark HDT (DIN EN ISO 75-2)



Benchmark MAHRE (Cone Calorimeter ISO 5660-1 at 900 µ)



Discover Sustainable Resin Solutions

Resins - High Performance for Fire Retardant Applications

BÜFA offers a wide Portfolio of high-performance and proven Fire Retardant Resins. BÜFA®-Firestop S 400 and S 405 stand for sustainable performance in modern Fire Retardant Applications.

These rPET-based resin systems combine a lower eco-footprint with strong mechanical performance, comparable to or even better than conventional resin systems.

BÜFA®-Firestop S 400 | Fire Retardant Resin for Vacuum Infusion

Art. No. 716-0400

This product is the rPET version of our best-selling vacuum infusion resin, BÜFA®-Firestop S425.

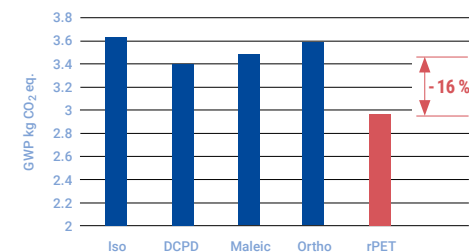
BÜFA®-Firestop S 405 | Fire Retardant Resin for Hand Lay-Up Applications

Art. No. 716-0405

This product is the rPET version of our best-selling hand-lamination resin, BÜFA®-Firestop 8175-W-1.

rPET-based Formulations Have Low Eco-Footprint

Global Warming Potential (GWP) as per Ecoinvent 3.11



GWP of rPET formulations is much lower than Ortho, DCPD, Iso, and Maleic equivalents (average - 16 %)

BÜFA®-Firestop Liquid Mat

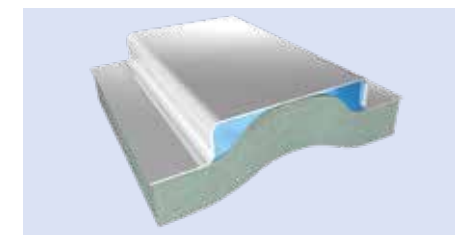
The Fire Retardant Solution for smoothing Sharp Edges and Corners

BÜFA®-Firestop Liquid Mat

is a fibre-reinforced, Fire Retardant bonding paste used in sharp corners between gelcoat and laminate.

It improves fibre placement in complex geometries, helps avoid resin-rich areas, and is particularly effective in vacuum infusion processes, while also contributing to fire performance in these transition zones.

Art. No. 715 0245



Liquid Mat

Gelcoat Spraying Unit

BÜFA®-Tec GSU Delta EVO-LINE IM

The BÜFA®-Tec GSU Delta EVO-LINE IM is designed for demanding gelcoat applications directly from the container. It is suitable for medium to large components.

The system, featuring internal mixing, is the ideal choice, particularly when processing fire retardant products. Its modular design allows for easy maintenance and customisation with optional accessories.

There are other options for machine application. Please feel free to contact our BÜFA Tec experts for more information.

Details:

- System optionally available with standard chassis, EVO-Line chassis or for wall mounting
- Clearly organised machine with simple operation
- Low pulsation thanks to the quick-change-over valve technology in the air motor in combination with the proven filter and pulsation damper unit
- Pump seals available for abrasive materials
- Suitable for use in explosion-protected areas
- Pneumatic control
- Proven Century gun technology

For more

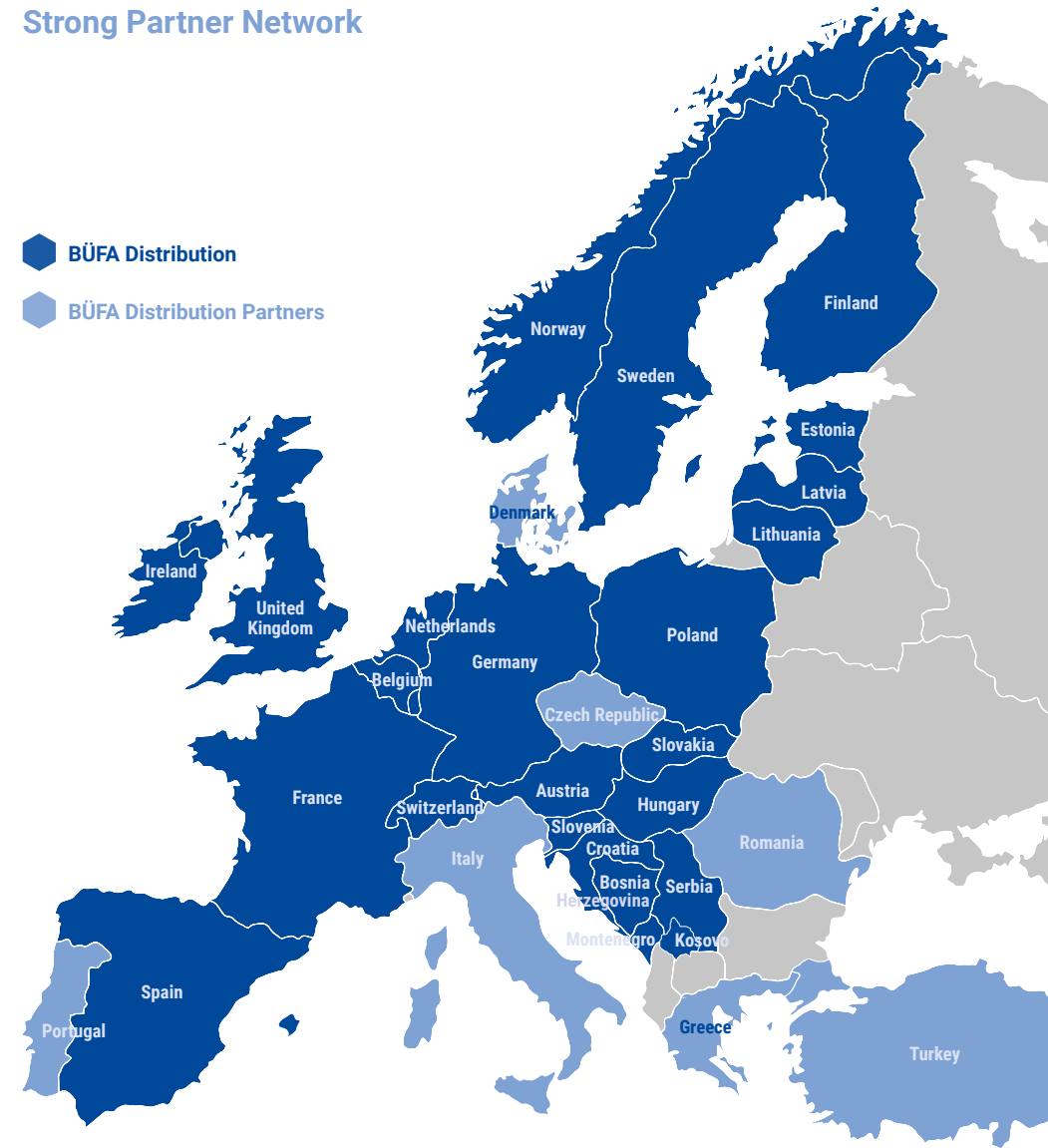


BÜFA®-Tec GSU Delta EVO-LINE IM
Art. No. 028-1981

Performance across Europe

Strong Partner Network

- BÜFA Distribution
- BÜFA Distribution Partners



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Fire Retardant



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BÜFA, AdobeStock(C)Alex Kondratenko
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The latest version of the EU Safety Data Sheet must also be observed.
For Technical Data Sheets and information, go to www.buefa-composites.com