

The logo for BUFA, consisting of the letters 'BUFA' in a bold, blue, sans-serif font. The letters are set against a light blue rectangular background with vertical white lines.A large, glowing orange and yellow fireball is shown on the left side of a blue rectangular background. The fireball is partially enclosed by a white, semi-transparent sphere that is slightly offset to the right. The background is a solid blue color.

UN ECE Reg.118
The new bus fire safety
standard

Fire retardant systems – Optimal safety
Innovative systems for the composite industry

Fire retardant trends in different branches



EN 45545



UN ECE Reg. 118



EN 13501



IMO 61/67



Focus on Buses



Fire retardant systems

New fire safety standard for buses

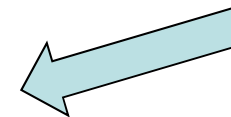


- All remain destroyed after some minutes
- Passangers will have no chance to escape after 2 min
- Introduction of new Bus Fire Safety standard **UN ECE Reg. 118**



- **Horizontal Flamespread acc. ECE R-118-02 Annex 6**
 - **95/28/EG Annex IV**
 - EVO 132.40 (2012-01-12)
 - DIN 75200
 - FMVSS 302
 - DBL 5307.10
- **Melting Behavior, burning droplets acc. ECE R-118-02 Annex 7**
 - **95/28/EG Annex V**
 - EVO 132.40 (2012-01-12)
- **Horizontal Flamespread acc. ECE R-118-02 Annex 8**
 - **95/28/EG Annex VI**
 - EVO 132.40 (2012-01-12)

„New“



Old test according EG 95/28

Example of combustion chamber with sample holder and drip tray

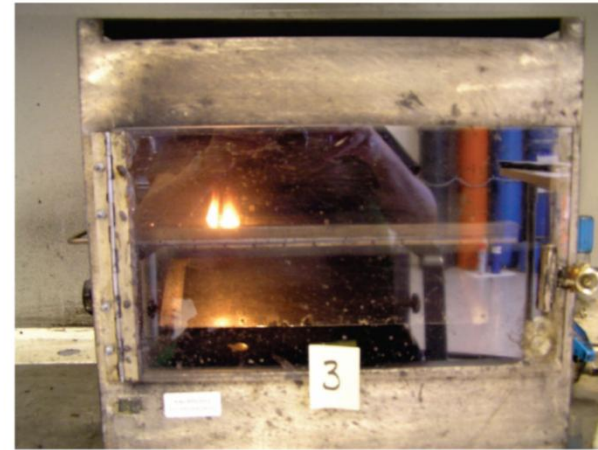
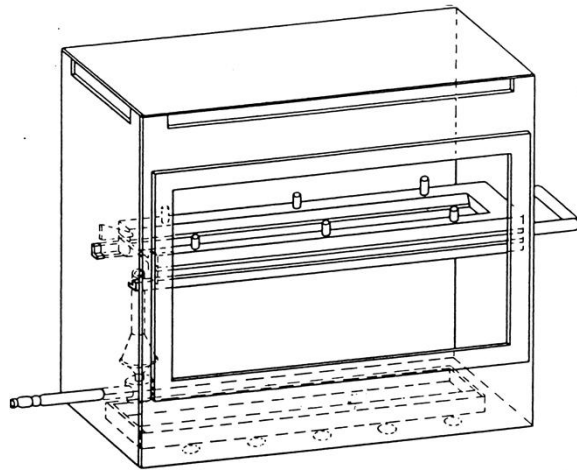


Figure 1 Test to determine the horizontal burning rate according to Regulation No. 118.

- Test will be still used in the UN ECE Reg.118 for horizontal parts
- Additional test for inner vertical parts is defined in the **UN ECE Reg. 118**



Comparison of tests



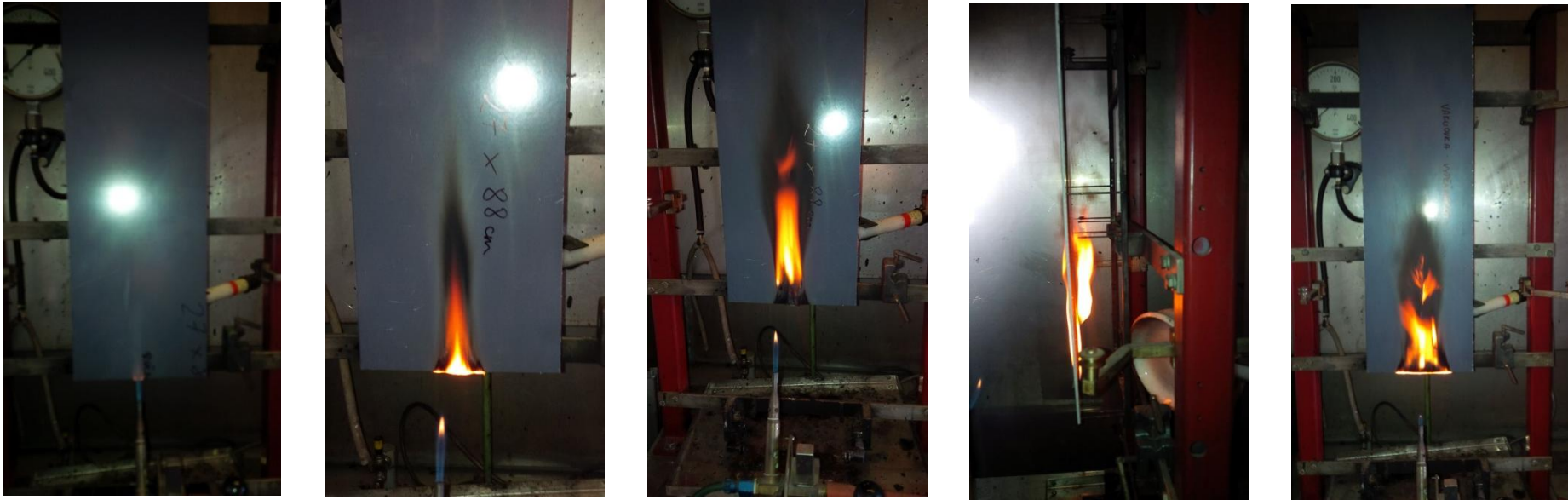
Old test
Slow burning



New test
Fast burning



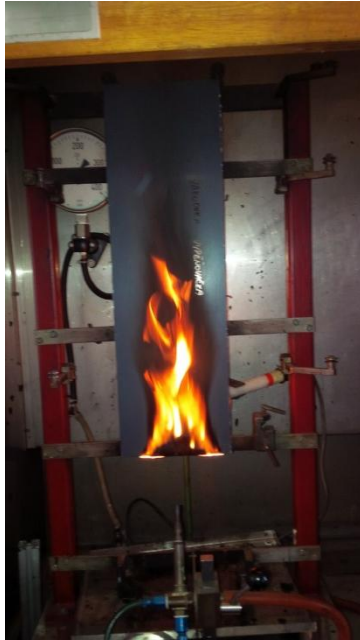
Vertical Fire tests



BÜFA®-Firestop S 250 + BÜFA®-Firestop 8175-W-1 passes this test



Vertical Fire tests



BÜFA Firestop S 250 + unprotected resin:

failed

A solution for a better result could be sealing the edges with gelcoat.



Systems for UN ECE Reg.118



Gelcoat	Resin	Classification
S 250	8175-W-1 (HLU)	passed
S 250	8175-W-1 (light RTM)	passed
S 260	BÜFA Firestop Foaming Resin	passed
S 250	BÜFA Firestop Foaming Resin	In test

+ all our systems classified according to ISO 5658 test as HL 2 (part of EN 45545)



- **For your information:
Cost for this test series
over all approximately 600 €**



Frankfurt



Acceptance of ISO 5658

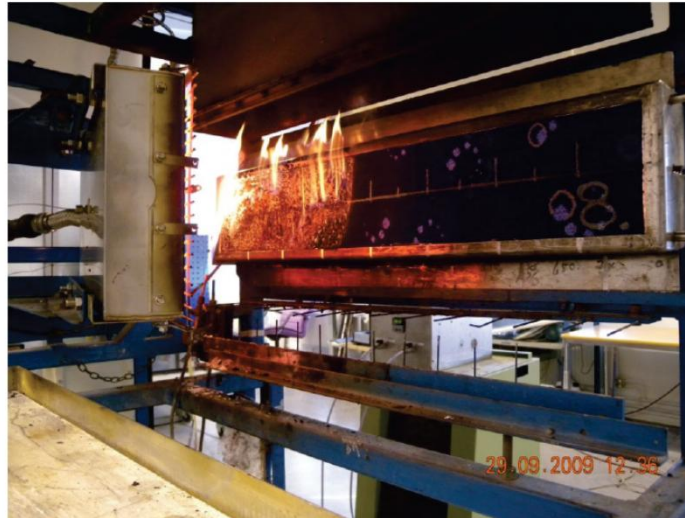


Figure 3 Test according to ISO 5658-2 which is implemented in the latest revision of Regulation No. 118. A successful test renders unnecessary both the melting test and the vertical burning rate test.

Attention:

All systems which passed the ISO 5658 (radiant panel test) according to the railway requirements (HL1 - HL3) are also allowed for use in busses.



Systems for EN 45545



Gelcoat	Resin	Classification
S 270*	S 570	HL 2
S 270*	8175-W-1	HL 2
S 270	S 520	HL 2 (customer owned certificate)
S 272	S 570	HL 2
S 272	5001-W-2	HL 2
S 272	8175-W-1	HL 2
S 300	S 570	HL 3
LEO Protection Layer R 6500	LEO Injection Resin R 6500	HL 3
	5001-W-2	HL 2
	5001-T-1 + 300 Teile ATH	HL 3

*= certificates with paint also available



Fire retardant systems

New standard consequences

- Increase of weight of each single part due to fire retardant additives
- Increase of life time costs (increase of needed fuel)
- Increase of material costs (FR materials are more expensive)

- **The solution could be:**
 - Saving weight with:
 - Using **BÜFA®-Firestop Foaming resin**

 - Using the **LEO system** by changing the laminate construction



Application example LEO system



Train sanitary part with LEO



Thank you for
your attention

