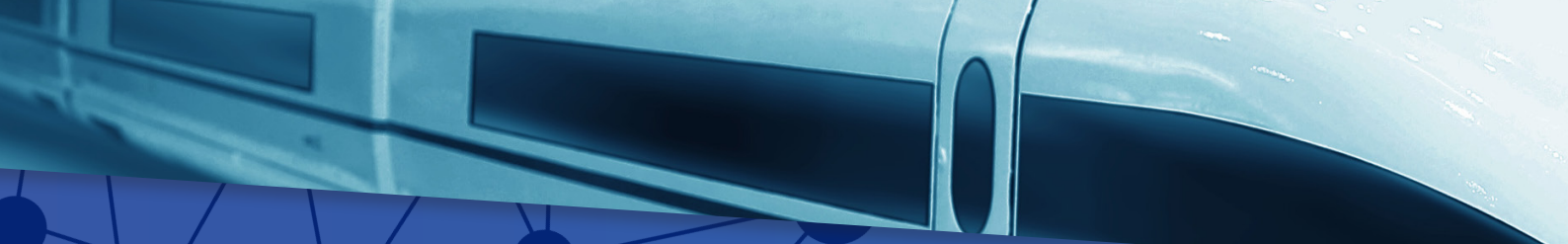


**RAILWAY**  
**PROTECTION SOLUTIONS**  
Industrial Market





# EN 45545-2

This European specification defines the requirements for the fire behaviour of materials and components on the railway market. The aim of the testing is to guarantee the protection of the passengers in the case in the event of an onboard fire and allow them the ability to leave their vehicle quickly and safely. Oxygen index, smoke density, toxic gas generation and fire behaviour are the required parameters to be conform with the European railway requirements.

The specification defines **4 design categories:**

- N** Standard vehicles
- A** Vehicles forming part of an automatic train and having no emergency trained staff on board
- D** Double-decked vehicles
- S** Sleeping and couchette vehicles

But it also defines **4 operation categories:**

- CATEGORY 1:** Above-ground operation
- CATEGORY 2:** Underground operation
- CATEGORY 3:** Inter City operation (tunnel)
- CATEGORY 4:** Underground lines/ tunnel with restricted evacuation



The combination of these two categories determines the **hazard level (HL):**

Operation Category	Design Category			
	N	A	D	S
1	HL1	HL1	HL2	HL2
2	HL2	HL2	HL2	HL2
3	HL2	HL2	HL2	HL3
4	HL3	HL3	HL3	HL3



PRODUCT NAME	PHOTO	CONSTRUCTION	TEMPERATURE OF USE	EN 45 545-2	FLAMMABILITY	APPLICATIONS*
<b>STANDARD PRODUCT RANGE</b>						
POLYFLEX NP PA6 BS		Standard convoluted tubing made of flame retardant PA6 material	-40/120°C	✓ R22 HL3;R23 HL3	UL94 V0	
TWIN FLEX PA6 BS		Double C-shaped tubing locking into each other made of flame retardant PA6 material	-40/120°C	✓ R22 HL3;R23 HL3	UL94 V0	
LANGOFLEX PET		PET .010" (0.25mm) braided monofilament - standard construction	-40/150°C	✓ R22 HL3;R23 HL3	self-ext.	
LANGOFLEX PET-D		PET .010" (0.25mm) braided monofilament - dense construction	-40/150°C	✓ R22 HL3;R23 HL3	self-ext.	
LANGOFLEX PET-HD		PET .010" (0.25mm) braided monofilament - high density construction	-40/150°C	✓ R22 HL3;R23 HL3	self-ext.	
LANGOFLEX PET022		PET .009" (0.22mm) braided monofilament	-40/150°C	✓ R22 HL3;R23 HL3	self-ext.	
LANGOFLEX PET FR		Flame retardant PET .010" (0.25mm) braided monofilament	-40/150°C	✓ R22 HL3;R23 HL3	UL94 V2	
LANGOFLEX PET V0		UL94 V0 PET .010" (0.25mm) braided monofilament	-40/150°C	✓ R22 HL3;R23 HL3	UL94 V0	
NU-GUARD SC-P V0		UL94 V0 PET mono & multifilaments self-closing sleeving	-40/150°C	✓ R22 HL3;R23 HL3	UL94 V0	
LANGOFLEX EMI-HV M		PET braided monofilament with tinned copper wires	-40/150°C	✓ R22 HL3;R23 HL3	self-ext.	
<b>OTHER SOLUTIONS</b>						
NU-KOOL T-G/E		Tubular braided fiberglass with aluminized foil lamination	-40/200°C		self-ext.	
NU-KOOL SC-G		Self-closing knitted fiberglass and PET monofilaments with aluminized foil lamination	-40/150°C		self-ext.	
NU-SHIELD FG/FGA		Woven fiberglass with aluminized foil lamination + acrylic adhesive (FGA)	-40/225°C (FG) -40/175°C (FGA)		self-ext.	
NU-SHIELD FG2A		Woven fiberglass with aluminized foil lamination + acrylic adhesive	-40/175°C		self-ext.	

\* Mechanical & Abrasion Protection

Compression Resistance

Electromagnetic Shielding

Radiant Heat Protection

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