

ELASTOSIL® – SILICONE ELASTOMERS FOR FIRE-SAFETY STANDARD EN 45545-2

Particularly stringent fire-safety codes have always applied to trains. With the EN 45545-2 standard in effect across Europe, the requirements have become even stricter. Since 2018, all components installed in rolling stock must comply with this standard. This also affects materials used to make rubber-elastic parts, such as solid and liquid silicone rubber grades.

The new fire-safety standard EN 45545-2 distinguishes three different hazard levels (HLs). These are derived from a matrix of train operation and design categories:

Operation Categories

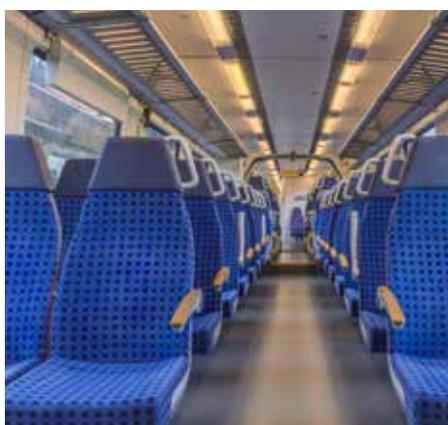
1	Vehicles running on surface
2	Vehicles used in tunnels of max. 5 km
3	Vehicles used in tunnels > 5 km
4	Vehicles used in tunnels without evacuation from the side of the tunnel

Design Categories

A	Vehicles of automatic trains without emergency-trained personnel
D	Double-stack trains
S	Sleeping compartments
N	Other, typically standard trains

Hazard Levels

	N	A	D	S
1	HL1	HL1	HL1	HL2
2	HL2	HL2	HL2	HL2
3	HL2	HL2	HL2	HL3
4	HL3	HL3	HL3	HL3



Hazard levels HL1 to HL3 specify the fire-safety requirements that installed components and materials must meet. HL1 denotes the lowest requirements, HL3 the highest. For example, materials in sleeping cars that travel through long tunnel sections must meet higher requirements than ones in regional trains that frequently stop aboveground and can be evacuated more quickly.

ELASTOSIL®: Tested and Certified

In order to conform to a hazard level, components and the materials used in them must meet certain requirements. There are a total of 26 defined requirement sets that are checked by means of 17 different test methods. The most important requirement sets for rubber-elastic parts in rail transport are denoted by the abbreviations R1, R7, R22 and R23. In line with the stricter regulations, WACKER tested its existing ELASTOSIL® solid and liquid silicone rubber portfolio and certi-

fied it for a large portion of the applications mentioned in EN 45545-2:

ELASTOSIL®	Requirement Set	Hazard Level
R 770/50	R 22	HL1-HL3
	R 23	HL1-HL3
	R 24*	HL1-HL3*
R 770/60	R 22	HL1-HL3
	R 23	HL1-HL3
	R 24*	HL1-HL3*
R 770/75	R 22	HL1-HL3
	R 23	HL1-HL3
	R 24*	HL1-HL3*
LR 3001/55 FR	R 22	HL1-HL3
	R 23	HL1-HL3
	R 24*	HL1-HL3*
LR 3011/50	R 22	HL1-HL3
	R 23	HL1-HL3
	R 24*	HL1-HL3*

Slab: 2 mm thickness

* No existing certificate; R24 is part of R22 tests



ELASTOSIL® R 771 – Silicone Elastomer for Top Fire Protection

In order to also meet the strict R1 and R7 requirement sets as per EN 45545-2, WACKER furthermore developed its new ELASTOSIL® R 771 solid silicone rubber. It is characterized by an optimized silicone content and an intelligent combination of fillers. It is suitable, for instance, for the manufacture of regulation-compliant door and window profiles, or bellows used in corridor connections.



ELASTOSIL® R 771 is currently available in Shore A hardnesses of 60 and 70, and can be compression molded using all conventional processes, extruded or calendered.

Like its predecessor ELASTOSIL® R 770, ELASTOSIL® R 771 is a peroxide-curing system. The peroxide needed for cross-linking is added during production. Premixed products are also available.

Requirements According to EN 45545-2 R1				
Test method	Parameter	Requirements		
		HL1	HL2	HL3
T02 ISO 5658-2	CFE [kW/m ²]	≥ 20	≥ 20	≥ 20
TO3.01 ISO 5660-1: 50 kW/m ²	MARHE [kW/m ²]	-	≤ 90	≤ 60
T10.01 EN ISO 5659-2: 50 kW/m ²	D _s (4)	≤ 600	≤ 300	≤ 150
T10.02 EN ISO 5659-2: 50 kW/m ²	VOF4 [min]	≤ 1200	≤ 600	≤ 300
T11.01 EN ISO 5659-2: V 50 kW/m ²	CIT _G	≤ 1.2	≤ 0.9	≤ 0.75

HL – Hazard level

ELASTOSIL® R 771 Fulfills the R1 and R7 Requirement Sets for Hazard Level HL2		
ELASTOSIL®	Requirement Set	Hazard Level
R 771/60	R 1	HL1, HL2
	R 7	HL1, HL2
R 771/70	R 1	HL1, HL2
	R 7	HL1, HL2

ELASTOSIL® R 771: Product Properties*			
		ELASTOSIL® R 771/60	ELASTOSIL® R 771/70
Shore A		60	70
Density	g/cm ³	1.43	1.47
Tensile strength	N/mm ²	3.9	4.0
Elongation at break	%	430	260

* Addition of 1.5% ELASTOSIL® AUX CURING AGENT E, curing conditions: 10 min. at 135 °C, postcuring: 4h at 200 °C



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