



HCR Excellence

April 2024 Burghausen

Vita

M+S Group



- The M+S Silicon GmbH & Co. KG has been founded in 2001 in Dortmund and forms the origin of the M+S Group. Its extensive product range includes extruded products, moulded parts (LSR and HCR), sheets and insulating sleeves.
- To ensure our ability to respond flexibly at all times, we maintain our own mixture compounding facility and an associates toolmaking plant.
- We also have implemented a quality management system in accordance with ISO 9001. As a responsible German company, we consider sustainability as a priority and therefore, have established an environmental management system compliant with ISO 14001 and ISO 50001.

Facts

M+S Group



Turnover
in 2023

33 Million
Euros



Employees

245

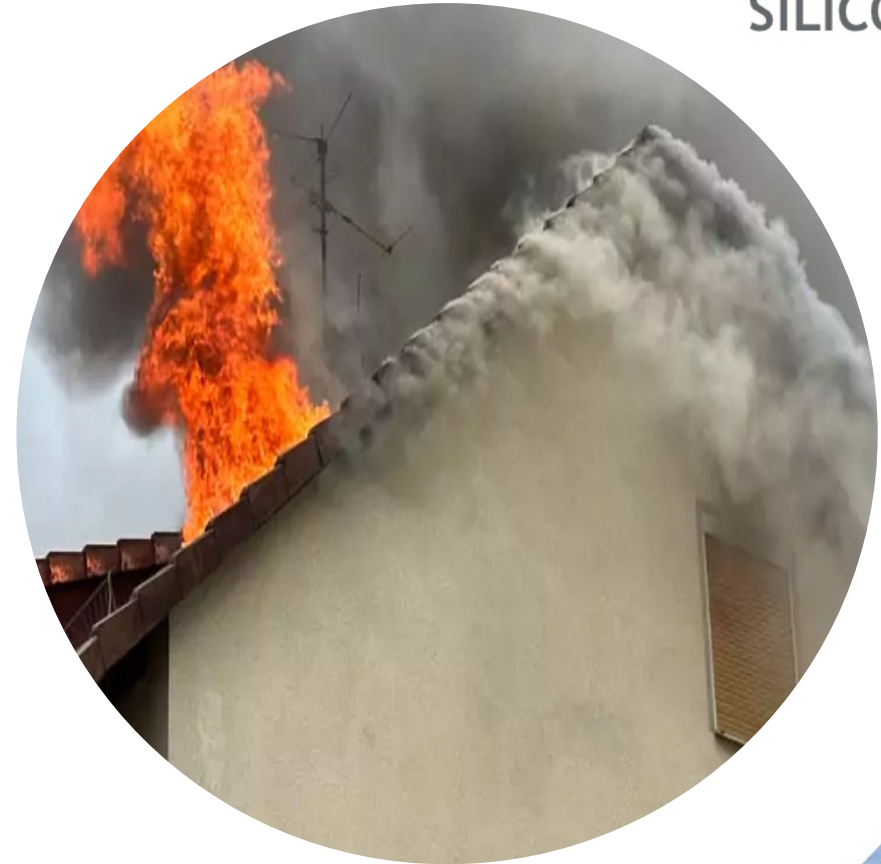
Fire Protection



The entirety of all preventive measures that prevent the development of a fire or limits its effects.

The highest priority is to save lives by minimizing the probability of fire occurrence and restricting the speed and extent of fire development.

We focus on the three key industry sectors for M+S Silicon and briefly discuss the relevant standards.



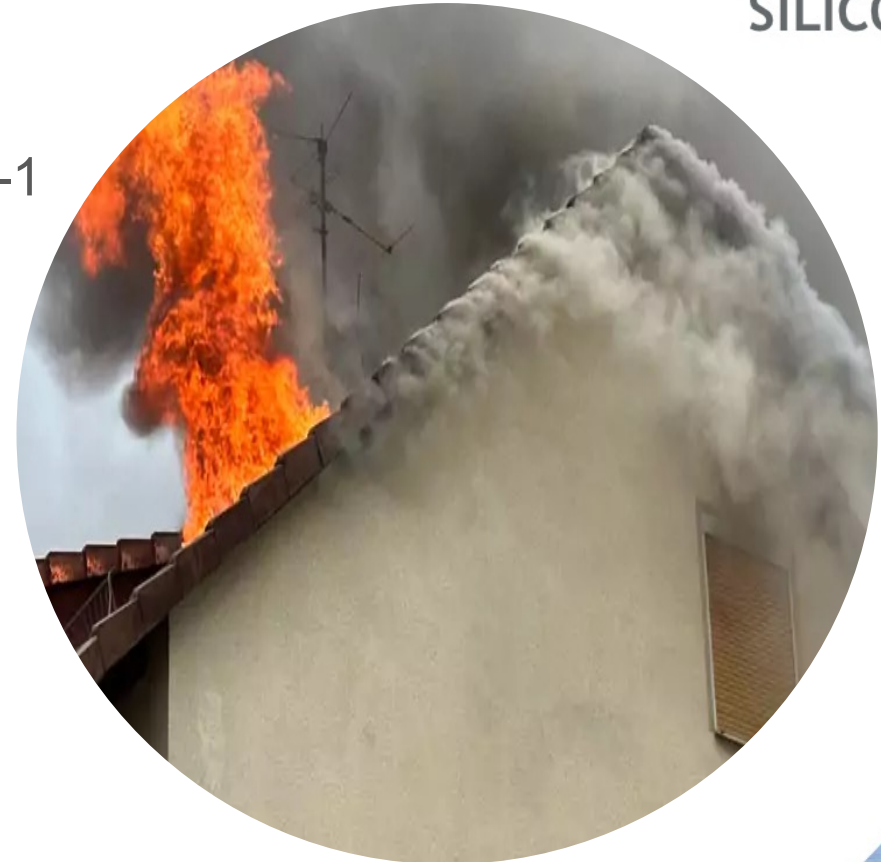
Fire Protection



1. Construction Industry DIN 4102-1 / DIN EN 13501-1

2. Underwriters Laboratories - UL 94 Standard

3. Railway Industry EN 45545-2



Fire Protection

Comparison of Relevant Standards in Construction DIN 4102-1 vs. DIN EN 13501-1



National class according to DIN 4102-1	Official Building Requirement	European Class according to DIN EN 13501-1	Additional Requirements No Smoke	No burning droplets / drips
A 1	non-combustible	A 1	X	X
A 2	non-combustible	A 2 - s1, d0	X	X
B 1 *)	durable flame resistance	B - s1, d0 or C - s1, d0	X	X
		A 2 -s2, d0 or A 2 -s3, d0		X
		B - s2, d0 or B - s3, d0		X
		C -s2, d0 or C - s3, d0		X
		A 2 - s1, d1 or A 2 - s1, d2	X	
		B - s1, d1 or B - s1, d2	X	
		C - s1, d1 or C s1, d2	X	
		A 2 - s3, d2 / B - s3, d2 / C - s3, d2		
B 2 *)	normal flammability	D - s1, d0 or D - s2, d0		X
		D - s3, d0 or E		X
		D - s1, d1 or D - s2, d1		
		D - s3, d1 or D - s1, d2		
		D - s2, d2 or D - s3, d2		
		E - d2		
B 3 **)	Easily flammable**	F **)		

Allocation of official designations for construction materials (excluding floor covers) for national classifications according to DIN 4102-1 and European classifications according to DIN EN 13501-1



*Information about high smoke development and burning droplets / drips is provided in the usability proof in the label

**Easily flammable construction materials must not be used. This does not apply when the materials are no longer easily flammable due to combining them with other construction materials.

Construction Industry - Construction Law



- Construction regulations fall under the jurisdiction of the respective federal state in Germany. Therefore, there are 16 different interpretations.
- The German building material class DIN 4102-1 applies in Germany. Structural component tests can still be conducted based on this standard to achieve, for example, the B1 classification.
- Harmonization in line with the more broadly applicable DIN EN 13501 should be pursued.

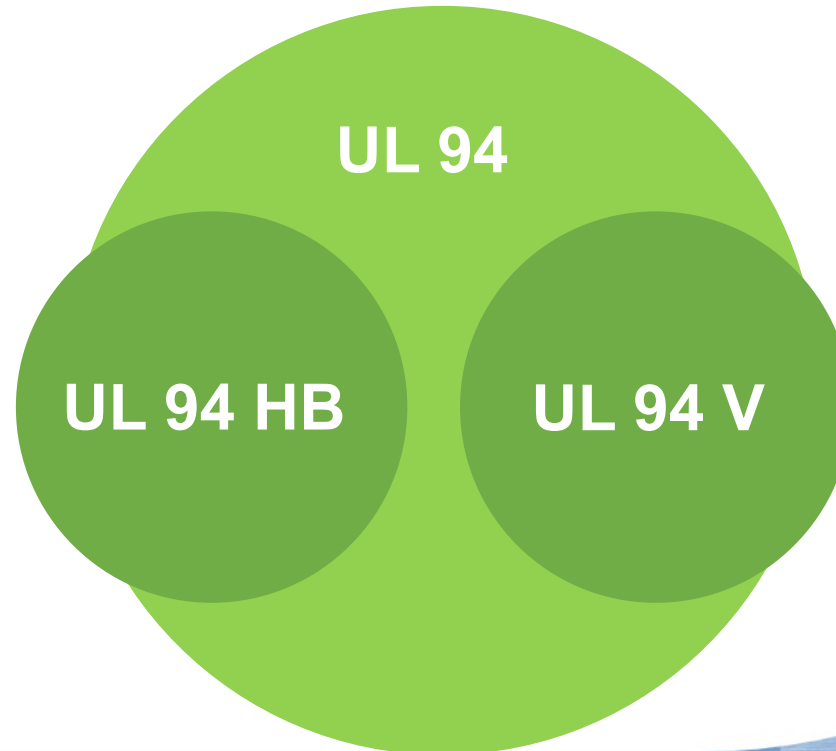
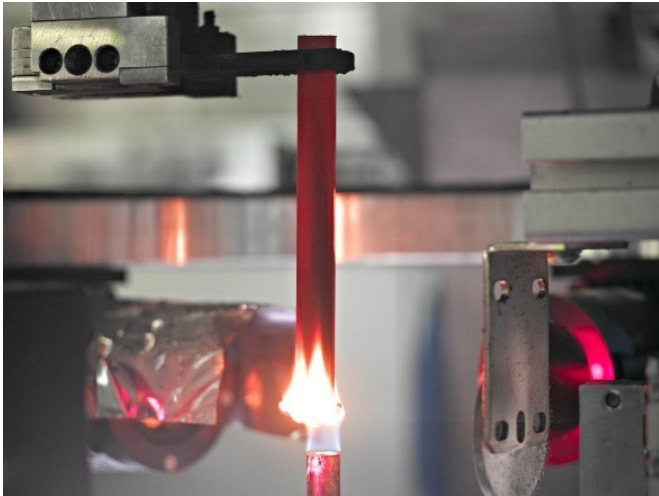
1.

Fire Protection

Underwriters Laboratories (UL)



- The UL94 standard is employed by the American laboratory to analyze the flammability and fire safety of plastics. In the UL 94 HB (Horizontal Burning) test, the burning characteristics of a plastic part are examined. In the more challenging UL 94 V (Vertical Burning) test, the plastic specimen is held vertically. Detailed explanations of the test setup can be found in the UL 94 standard.



2.






Classification according to UL



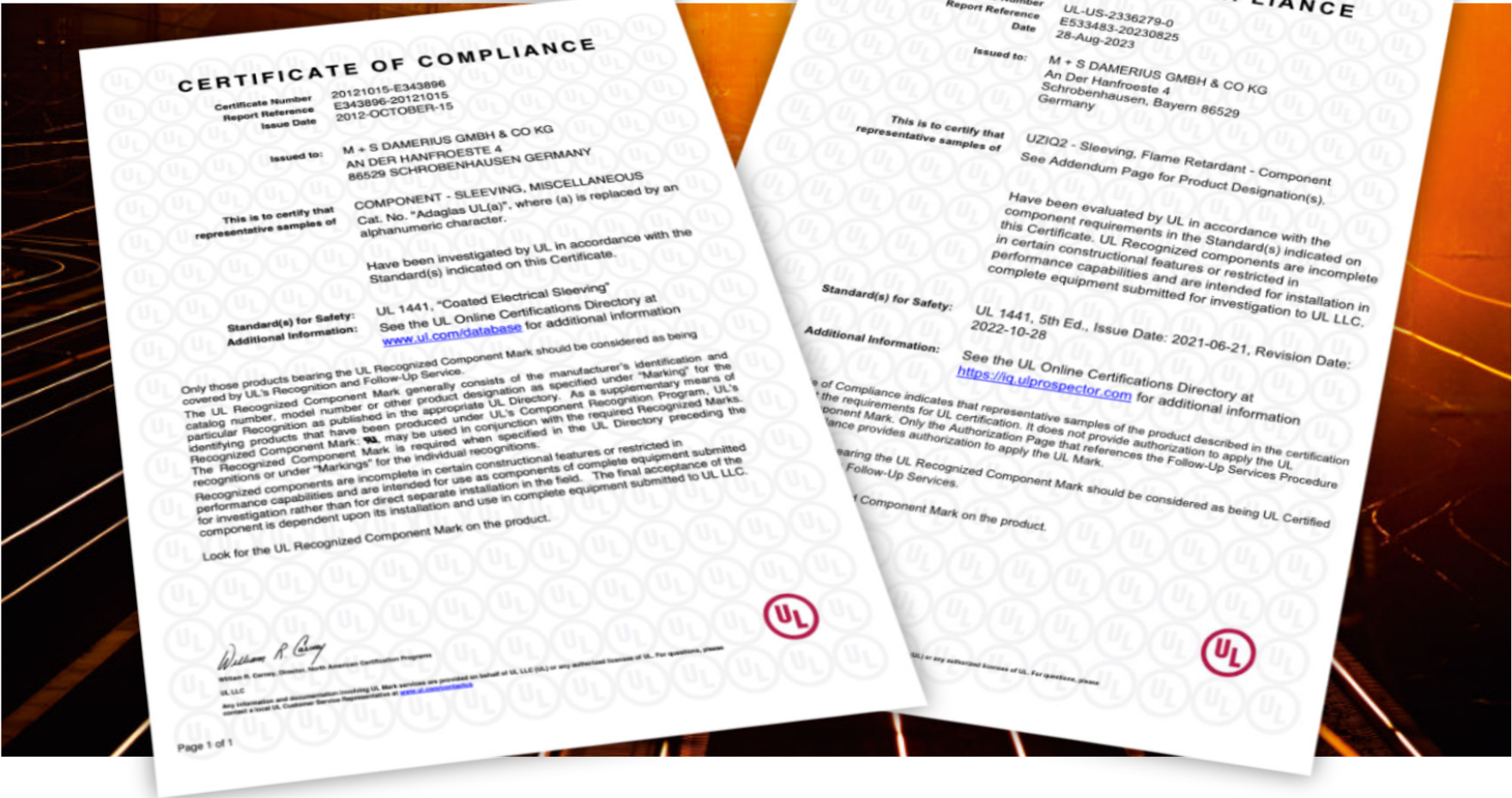
- The classification is done for the tested sample thickness into the categories HB (Horizontal Burning Test) as well as V-0, V-1, V-2, 5VA, and 5VB (Vertical Burning Test). These are, ordered by increasing stringency, specifically defined as follows:
- HB: Slow burning of a horizontally clamped specimen (self-extinguishing or for thickness <3 mm; rate <75 mm/min (HB75); for thickness 3...13 mm; rate <40 mm/min (HB40)).
- V-2: Extinguishing of a vertically clamped specimen within 30 seconds. Allowance for burning droplets of molten plastic.
- V-1: Similar to V-2, but no allowance for burning droplets of molten plastic. Maximum 60 seconds of afterglow.
- V-0: Similar to V-1, but extinguishing of the flame within 10 seconds. Maximum 30 seconds of afterglow

2.

Criteria for the classification of vertical burning according to UL 94(4)(5)

Criteria	V-0	V-1	V-2	
Burning time with flame for each individual test specimen	≤ 10 s	≤ 30 s	≤ 30 s	
Total burning duration with flame for a set of test specimens after respective conditioning	≤ 50 s	≤ 250 s	≤ 250 s	
Burning time with flame plus afterglow time for each individual test specimen after the second flaming	≤ 30 s	≤ 60 s	≤ 60 s	
Is burning and/or afterglow allowed for an individual test specimen until the holder?	no	no	no	
Ignition of the cotton pad by burning particles or droplets is allowed?	no	no	yes	

Certificates for ADASIL and ADAGLAS



2.

Fire Protection

for Railway Vehicles according to EN 45545



3.

- This standard is the result of harmonizing several regional standards in Europe such as DIN 5510, NF F 16-101, or BS 6853 and is mandatory for all new vehicles after a transitional period since January 1st, 2018.
- It establishes the classification of a material or component based on its potential hazard.

Step A: DIN EN 45545-1 Section 5 Classification



- The classification of the Operating Category (OC 1- OC 4) is based on the required time for evacuation in open air (OC1), such as a tram, or underground (OC4), as in the case of a train in a long tunnel.
- The Construction Category further divides vehicles into Standard (N), Automatic Operation (A), Double-deck (D), or Sleeping Cars (S).
- The combination of these two classifications results in the so-called Hazard Level (HL).

3.

Step B: Determination of the Hazard Level

The identified combination of the Operating Category and Construction Category of the railway vehicle results in the so-called Hazard Level (HL).

Subsequently, the determined Hazard Class prescribes the necessary fire protection technical requirements (sets of requirements) for the materials and components.

Operation Category	Construction Category:			
	N (Normal / Standard)	A Automatic Operation	D Double-deck	S Sleeping Cars
1. Above-ground operation	HL 1	HL 1	HL 1	HL 2
2. Tunnel <5 km	HL 2	HL 2	HL 2	HL 2
3. Tunnel >5 km	HL 2	HL 2	HL 2	HL 3
4. No lateral evacuation	HL 3	HL 3	HL 3	HL 3

Table according to DIN EN 45545-2-2016-02

Step C: Listed or Non-listed Components

Once the Hazard Class is determined, the next step is to check whether the component is "listed" or "non-listed."

Step C1: Listed Components

The listed components are listed in Table 2 of DIN EN 45545-2. For these components, the corresponding requirements ("R-set," a set of multiple requirements such as quantity of toxic gasses, smoke generation, and associated measurement method) are derived from the table, which must be tested and met by the components.

3.

Flame-resistant silicones for the railway industry



	EN 45545-2	shore hardness	curing system	colour
FLEXCOMP® Series RB-R: flame resistant, universally applicable				
RB-R 50010	R22/R23: HL3	50	peroxide cured	blueblack
RB-R 60010-03	R22/R23: HL3	60	peroxide cured	black
RB-R 70010-03	R22/R23: HL3	70	peroxide cured	black
RB-R 70020	R22/R23: HL3	70	peroxide cured	blueblack
RB-A-U 60010-03	R22/R23: HL3	60 (untempered)	platinum cured	blueblack
RB-A-U 70010-03	R22/R23: HL2	70 (untempered)	platinum cured	blueblack
FLEXCOMP® Specialities: a selection				
STRB 25130-02 high tear strength with flame retardants	R22: HL2 / R23: HL3	25	platinum cured	blueblack
STRB 60130-01 high tear strength with flame retardants	R22/R23: HL3	60	platinum cured	blueblack
STRB70130-01 high tear strength with flame retardants	R22/R23: HL3	70	platinum cured	blueblack
X-RB-R 50010 flame resistant silicone foam, density 0,40 g/cm³	R22/R23: HL3	-	peroxide cured	blueblack

**Thank you
for your attention!**



Martin Richartz

Field Sales Management
Marketing



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