

SEALING & BONDING
SIKA FIRE PROTECTION
SOLUTIONS FOR JOINTS AND
PENETRATIONS

BUILDING TRUST





BENEFITS OF OUR SOLUTIONS

Sika provides comprehensive solutions where fire resistant construction is required such as tunnels, commercial and residential buildings and steel structures. Fire resistant mortars, intumescent coatings and specially designed sealants enable the building of safer buildings and infrastructure. Our fire rated sealants and foams comply with the latest relevant standards and can be used for inside and outside applications on various substrates.

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SIKA SOLUTIONS FULFILL THE HIGHEST STANDARDS

SIKA SOLUTIONS HELP TO SAVE LIVES

In case of fire within buildings smoke and heat will spread through penetrations and joints endangering residents and blocking escape paths.

Fire protection solutions from Sika seal penetrations and joints and help retain fire and smoke to where they occur for a certain time, allowing inhabitants to exit the building safely. Sika fire rated products and systems comply with the most relevant standards (EN, ETAG, UL, ASTM) in order to ensure the highest fire resistance.

It is important to distinguish two different types of fire testing for building materials:

- **Reaction to fire:** How does the product react to an open flame? The reaction to fire is described by the combustability, smoke development and dripping behaviour.
- **Fire Resistance:** How long can a product that is built into a fire protection system withstand the impact of fire. This is described by the resistance time during standardized fire tests.

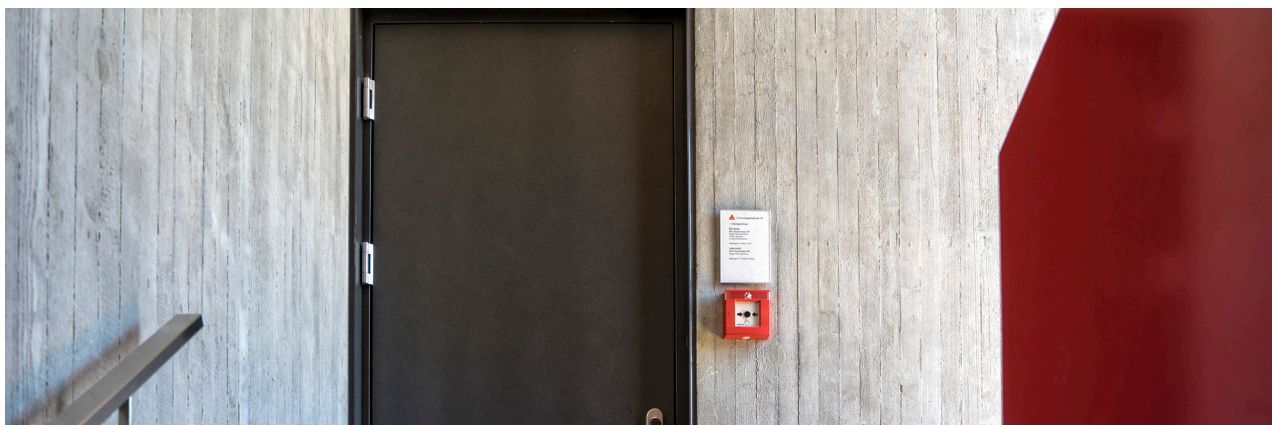
For the fire resistance of a building only the combined resistance of the system's individual components counts. For example a fire resistant door together with the fire resistant sealant and wall can hinder the spreading of fire and smoke. Therefore fire resistant tests are much more important than the reaction of a product to a flame.

REACTION OF BUILDING MATERIALS TO FIRE

The reaction of building materials to fire is determined by exposing the single product in its not installed state to fire and heat. For example EN 13501-1 classifies how easily materials can catch fire, how smoke develops and if dripping occurs. It does not, however, provide any information about how long the product resists fire in a system.

Building material class according to EN 13501-1*	Building inspection designation	Test standards
A1	non-combustible and not containing any combustible components	EN ISO 1182, EN ISO 1716, EN ISO 9239
A2	non-combustible but containing certain amounts of combustible components	EN ISO 1182, EN ISO 1716, EN ISO 9239
A2, B, C	Flame retardant	EN ISO 9239-1
D	Normally flammable	EN ISO 9239-1
E	Normally flammable	EN ISO 11925-1
F	Easily flammable	No test required

* For additional sub-classes for smoke development and occurrence of dripping see EN 13501-1



RESISTANCE TO FIRE OF INSTALLED BUILDING MATERIALS

There are many fire resistance testing standards for building materials or building elements. The most relevant for joint sealants and penetration seals are:

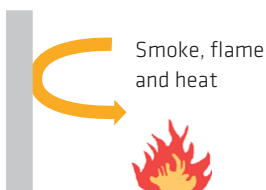
- AS 1530: Methods for tests on building materials, components, structures, Part 4: Fire-resistance tests of elements of construction. Part 10: Service penetrations and control joints.
- EN 1366: Fire resistance tests for service installations – Part 3: Penetration seals, Part 4: Linear joint seals
- ETAG 026: Fire stopping and fire sealing products – Part 3: Linear joint and gap seals
- UL 2079: Tests for fire resistance of building joint systems
- ASTM E119: Fire tests of building construction and materials
- BS 476-20: Fire resistance test for linear joints

These tests not only include the sealant but an entire section of the building where the sealant is installed with a backing rod into a joint formed by a relevant building material – concrete in most cases.

The tested Sika system consists of:

Integrity Function

Integrity is the capability of a building element, when exposed to fire on one side, to prevent the passage of flames, smoke and hot gases to the unexposed side. There is no temperature limit on the non-fire side.



FIRE RESISTANCE LEVEL

The performance of building materials or elements which are fire tested according to AS 1530 Part 4 are expressed in terms of their fire resistance level (FRL). The FRL describes the minimum fire resistance of the building material or element.

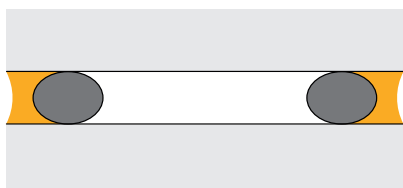
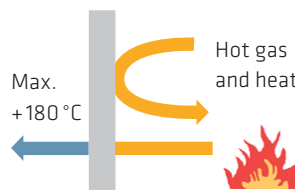
The FRL is expressed in terms of three numbers, giving the time in minutes for which each of the three criteria of *structural adequacy*, *integrity* and *insulation* are satisfied.

Examples of FRLs are:

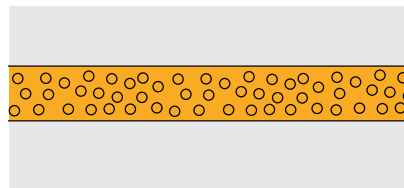
- a) 60/60/30 indicating structural adequacy 60 minutes, integrity 60 minutes, insulation 30 minutes.
- b) 30/-/- indicating structural adequacy 30 minutes, but no resistance level for integrity or insulation.

Insulating Function

Thermal insulation is the capability of a building element to maintain its required thermal insulation separating function in case of fire (with a max. 180 ° temperature rise on the non-fire side).



Fire rated sealant (yellow) combined with a standard PE backing rod.



Fire retardant foam (yellow).

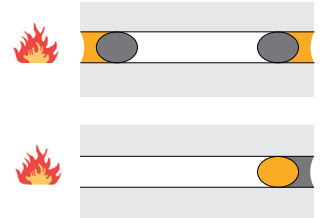
JOINT INFORMATION

Information needed to choose the best fire rated joint sealing solution



INFORMATION NEEDED:

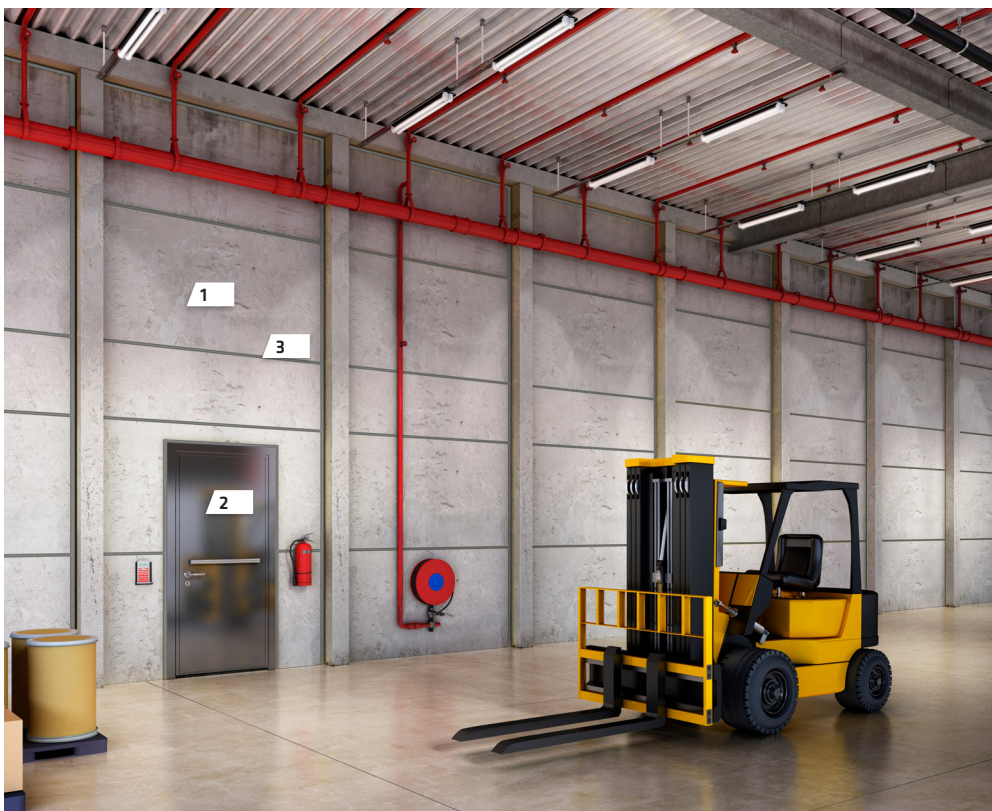
1. Substrates e.g. Concrete/Steel
2. Wall joint or floor joint
3. Wall thickness
4. Joint width
5. Single or double sided applied fire rated sealant



Many parameters have an influence on the fire resistance of a sealant in the applied and cured state in a joint. Therefore it is crucial to know the details of the joint.

Without the joint details the fire protection information *Integrity* and *Insulation* cannot be derived from the classification charts and the correct product chosen.

EXAMPLE OF FIRE RATED SEALANT APPLICATION



- 1
Precast concrete elements
- 2
Fire protection door
- 3
Sika fire protection sealant: Sikaflex®-400 Fire

In the image above a possible application of fire rated sealants and protective coatings is illustrated. A big distribution centre and warehouse is divided into several sections. To avoid the spread of fire and smoke between the sections several fire protection measures are taken. The walls

are made of precast concrete elements that are sealed to each other with Sikaflex®-400 Fire. This combination unifies efficient installation, best sealing properties and highest fire protection. Choose Sika fire protection solutions for best performance.

SIKA FIRE RATED PRODUCTS

Sikaflex®-400 Fire

1-part, fire rated moisture curing elastic joint sealant



UP TO 4 HOURS
FIRE RESISTANCE

Use

Sikaflex®-400 Fire is designed for fire rated movement and connection joints on porous and non-porous substrates. It is suitable for interior and exterior applications.

Key Advantages & Benefits

- Up to 4 hours fire resistance according to AS 1530.4
- Up to 4 hours fire resistance according to EN 1366-4
- Movement capability of $\pm 35\%$ (ASTM C719)
- Easy to smooth and very good workability
- Good adhesion to many different substrates
- Long open time

Approvals/Standards

- AS1530.4 FRL
- EN 1366-4
- ASTM C920 class 25
- ISO 11600 class 25 LM
- EN 15651-1 F EXT-INT CC

Sika® Firerate

1-part, intumescent fire rated acrylic sealant



UP TO 4 HOURS
FIRE RESISTANCE

Use

Sika Firerate is ideal for use as an interior sealant when fire rated joints are required between concrete or masonry building components.

Key Advantages & Benefits

- Safe to use - water based, contains no asbestos or fibres
- Good adhesion to concrete and masonry substrates
- One component, ready to use
- Overpaintable when tack free
- Cost effective - minimal waste

Approvals/Standards

- AS 1530 Part 4

Sika Boom®-FR

1-part, high yield, fire rated polyurethane foam which can be applied by application gun



UP TO 5 HOURS
FIRE RESISTANCE

Use

Sika Boom® FR is designed for linear joints in brickwork and concrete where fire protection is required.

Key Advantages & Benefits

- High yield
- Easy application with application gun
- Very good temperature insulation
- Effective sound dampening
- HFC-free

Approvals/Standards

- DIN 4102: B1 fire rating class
- BS 476 Part 20: fire rated up to 5 hours fire protection

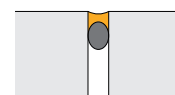
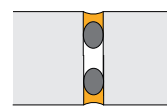
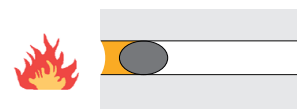
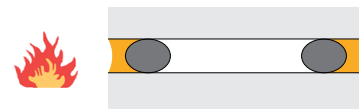
FIRE RESISTANCE OF JOINTS WITH Sikaflex®-400 Fire

FIRE RESISTANCE OF Sikaflex®-400 Fire TESTED ACCORDING TO AS 1530 Part 4




Sikaflex®-400 Fire	Substrates	Element type	Minimum element thickness	Joint width
	Concrete/Concrete	Wall	150 mm	20 mm
	Autoclaved aerated concrete / Autoclaved aerated concrete	Wall	150 mm	12 mm
	Autoclaved aerated concrete / Autoclaved aerated concrete	Wall	150 mm	40 mm
	Concrete/Concrete	Wall	150 mm	20 mm
	Autoclaved aerated concrete / Autoclaved aerated concrete	Wall	150 mm	12 mm
	Autoclaved aerated concrete / Autoclaved aerated concrete	Wall	150 mm	40 mm
	Concrete/Concrete	Wall	150 mm	20-30 mm
	Autoclaved aerated concrete / Autoclaved aerated concrete	Floor	150 mm	12-40 mm
	Autoclaved aerated concrete / Autoclaved aerated concrete	Floor	150 mm	12 mm
	Autoclaved aerated concrete / Autoclaved aerated concrete	Floor	150 mm	40 mm

Width/depth ratio	Fire resistance rating to AS 1530 Part 4	Kind of sealing
2:1	-/240/180	Double seal
2:1	-/240/240	Double seal
2:1	-/180/120	Double seal
2:1	-/240/120	Single seal on non-fire side
2:1	-/240/120	Single seal on non-fire side
2:1	-/120/120	Single seal on non-fire side
2:1	-/240/-	Single seal on fire side
2:1	-/240/240	Double seal
2:1	-/180/120	Single seal on non-fire side
2:1	-/120/120	Single seal on non-fire side

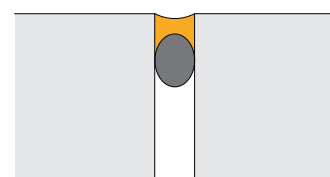
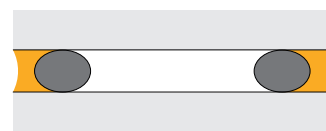


FIRE RESISTANCE OF JOINTS WITH Sika® Firerate

FIRE RESISTANCE OF Sika® Firerate, TESTED ACCORDING TO AS 1530.4-1997 SECTIONS 2, 4 & 10 AND AS 4072.1-1992


Sika® Firerate	Substrates	Element type	Minimum element thickness	Joint width
	Concrete or masonry walls (FRL 120/120/120 or -/120/120)	Wall	120 mm	10 mm
		Wall	120 mm	20 mm
		Wall	120 mm	30 mm
		Wall	120 mm	40 mm
		Wall	120 mm	50 mm
	Concrete or masonry walls (FRL 180/180/180 or -/180/180)	Wall	150 mm	10 mm
		Wall	150 mm	20 mm
		Wall	150 mm	30 mm
		Wall	150 mm	40 mm
		Wall	150 mm	50 mm
	Concrete or masonry walls (FRL 240/240/240 or -/240/240)	Wall	170 mm	20 mm
		Wall	170 mm	30 mm
		Wall	170 mm	40 mm
		Wall	170 mm	50 mm
	Solid normal weight/light- weight concrete floors (FRL 120/120/120)	Floor	120 mm	20 mm
		Floor	120 mm	30 mm
		Floor	120 mm	40 mm
		Floor	120 mm	50 mm
	Solid normal weight/light- weight concrete floors (FRL 180/180/180)	Floor	150 mm	20 mm
		Floor	150 mm	30 mm
Floor		150 mm	40 mm	
Floor		150 mm	50 mm	
Solid normal weight/light- weight concrete floors (FRL 240/240/240)	Floor	170 mm	20 mm	
	Floor	170 mm	30 mm	
	Floor	170 mm	50 mm	

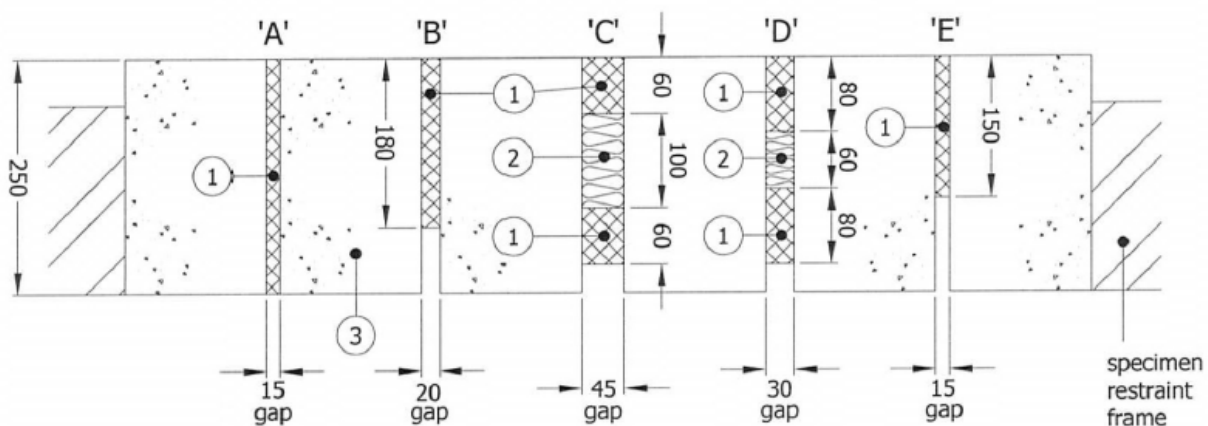
Width/depth ratio	Resistance class according to EN 13501-2	Kind of sealing
1:1	-/120/120	Single seal on fire side or double seal
2:1	-/120/120	Single seal on fire side or double seal
2:1	-/120/120	Single seal on fire side or double seal
2:1	-/120/120	Single seal on fire side or double seal
2.5:1	-/120/120	Single seal on fire side or double seal
1:1	-/180/180	Single seal on fire side or double seal
2:1	-/180/180	Single seal on fire side or double seal
2:1	-/180/180	Single seal on fire side or double seal
2:1	-/180/180	Single seal on fire side or double seal
2.5:1	-/180/180	Single seal on fire side or double seal
2:1	-/240/240	Single seal on fire side or double seal
2:1	-/240/240	Single seal on fire side or double seal
2:1	-/240/240	Single seal on fire side or double seal
2.5:1	-/240/240	Single seal on fire side or double seal
2:1	-/120/120	Single seal on fire side or double seal
1.5:1	-/120/120	Single seal on fire side or double seal
2:1	-/120/120	Single seal on fire side or double seal
2.5:1	-/120/120	Single seal on fire side or double seal
2:1	-/180/180	Single seal on fire side or double seal
1.5:1	-/180/180	Single seal on fire side or double seal
2:1	-/180/180	Single seal on fire side or double seal
2.5:1	-/180/180	Single seal on fire side or double seal
2:1	-/240/240	Single seal on fire side or double seal
1.5:1	-/240/240	Single seal on fire side or double seal
2:1	-/240/240	Single seal on fire side or double seal
2.5:1	-/240/240	Single seal on fire side or double seal



FIRE RESISTANCE OF JOINTS WITH Sika[®] Boom-FR

FIRE RESISTANCE OF Sika Boom[®]-FR, TESTED ACCORDING TO BS 476:20 1987 & ASSESSED IN COMPLIANCE WITH AS 1530.4 - 2005

Sika Boom [®] -FR	Substrates	Element type	Minimum element thickness	Joint width	Joint depth
	Autoclaved Aerated Concrete Walls 670 kg/m ³	Wall A	250 mm	15 mm	250 mm
		Wall B	250 mm	20 mm	180 mm
		Wall C	250 mm	45 mm	60 mm
		Wall D	250 mm	30 mm	80 mm
		Wall E	250 mm	15 mm	150 mm
	Autoclaved Aerated Concrete Floors 670 kg/m ³	Floor F	250 mm	15 mm	250 mm
		Floor G	250 mm	30 mm	200 mm
		Floor H	250 mm	45 mm	150 mm
		Floor I	250 mm	20 mm	140 mm
		Floor J	250 mm	15 mm	100 mm

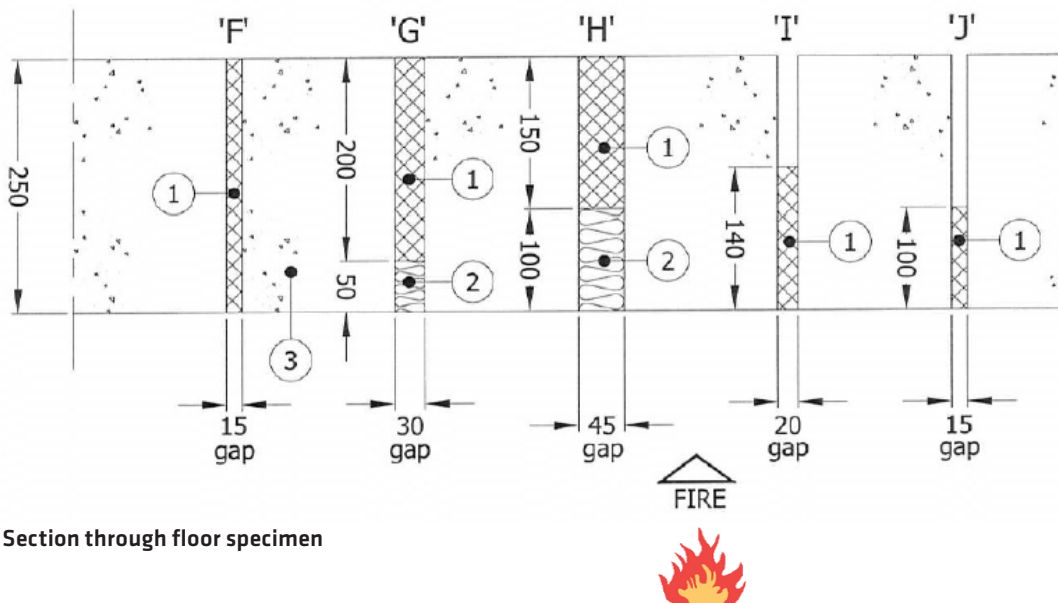


Section through wall specimen

KEY

- 1. Sika Boom-FR
- 2. Backing material - Rockwool RPB-12 Mineral rock fibre (110 kg/m³)
- 3. Autoclaved aerated concrete wall/floor (670 kg/m³)

Resistance class according to BS 476:20 1987/ AS 1530.4 2005	Kind of sealing
-/240/240	Double seal (no backing material)
-/180/180	Single seal on fire side (no backing material)
-/240/240	Double seal (with backing material)
-/240/240	Double seal (with backing material)
-/120/120	Single seal on fire side (no backing material)
-/240/240	Double seal (no backing material)
-/240/240	Single seal non-fire side (with backing material)
-/240/240	Single seal non-fire side (with backing material)
-/60/60	Single seal on fire side (no backing material)
-/30/30	Single seal on fire side (no backing material)



Section through floor specimen

FIRE PROTECTION MORTAR FOR TUNNELS

Sikacrete®-213 F: Sprayed fire protection mortar for concrete

In the case of fire in a tunnel, the concrete can be exposed to extreme temperatures within a very short time. This heat causes high vapour pressure within the concrete that fractures and destroys it from the inside. Sikacrete®-213 F is a spray-applied mortar providing an insulating layer, which protects the load-bearing structural concrete from high temperatures.



This pre-batched mortar is classed as a passive fire protection system and is applied by the wet-spray process.

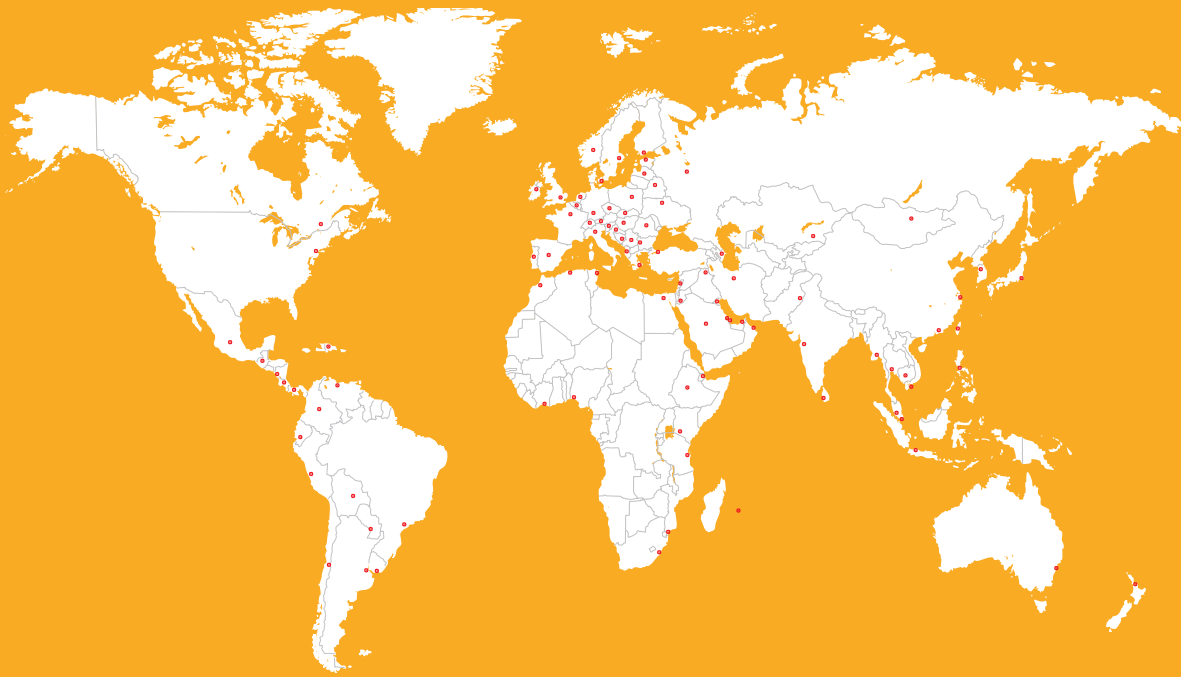
Sikacrete®-213 F is a fire protection mortar with exceptional heat insulation properties, applied in thin layers to provide reliable fire protection for concrete structures. The material is straightforward and easy to apply, with effective insulation being achieved with relatively low quantities and thickness of the material.

Sikacrete®-213 F is a fire protection mortar with high compressive strength and durability. This mortar is also designed to be frost resistant and is used in tunnels with high exposure stresses – such as lower temperatures, damp environments and abrasion from frequent cleaning.

Advantages

- Thin-layer system
- High insulation
- Ready-to-use mortar
- Easy and fast application
- Low material consumption
- Tested according to RWS, ISO 834 and HCinc
- High durability
- Coatable with Sikagard-Wallcoat

GLOBAL BUT LOCAL PARTNERSHIP



FOR MORE FIRE-RATED SEALING & BONDING INFORMATION:



WE ARE SIKA

Sika is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing and protecting in the building sector and the motor vehicle industry. Sika's product lines feature concrete admixtures, mortars, sealants and adhesives, structural strengthening systems, flooring as well as roofing and waterproofing systems.

Our most current General Sales Conditions shall apply.
Please consult the Data Sheet prior to any use and processing.



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