SEALING & BONDING
SIKA FIRE PROTECTION SOLUTIONS FOR JOINTS AND PENETRATIONS
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 and backing materials enable to build safer buildings and infrastructure.

Our fire rated sealants, foams and special backing material comply with the latest relevant standards and can be used for inside and outside applications on various substrates.

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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.

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

**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 or time about how long the product resists to fire in a system.

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

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

**FIRE RESISTANCE CLASSIFICATION**

The performance of Building materials or elements which are fire tested according to EN 1366-3 and/or EN 1366-4 are then classified according to EN 13501-2. This means the achieved results from the testing are transferred into classes considering various criteria out of which the two are relevant for linear joints and penetrations.

**E – Integrity separation function**

Integrity E 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 fire averted side.

**I – Thermal Insulating separation 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 °C temperature rise on the fire averted side).

The tested Sika system consists of:

- Fire rated sealant (yellow) combined with a standard PE backing rod.
- Standard sealant combined with a fire resistant backer rod (yellow).
- Fire retardant foam (yellow).
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 E and I cannot be derived from the classification charts and the correct product chosen.

The resistance to fire for fire rated sealants is tested in simulated real-life situations as shown in the picture above. The sealants are in an applied and cured state in joints.

For fire protection sealants, foams or backer rods a series of application situations is tested:
- Wall and floor joint
- Different joint widths
- Different substrate combinations

All the combinations lead to different times for integrity and thermal insulation based on which the products are then classified. The detailed classification according to EN 13501-2 of our products is presented on pages 10 – 15.
SIKA FIRE RATED PRODUCTS

Sikasil®-670 Fire
1-part, elastic fire rated silicone joint sealant

Key Advantages & Benefits
- Movement capability of 25% (ISO 11600 25 LM)

Certificates available
- EN 13866-4
- EN 13501-1
- BS 476-20
- UL 2079

Use
Fire resistant sealing of exterior and interior movement and connection joints in walls and floors.

Sikacryl®-620 Fire
1-part, intumescent fire rated acrylic sealant

Key Advantages & Benefits
- Intumescent property (selfexpanding under fire) that ensures tightness of penetrations in case of fire
- Easy to apply and overpaintable

Certificates available
- EN 13866-3
- EN 13501-1
- UL 2079
- BS 476-20

Use
Fire resistant sealing of interior connection joints and filling of openings and penetrations around cables and pipes.

Sika Boom®-400 Fire
1-part, high yield, fire rated polyurethane combi foam which can be applied either by application gun or attached nozzle

Key Advantages & Benefits
- Suitable for application at lower temperatures (<5 °C)
- Very good thermal insulation
- Effective sound dampening
- HFC-free

Certificates available
- EN 13866-4
- EN 13501-2

Use
Fire resistant sealing of linear wall joints and for installing fire doors or windows.

Sika® Backer Rod Fire
Universal fire resistant backer rod for movement and connection joints

Key Advantages & Benefits
- Tested with Sikalox® and SikaHylo® sealants on top.

Sika® RV-585
Fire resistant backing material for movement and connection joints

Key Advantages & Benefits
- Adapts to all irregularities of the joints. Dimensional variations of the joint width are compensated by stretching and compressing.
- Can be combined with certified Sikalox® and SikaHylo® sealants
- Fast application thanks to roll length of 20 meters.

System
To protect the backer rod against dust, moisture and mechanical influences apply certified Sikalox® or SikaHylo® sealants on top.

Certificates available
- EN 13866-4
- EN 13501-2

Use
Fire resistant sealing of movement and connection joints in walls and floors.

System
Sika® RV-585 has to be protected against dust, moisture and mechanical influences with SikaHylo®-250 Facade sealant on top.

Use
Fire resistant sealing of movement and connection joints in walls and floors.

Certificates available
- EN 13866-4
- EN 13501-2

System
Adapts to all irregularities of the joints. Dimensional variations of the joint width are compensated by stretching and compressing.

Certified with SikaHylo®-250.

Certificates available
- EN 13866-4
- EN 13501-2
## FIRE RESISTANCE OF JOINTS WITH Sikasil®-670 Fire AND Sikacryl®-620 Fire

### FIRE RESISTANCE OF Sikasil®-670 Fire AND Sikacryl®-620 Fire TESTED ACCORDING EN 1366-4 AND CLASSIFIED ACCORDING EN 13501-2

<table>
<thead>
<tr>
<th>Substrates</th>
<th>Element type</th>
<th>Minimum element thickness</th>
<th>Joint width</th>
<th>Width/depth ratio</th>
<th>Resistance class according to EN 13501-2</th>
<th>Kind of sealing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete/Concrete</td>
<td>Wall</td>
<td>150 mm</td>
<td>12 - 50 mm</td>
<td>2:1</td>
<td>E 240 or EI 180</td>
<td>Double seal</td>
</tr>
<tr>
<td>Concrete/Softwood</td>
<td>Wall</td>
<td>150 mm</td>
<td>12 mm</td>
<td>2:1</td>
<td>E 180 or EI 120</td>
<td>Double seal</td>
</tr>
<tr>
<td>Concrete/Hardwood</td>
<td>Wall</td>
<td>150 mm</td>
<td>12 - 29 mm</td>
<td>2:1</td>
<td>EI 120</td>
<td>Double seal</td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>150 mm</td>
<td>30 - 50 mm</td>
<td>2:1</td>
<td>EI 240</td>
<td>Double seal</td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>150 mm</td>
<td>12 - 29 mm</td>
<td>2:1</td>
<td>EI 240 or EI 60</td>
<td>Double seal</td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>150 mm</td>
<td>30 - 49 mm</td>
<td>2:1</td>
<td>EI 240 or EI 90</td>
<td>Double seal</td>
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<td>Wall</td>
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<td>50 mm</td>
<td>2:1</td>
<td>EI 240 or EI 120</td>
<td>Double seal</td>
</tr>
<tr>
<td>Concrete/Steel</td>
<td>Floor</td>
<td>150 mm</td>
<td>12 - 30 mm</td>
<td>2:1</td>
<td>E 240 or EI 120</td>
<td>Single seal</td>
</tr>
<tr>
<td></td>
<td>Floor</td>
<td>150 mm</td>
<td>31 - 50 mm</td>
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<td></td>
<td>Floor</td>
<td>150 mm</td>
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<td>2:1</td>
<td>E 240 or EI 30</td>
<td>Single seal</td>
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<td></td>
<td>Floor</td>
<td>150 mm</td>
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<td>E 180 or EI 30</td>
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### FIRE RESISTANCE OF Sikasil®-670 Fire AND Sikacryl®-620 Fire TESTED ACCORDING EN 1366-4 AND CLASSIFIED ACCORDING EN 13501-2

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<td>Floor</td>
<td>150 mm</td>
<td>13 - 50 mm</td>
<td>2:1</td>
<td>E 240 or EI 30</td>
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</tr>
</tbody>
</table>

Concrete: Concrete and aerated concrete with a density ≥ 760 kg/m³.
## FIRE RESISTANCE OF JOINTS WITH Sika Boom®-400 Fire

**FIRE RESISTANCE OF SikaBoom®-400 Fire, TESTED ACCORDING EN 1366-4 AND CLASSIFIED ACCORDING EN 13501-2**

<table>
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<tr>
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<tbody>
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<td></td>
<td>Wall</td>
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<td>EI 120</td>
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<tr>
<td></td>
<td>Wall</td>
<td>200 mm</td>
<td>≤ 45 mm</td>
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<td>Wall</td>
<td>200 mm</td>
<td>≤ 20 mm</td>
<td>120</td>
<td>EI 240</td>
<td>Single seal</td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>200 mm</td>
<td>≤ 35 mm</td>
<td>120</td>
<td>EI 90</td>
<td>Single seal</td>
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<tr>
<td>Concrete/Concrete</td>
<td>Floor</td>
<td>200 mm</td>
<td>≤ 10 mm</td>
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<td>Single seal</td>
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Concrete: Concrete and aerated concrete with a density ≥ 760 kg/m³
FIRE RESISTANCE OF JOINTS WITH Sika® Backer Rod Fire AND Sika® RV-585

FIRE RESISTANCE OF Sika® Backer Rod Fire/Sika® RV-585 COMBINED WITH SikaHyflex®-250 Facade
TESTED ACCORDING EN 1366-4 AND CLASSIFIED ACCORDING EN 13501-2

<table>
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<tr>
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<td>25 mm</td>
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<td>Single seal</td>
</tr>
</tbody>
</table>

Concrete: Concrete and aerated concrete with a density ≥ 760 kg/m³
Sika® Unitherm® and Sika® Pyroplast® are fire protection coatings that are applied on building materials like steel, wood, concrete and cables. Under the impact of heat the surface of the coating softens and the coating swells to from a foam. The originally millimetre-thin coating converts into a centimetre-thick, micro-porous foam that insulates the substrate against heat.

For a safe evacuation of the building in case of fire, fire protection regulations require that the structural construction elements of a building are effectively protected from losing their load-bearing stability for a certain time.

**STEEL**

Steel structures do not burn but can lose their load bearing capability and static stability under the impact of fire and heat within a few minutes. The activated fire protection coating delays the steel structure to reach the critical temperature of 500°C.

- Sika has several products for steel protection coatings in various colours.
- Sika Steel S: Solvent based coating for exterior steel structures
- Sika Steel W: Water based coating for interior steel structures
- Sika® Unitherm® Platinum: Two component epoxy coating for exterior and interior steel structures

**Wood**

Wood is a natural building material with a multitude of uses in construction. However, wood is flammable and especially when used in public buildings needs to be protected for the case of fire. Sika® Pyroplast® inhibits or delays inflammation of the wood surface and hinders the spreading of fire due to limited access to oxygen. Sika fire protection coatings combine highest protection with aesthetic advantages and do not affect the natural beauty of the wood.

**Concrete and cable**

Fire protection for concrete is used where a fire protection retrofit is necessary due to change of use or inventory of a building. Cable fire protection prevents spread of flames, drastically reduces the burning rate and lowers the flammability of the cable insulation. The so called fuse effect is terminated.

**Advantages**

- Independent fire testing according to EN 13981-8 & CF-Certification
- Classified according to ETAG 018-2: 2006 Type X & ISO 12944 C5M/I
- Fire protection performance: Classification B-s2, d0 (EN 13501-1)
- 100% total solid content. Wet film thickness = dry film thickness
- In-shop application under controlled climatic conditions
- Short application and drying times. Ready for transport and handling only after 24 hours
- Can be applied with or without a primer
- No top coat needed
- Excellent corrosion protection
- High mechanical impact, shock and abrasion-resistant, minimizing transportation damages
- Resistant against any atmospheric conditions
- Simplifies and accelerates construction process and reduces project costs
- Cleaning of the coated surface is possible with high-pressure water jet
FIRE PROTECTION MORTAR FOR TUNNELS
Sikacrete®-213 F: Sprayed fire protection mortar for concrete

In 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 insulating layers, which protect the load-bearing structural concrete from high temperatures. Both of these pre-batched mortars are classed as passive fire protection systems and are 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 mortars
- Easy and fast application
- Low material consumption
- Tested according to RWS, ISO 834 and HClfrc
- High durability
- Coatable with Sikagard-Wallcoat

In the image above a possible application of fire rated sealants and protective coatings is illustrated. A big distribution center 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 Sika Backer Rod Fire and SikaHyFlex®-250 Facade. This combination unifies efficient installation, best sealing properties and highest fire protection. Choose Sika fire protection solutions for best performance.

EXAMPLE OF FIRE RATED SEALANT APPLICATION

1. Precast concrete elements
2. Fire protection door
3. Sika fire protection sealant, Sika Backer Rod Fire & SikaHyFlex®-250
4. Sika fire protection coating
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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