In mass concrete and reinforced concrete exposed to a fire, as the temperature rises, the liquid capillary water (free water) and physically bound water (in gel pores and interstitial layers) changes to steam above 100°C. Therefore, a high pressure is built up inside the concrete and as soon as this pressure is higher than the internal tensile strength of the concrete matrix the concrete fractures and spalls. As a result, concrete is continuously eroded during a fire and its strength and structure can be completely destroyed.

**REQUIREMENTS ON PASSIVE FIRE PROTECTION**

The temperature of a fire in an enclosed concrete structure such as a tunnel or an underground car park, can reach 1000°C even within the first five minutes. Passive fire protection like thermal insulation, therefore, should meet the following requirements:

- Concrete temperatures during the fire exposure < 380°C
- Steel reinforcement temperatures during the fire exposure < 250°C
- No spalling during the fire exposure
- No delamination of the fire protection material after the fire exposure

New concrete structures can be built with integral protection from fire, e.g. by the addition of Sika polypropylene fibers to the concrete mix design. In a fire these fibers melt, thus, creating additional voids for the vapor, greatly reducing the rate of increase and level of vapor pressure. Unfortunately, the embedded reinforcing steel is still exposed to high heat transfer temperatures inside the concrete and steel loses its static and dynamic load bearing properties when this heat becomes too high. Steel reinforcement in fire-resistant concrete, generally, should not be exposed to temperatures exceeding 250°C, because at this temperature its strength is already reduced by around 20%.
Sikacrete®-213 F

Sikacrete®-213 F effectively protects concrete from the effects of extreme heat in the event of a fire. The structures just need a thin layer of Sikacrete®-213 F to withstand extensive fire stress undamaged. Sikacrete®-213 F is a cementitious fire protection mortar comprising Vermiculite as its insulating filler component. Due to a special pretreatment, our vermiculite exhibits extraordinary thermal insulation properties paired with optimal mechanical and chemical resistance. Sikacrete®-213 F has clearly demonstrated in many different national and international fire tests that it is a fire protection mortar with outstanding properties.

APPLICATION

Sikacrete®-213 F fire protection mortar is ideally suited to be used for the protection of:
- Mass concrete structures
- Reinforced concrete structures
- Tunnels and other road / rail network structures
Sikacrete®-213 F fire protection mortar systems is very easy to use and can therefore be applied very quickly. The product was especially developed to be applied using the conventional wet spray mortar machines as used for concrete surface repair mortars.
The use of additional wire mesh reinforcement is mandatory. Sikagard®-Wallcoat T can be applied as high performance protection of the trowelled surface of SikaCrete-213 F.

SURFACE FINISHES

Rough sprayed  Trowelled finish  Trowelled and protected with Sikagard®- Wallcoat T
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.

FOR MORE CONCRETE INFORMATION:

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

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