BUILDING TRUST
CONSTRUIRE LA CONFIANCE

PRODUCT DATA SHEET

Sikacrete®-213 F

PRE-BAGGED, CEMENT-BASED AND WET-SPRAYED, FIRE PROTECTION MORTAR FOR STRUCTURAL STRENGTHENING SYSTEMS AND CONCRETE

PRODUCT DESCRIPTION

Sikacrete®-213 F is a one-component, dry mix cement mortar formulated for wet spray application. Containing phyllosilicate aggregates, which are highly effective in resisting the heat of hydrocarbon fires, the material is used to provide fire protection.

WHERE TO USE

- Use on mass and reinforced concrete structures.
- As a wet-sprayed fire protection in tunnels and similar structures where exposure to fire hazards exists.
- Use on Sika® FRP structural strengthening systems to upgrade fire resistance.

CHARACTERISTICS / ADVANTAGES

- Pre-bagged, quality controlled mortar.
- Easy to prepare dry mix; just add water.
- Easy to use; employ wet spray equipment and techniques.
- Light weight, low density, minimal rebound.
- Formulation and spray method reduce consumption in comparison to dry sprayed fire protection mortars.
- Properties allow greatly reduced thickness of fire protection layer to be required.
- Does not require reinforcement up to 40 mm (1.57 in) thick.
- Sprayed mortar surface can be finished by trowel or wood float.
- 4 hour fire resistance achievable over Sika® Carbodur® and SikaWrap® systems
  ULC File BXUV.N856: beam strengthened with Sika® Carbodur® plates and SikaWrap® 103/230C fabrics
  ULC File BXUV.N857: beam strengthened with SikaWrap® 103C/100G/430G fabrics
  ULC File BXUV.X855: column strengthened with SikaWrap® 103C fabric.
- Tested to rating curves for tunnel fires according to International and European standards including ISO 834, Dutch Rating RWS and German regulation ZTV.
- Does not contribute to the formation of smoke or toxic fumes in fire.

PRODUCT INFORMATION

CSC MasterFormat®	
Packaging	12 kg (26.4 lb) bag
Appearance / Colour	Grey

Shelf Life	1 year in original, unopened packaging.
Storage Conditions	Store dry, ensuring that product is not exposed to rain, condensation or high humidity. For best results, condition product between 18 and 29 °C (65 and 84 °F) before using.
Density	Powder: Approx. 0.46 kg/L Fresh applied: Approx. 1.17 kg/L (sprayed) After hardened (28 days): Approx. 0.61 kg/L (sprayed)

TECHNICAL INFORMATION

Compressive Strength	7 days	Approx. 2 MPa (290 psi)
	28 days	Approx. 2.6 MPa (377 psi)
Tensile Strength in Flexure	1.7 MPa (246 psi) at 1:1 water:powder ratio	(28 days)
Thermal Conductivity	Approx. 0.23 W/mK at 10 °C (50 °F)	

APPLICATION INFORMATION

Mixing Ratio	Mix mortar with approx. 9.6 - 13.4 L (2.5 - 3.5 US gal.) of water per 12 kg (26.4 lb)
Yield	Approx. 18 - 22.8 L (0.63 - 0.8 ft^3) dependent on water content. Approx. 12 kg/m^2 (1.2 lb/ft^2) for a 20 mm (4/5 in) layer thickness.
Layer Thickness	Minimum: 15 mm (5/8 in) without reinforcement Maximum: 40 mm (1 ½ in) without reinforcement
Ambient Air Temperature	Minimum: 5 °C (41 °F) Maximum: 35 °C (95 °F)
Substrate Temperature	Minimum: 5 °C (41 °F) Maximum: 35 °C (95 °F)

BASIS OF PRODUCT DATA

Product properties are typically averages, obtained under laboratory conditions. Reasonable variations can be expected on-site due to local factors, including environment, preparation, application, curing and test methods. Properties tested at 23 °C (73 °F) and 50 % R.H. unless stated otherwise.

LIMITATIONS

- Important: protect stored material from exposure to rain, condensation and high humidity as moisture may penetrate packaging, causing lumps.
- For best results, condition product to 18 to 29 °C (65 to 84 °F) prior to mixing and installation. Lower temperatures may result in slower strength development and longer cure times.
- Sikacrete®-213 F should be applied by experienced applicators, especially the nozzleman, in order to ensure the mortar is correctly installed and the fire protection properties are achieved.
- The substrate temperature must be at least 3 °C (5.4 °F) above the measured dew point.
- Minimum ambient and surface temperatures: 5 °C (41 °F) and rising at time of application.
- Do not overwater and use only clean, potable water.
- Do not extend, 'bulk out' or modify the mortar in any way as this will interfere with fire resistance values.
- Minimum application thicknesses must be observed, 15 mm (5/8 in) for unreinforced mortar and 25 mm (1 in) for reinforced mortar.
- The use of wire mesh might be required when the mortar is applied in thicknesses greater than 40 mm (1 1/2 in)
- Sikacrete®-213 F must be overcoated , using an appropriate Sika® material in order to be resistant to frost, freeze/thaw cycles and de-icing salts

ENVIRONMENT, HEALTH & SAFETY

User must read the most recent corresponding Safety Data Sheets (SDS) before using any products. The SDS provides information and advice on the safe handling, storage and disposal of chemical products and contains physical, ecological, toxicological and other safety-related data.

APPLICATION INSTRUCTIONS

SURFACE PREPARATION

Concrete: Concrete substrates must be clean and sound. Remove any existing coatings, oil, grease, dirt, dust, curing agents, impregnations, wax, laitance, coatings and detritus from the surface by appropriate means, including highpressure water jetting (11 000 psi [>750 bar] or as required). The resultant substrate must have a profile of at least 1 mm, otherwise a bonding agent may be required. The concrete substrate must then be thoroughly pre-dampened to a saturated, substrate dry (SSD) condition to prevent water loss and incomplete cement hydration when the mortar is applied.
FRP Composites: Composite materials, including carbon and glass fibre, must be clean, dry and stable. Remove all carbon and glass dust or similar loose and friable material by suitable means. If epoxy resin has 'blushed', this must be cleaned prior to installing the mortar. Prime the FRP composite surface with Sikadur®-300 or Sikadur®-330 epoxy resin. Broadcast blinding aggregate into the wet prime coat to adhere the Sikacrete®-213 F fire resistant mortar. Allow the epoxy primer to cure for at least 24 hours before applying the fire resistant mortar. Acceptable aggregate is Sorelmix by Bellemare Abraisives & Minerals or equivalent. Consult Sika Canada Technical Services for guidance.

MIXING

Pour approx. 9.6 L (2.5 US gal.) of potable water into a suitably sized and clean mixing container. Slowly add Sikacrete®-213 F powder while mechanically mixing, using a heavy duty, low speed drill (300-450 rpm) with a mud mixer or other suitable paddle. Mix to a uniform consistency for a minimum of three (3) minutes. Mixing can also be done in a mortar mixer setup for direct feed into wet shotcreting equipment, maintaining the same mixing requirements as when mixing with a drill. Once mixed, if a wetter consistency is desired, increase the water content up to a maximum of 13.4 L (3.5 US gal.). Note: Do not overwater as excessive water/cement ratios may cause severe bleeding and retardation and will reduce the strength and performance of the mortar. Extending ('bulking out') the mortar with additional aggregates and incorporating any other material is not permitted as this may impact upon the fire resistance of the mortar.

APPLICATION

At the time of application concrete should be SSD (Saturated Surface Dry) with no surface water visible. FRP composite surfaces should be dry and clean. Resin surfaces must have an acceptable contact surface to which the mortar will adhere.

Where a risk of vibration or mechanical damage to the surface exists, the use of a light wire mesh reinforcement is recommended in order to prevent any debonding of the mortar layer.

Sikacrete®-213 F is applied by the wet-spray, dense stream or wet-spray, thin stream method to vertical and overhead surfaces. Application equipment should include wet-spray screw pump systems, such as an Aliva® rotor system, a Putzmeister®, Bunker® concrete spray system or similar.

To achieve the optimum physical characteristics, the spray nozzle must be handled by a trained and experienced operator. Position spray nozzle 450 - 600 mm (18 - 24 in) perpendicular to the surface. This will minimize rebound, create a smoother finished surface and will flatten out when applied at the proper pressure.

Allow Sikacrete®-213 F to set sufficiently before finishing or scraping to the desired lines. When application requires an aesthetic or protective coating contact Sika Canada Technical Services for guidance.

The surface of the freshly applied mortar can be finished for up to one hour after application. This finishing time will be dependent upon local conditions, including temperature and humidity.

CURING TREATMENT

As per ACI 308 recommendations for cement concrete, curing is required. To achieve performance consistent with the properties recorded on this Product Data Sheet curing must done using recognized curing methods, such as, mist spray or water/damp burlap, white polyethylene film or approved curing compound. Curing must start immediately after finishing. Protect freshly applied mortar from direct sunlight, wind rain and frost.

CLEAN UP

Remove Sikacrete®-213 F from tools and mixing equipment with water. Cured product can only be removed mechanically.

LOCAL RESTRICTIONS

Note that as a result of specific local regulations the declared data and recommended uses for this product may vary from country to country. Consult the local Product Data Sheet for exact product data and uses.

LEGAL NOTES

The information, and in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such

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Sika Canada Inc.
Head Office
601, avenue Delmar
Pointe-Claire, Quebec
H9R 4A9
1-800-933-SIKA
www.sika.ca

Other locations
Boisbriand (Quebec)
Brantford; Cambridge;
Sudbury; Toronto (Ontario)
Edmonton (Alberta)
Surrey (British Columbia)