

Steelguard CM 4701

Spray Applied Fire Resistant Tunnel Coating

Product Data/ Application Instructions

- **Passive fire protection for use in tunnels**
- **Spray applied**
- **Durable, impact resistant**
- **Modified vermiculite cement**
- **Tested to meet recognized international tunnel standards**
- **Most fire ratings achieved in one single application**
- **Top coat systems to meet required colour and reflectance levels**
- **Easy clean top coats**
- **Up to 4 hours insulation**

Typical Uses

Steelguard CM 4701 is a tough, hard and highly stable passive fire protection for use on concrete & steel tunnel segments and walls. The spray-applied coating provides durability and resistance to tunnel conditions such as exhaust fumes, dirt & moisture exposure. With the appropriate PPG finishes any requirements with respect to colour, appearance, gloss reflectance and cleanability can be met. It does not rely on any form of expansion, foaming or chemical reaction to impart its fire protection properties.

Approvals

Steelguard CM 4701 is tested to resist fire conditions in tunnels meeting recognized international tunnel standards including the RATB in Germany, Eurocode's 1, 2 & 3 (EN 1991-1-2; EN 1992-1-2 & EN 1993-1-2) and the Dutch Rijkswaterstaat in cooperation with the TNO Institute using the 'RWS 97-CVB-R0710 Hydrocarbon time/temperature curve. Project specific tunnel fire test may be required. For suitable tunnel system specification contact PPG for details.

Physical Data

Appearance	sprayed textured finish, usually trowelled to close the surface
Colour	off white
Components	1 (excluding water/additives)
Dry density of the powder.....	465 kg/m ³
Nominal dry density applied ...	725-775 kg/m ³
VOC	0 g/l
Curing mechanism	Hydrolisation
Thickness requirements	Contact PPG for details
Nominal usage at 25 mm thickness	
Per 25 kg sack.....	1.35 m ²
Per tonne.....	54 m ²
Thermal conductivity tested according to BS 874 : 1973 at mean temperature 10°C/50°F.....	
	0.15W/mK

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Surface Preparation

CONCRETE

Concrete surfaces should be suitably cleaned to remove any dust and all traces of oil, grease and salts, including any mould release agents. Concrete should not have any condition preventing good adhesion. High Pressure Water Washing can be recommended for optimal preparation. Concrete may require a bonding coat prior to the application of Steelguard 4701.

STEEL

Abrasive blast to Sa 2½ ISO 8501-1 and apply the specified PPG primer. Steelguard CM 4701 may be applied directly to bare steel for internal dry C1 environments only. The surface must be dry and free of dust, salts, grease and other contaminants immediately before coating. If the steel is already primed, check compatibility with PPG. Compatible primers may require the application of either a bonding coat or Steelguard CM 4706 prior to Steelguard CM 4701 being applied – please refer to PPG for guidance. Steelguard CM 4701 has a pH value of 12 at application which could react with certain primers such as Alkyd based. Steel coated with an alkyd or unknown primer must be treated with Steelguard CM 4706 emulsion primer sealer prior to the application of Steelguard CM 4701.

MESH

May be required depending on the tunnel design.

Mixing – NB : always use whole sacks

NB : For the bonding coat ½ the water is replaced with Steelguard CM 4705 SBR additive.

Steelguard CM 4701 is typically mixed with a slow speed conventional ribbon or paddle plaster mixer. The mixer must be clean and free from all previously mixed materials.

Approximately 22.5±2# litres of fresh clean water is required per 25kg sack of Steelguard CM 4701. Empty the entire contents of the Steelguard CM 4701 in to the mixer and gradually add whilst mixing just less than half the full amount of water. "Pre-mix" and leave the product to wet for at least one minute. After starting the mixer again remaining# water is added to achieve an even, stiff consistency with the product typically clinging round the rotating paddle without slipping down. Total mixing time of pre-blending plus the final mixing should be less than 3 minutes.

(# Actual amount of water required per sack will vary slightly depending on the temperature and site conditions, it is recommended that less than the full amount is used initially, with some of the remainder added later to achieve correct consistency)

Application Equipment

Use a mechanical piston or rotor stator type pump equipped with a high-pressure plaster type hose avoiding brass or aluminium type couplings. The flexible hose length should not exceed 100 meters, with following typical length.

I.D. 75 mm (3")	maximum 100 meters
I.D. 50 mm (2")	maximum 50 meters
I.D. 35 mm (1 ½ ")	maximum 15 meters
I.D. 30 mm (1 ¼ ")	maximum 8 meters

For longer lengths use metal pipe with a I.D. of 65 -75 mm
Use as spray nozzle assembly a minimally 25-32 mm nozzle with a 10 to 13 mm nozzle orifice and a rubber blow-off cap. Atomising air should be 2-4 bar (28-57 psi) at the nozzle.

Drying Characteristics

Drying times will vary considerably depending on ambient conditions, ventilation and humidity.

The Steelguard CM 4701 typically sets in 6 hours.

The minimum substrate temperature of 4°C/39°F should be kept before, during and 24 hours after the application. Protect from rain, running water, frost or heat exposure during this period.

Maximum ambient application temperature is 40°C/104°F.

Application Data

Substrates Concrete/Steel

Application

Application method..... mortar spray

Environmental Conditions

Relative humidity: up to 85%
Surface temperature: 4 - 40°C 41 - 104°F

Mixed Steelguard CM 4701 can be damaged from frost. Surface temperature must be at least 2°C/36°F above the dew point to prevent moisture condensation on the surface. All work should be protected from extremes of heat and frost during and after spraying and from direct rain for at least 24 hours after spraying.

Potlife (at 20°C/68°F) 30 minutes (less than 30 minutes for bonding coat)

Thinner/Cleaner Fresh Potable Water

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Short Form Application Procedure*:

1. If required a bonding coat (see mixing details) is applied to a nominal thickness of 2 mm. Use minimum air pressure, achieving a heavy textured finish, providing a mechanical key to the next coat of Steelguard CM 4701. At least 20-50% of the entire steel surface should be covered.
2. Steelguard CM 4701 should be sprayed at a nominal dry density of 725-775 kgs/m³. Maximum thickness per coat depends on orientation of the surface. Steelguard CM 4701 can normally be applied at 10-25 mm thickness per coat. When the required final thickness is above 25 mm an initial coat at 10-12 mm should be applied followed after initial setting with second coat achieving a better overall finish. Caution should be exercised for application to extended vertical surfaces.
3. Initial setting of Steelguard CM 4701 is 4-8 hours depending on ventilation, temperature and relative humidity. Successive coats should preferably be applied directly after initial setting leaving the finish 'as applied' providing maximum key for subsequent coats. When cured Steelguard CM 4701 should be wetted before application of a further coat of itself.
4. Air pressure should be regulated to achieve desired texture. Too much air results in a fine texture, over-spray, rebound and increased density, increasing material consumption.
5. To achieve the required even rough surface with Steelguard CM 4701 it should be applied keeping the gun tip between 250-500 mm from the work face, the gun angled as near as possible to 90 degrees to the surface. The gun should not be held stationary, but kept moving in long even passes across the work face.
6. The final coat of Steelguard CM 4701 can be left as sprayed or lightly levelled by trowel. If a textured finish is required after levelling by trowel this can be achieved by spray application using a small nozzle held back from the surface. It should be noted that trowelling may result in superficial hairline cracks.
7. Where horizontal surfaces are to be coated the lowest areas should be sprayed first to avoid subsequent application on to loose overspray which would result in poor adhesion.
8. Clean after use mixer, pump lines and spray gun thoroughly with fresh water. Lines should be cleaned with a sponge flushed through with fresh water. Spray gun and nozzle should be removed and cleaned separately. Ensure the air supply line is turned on separately to remove all material contamination.
9. Steelguard CM 4701 should be left at least 7 to 10 days prior to application of top coat. Surface should be clean, dry, sound and free of contamination. Colour of the Steelguard CM 4701 visibly changes as it dries out to achieve the off white final appearance.

*A detailed application manual for tunnel applications is available from PPG and should be followed by PPG trained and recognized contractors.

Shipping Data

The Steelguard CM 4701 is packaged in multi-walled, polyethylene lined, kraft paper sack, shrink wrapped on pallets.

Pack size	25 Kgs sack
Packaging.....	40 Sack per pallet
Shipping weight	1000 Kgs per pallet

Sacks should be stored in a dry, ventilated area, off the ground, under cover. It is preferable to leave the sacks on the original pallets until use. As long as dry conditions are maintained, the temperature at which sacks are stored is not critical

Shelf life	1 year from shipment date when stored indoors in unopened, packaging at 5 to 40°C (41 - 104 °F).
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Density checks

In order to check material consistency the density of the slurry should be checked at the end of the pumping line at the start of the work and regular intervals thereafter.

Ensure that the samples are free from air voids.

Acceptable density ranges:	
At the mixer	900 – 1000 kg/m ³
At the end of the spray line	1050 – 1200 kg/m ³

Surface finish

It is recommended before the start of a contract is to prepare a sample of the surface finish which is agreed by the client and is kept during the contract as a reference.

Coating thickness

The coating thickness should be checked by means of a depth gauge at least once every square meter, according BS 8202 part 1. Particular attention should be given to the thickness over flanges and on edges.

Before using the product, read the label on the sack and consult the material safety data sheet

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Safety

Since improper use and handling can be hazardous to health and cause of fire or explosion, safety precautions included with Product Data/Application Instruction and Material Safety Data Sheet must be observed during all storage, handling, use and drying periods.

Warranty

PPG warrants its products to be free from defects in material and workmanship. PPG's sole obligations and Buyer's exclusive remedy in connection with the products shall be limited, at PPG's option, to either replacement of products not conforming this warranty or credit to Buyer's account in the invoiced amount of the non-conforming products. Any claim under this warranty must be made by Buyer to PPG in writing within five (5) days of Buyer's discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life, or one year from the delivery date, whichever is earlier. Buyer's failure to notify PPG of such non-conformance as required herein shall bar Buyer from recovery under this warranty.

PPG makes no other warranties concerning the product. No other warranties, whether express, implied or statutory, such as warranties of merchantability or fitness particular purpose, shall apply. In no event shall PPG be liable for consequential or incidental damages.

Any recommendations or suggestion relating to the use of the products made by PPG, whether in its technical literature, or response to specific enquiry, or otherwise, is based on data believed to be reliable; however, the products and information are intended for use by Buyer's having requisite skill and know-how in the industry, and therefore it is Buyer to satisfy itself of the suitability of the products for its own particular use and it shall be deemed that Buyer has done so, as its sole discretion and risk. Variation in environment, changes in procedures of use, or extrapolation of data may cause unsatisfactory results.

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Due to PPG's policy of continuous product improvement, the information contained in this Product Data/Application Instructions sheet is subject to change without notice. It is the Buyer's responsibility to check that this issue is current prior to using the product. For the most up-to-date Product Data/Application Instructions always refer to the PPG Protective & Marine Coatings website at www.ppgpmc.com

To avoid any confusion that may arise through translation into other languages, the English version of the Product Data/Application Instructions will be the governing literature and must be referred to in case of deviations with product literature in other languages.

Condition of Sale

All our transactions are subject to our Terms and Conditions of Sale.

