

# Steelguard CM 4704

Spray Applied Fire Resistant Coating / Internal Grade

## Product Data/ Application Instructions

- **Passive fire protection for steel framed structures**
- **Spray applied**
- **Robust coating for internal C1/C2 environments (ISO 12944)**
- **Modified vermiculite cement**
- **Up to 4 hours fire protection of structural steel**
- **Most fire ratings achieved in one single application**

### Typical Uses

Steelguard CM 4704 is a tough hard and highly stable passive fire protection for use on internal structural steel. The spray-applied coating shows excellent mechanical resistance. It does not rely on any form of expansion, foaming or chemical reaction to impart its fire protection properties.

### Approvals

Steelguard CM 4704 has been fully tested on structural steel beams and columns for up to 4 hours fire resistance in accordance with British Standard 476 Part 21 1987. The product is rated 'non combustible' to BS 476 Part 4 1984 and complies with the performance requirements of 'Class O' as defined in the UK building regulations. Steelguard CM 4704 has also been tested and assessed to several national fire test standards. Please contact your PPG representative for details.

### Systems

Steelguard CM 4704 can be applied clean bare steel. To hold the blast a suitable epoxy primer like Amercoat 71 can be used. If the steel is already primed, check with PPG on suitability.

- **Although no topcoat is required for internal applications decorative finishes can be offered please check with your PPG representative for details**

### Physical Data

Appearance .....	sprayed textured finish, usually trowelled to close the surface
Colour .....	grey
Components .....	1
Nominal dry density .....	350-400 kg/m <sup>3</sup>
VOC .....	0 g/l
Curing mechanism .....	Hydrolisation

Loading requirements: In order to establish the thickness required to give the specified fire resistance, reference should be made to the products Hp/A (A/V) values or limiting temperature tables. Contact your PPG representative for full details.

Nominal usage at 25 mm thickness

Per 25 kg sack.....	2.65 m <sup>2</sup>
Per tonne.....	106 m <sup>2</sup>

Thermal conductivity tested according to BS 874 : 1973 at mean temperature 10°C/50°F.....  
0.09W/mK

### Application Data

Substrates .....	Steel
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#### Application

Application method.....	mortar spray
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#### Environmental Conditions

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

Mixed Steelguard CM 4704 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)
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Thinner/Cleaner .....	Clean Potable Water
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## Surface Preparation

Abrasive blast to Sa 2½ ISO 8501-1 and apply the specified PPG primer. Steelguard CM 4704 may be applied directly to bare steel for internal dry C1 environments. 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 4704 being applied – please refer to PPG for guidance. Steelguard CM 4704 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 4704.

## Mixing – NB : always use whole sacks

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

Steelguard CM 4704 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 25 +/- 442 litres of fresh clean water is required per 25 kg sack of Steelguard CM 4704. Empty the entire contents of the Steelguard CM 4704 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 4704 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, protecting work from rain, frost or heat exposure

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

## Mesh reinforcement

In the following cases the Steelguard CM 4704 must be combined with reinforcement.

On structural steelwork where the web depth exceeds 650 mm or the flange width exceeds 325 mm.

On any steel section where the depth or breadth of the section or the circumference of a hollow section exceeds 650 mm.

On underdeck areas.

On castellated beams where the web depth exceeds one meter.

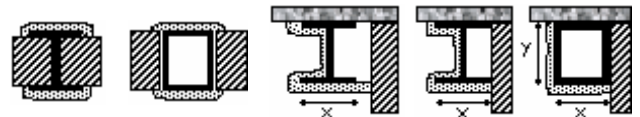
On flat surfaces of painted steel where there is more than 1 meter of uninterrupted surface in any direction.

On structural steelwork where the thickness of the Steelguard CM 4704 coating exceeds 60 mm.

On surfaces subjected to excessive vibration.



With above 7 steel shapes mechanical retention is not normally required because of existence of re-entrant angles or encapsulation of the section by the coating.



Reinforcement is required in all above 5 shapes, irrespective of coating thickness. (See also BS 8202: part 1)

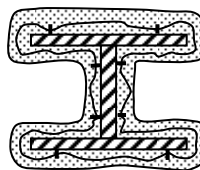
The mesh may be fixed to wall or steel work but never to both. If using expanded metal mesh squares fixed with speed fix washers or non-continuous reinforcement, pins should be fitted at 250 mm centres. Continuous mesh reinforcement may also be fixed to the flange of the section by means of pins & speed pin washers.

If distance X exceeds 160 mm, mesh reinforcement should be fixed to the bottom flange. Mesh reinforcement should only be fixed to the steel section when bridging gaps. When distance Y exceeds 325 mm mesh reinforcement should be fixed to a steel section.

## Mesh specification

Use galvanized chicken wire of 50 mm mesh size with 1.0 mm wire diameter. It should be fixed using spot welded pins at approximately 400 mm centres with a staggered pitch. The mesh should be substantially located within the middle third of the coating, at least 6 mm clear of the steel substrate. Use self-locking speed-fix washers or speed clips over the pin to hold the mesh at the fixing point.

The mesh must overlap by at least 40 mm at joints. No more than three layers should be allowed at overlaps. Self-adhesive glued pins should **never** be used on fire protection specifications.



Location of reinforcing mesh fitted to welded pins with spring clips to retain the mesh in position

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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 4704. At least 20-50% of the entire steel surface should be covered.
2. Steelguard CM 4704 should be sprayed at a nominal dry density of 350-400 kgs/m<sup>3</sup>. Maximum thickness per coat depends on orientation of the surface. Steelguard CM 4704 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 4704 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 4704 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, bounce-off and increased density, increasing material consumption.
5. To achieve the required even rough surface with Steelguard CM 4704 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 4704 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 4704 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 4704 visibly changes as it dries out to achieve the off white final appearance.

\*A detailed application manual for Steelguard CM 4704 application is available from PPG and should be followed by PPG trained and recognized contractors.

## Shipping Data

The Steelguard CM 4704 is packaged in multi-walled, polyethylene lined, kraft paper sack, shrink wrapped on pallets.

Pack size .....	25 Kgs sack
Packaging.....	40 Sacks 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 on at the start of the work and on regular intervals.

Ensure that the samples are free from air voids.

Acceptable density ranges:	
At the mixer	650 – 750 kg/m <sup>3</sup>
At the end of the spray line	900 – 1050 kg/m <sup>3</sup>

## Surface finish

It is recommended before the start of a contract 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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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.

