

Promat



Structural
fire protection

CAFCO[®] 300

Steelwork Sprayed Coating Fire Protection Building & Construction Solutions

Technical manual



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Promat sprays coating

Promat fire sprays are designed to protect structural steel, concrete and also steel air ducts against fire. They are supplied as a powder, which is then mixed with water to produce a pumpable mixture. This is then pumped through a hose, mixed with compressed air at the nozzle so that it can be applied or sprayed on to the substrate that is being protected.

Promat have both plaster and cement based fire sprays and the selection of the product to be used will be based on a number of criteria such as environment, substrate and type of protection required.



Fire test furnace

Research and development drives growth of sophisticated fire protection technologies

Fire protection nowadays is divided into two broad categories. These are described as “active” and “passive” systems.

Active fire protection measures are those that use an integrated system consisting of sprinklers and alarms that require electricity and water to realise their full potential in fire situations.

On the other hand, passive fire protection systems do not require power or water to operate in the event of a fire. They are designed and built into the structure to protect on demand, as and when necessary.

It is the research and development of passive fire protection that Promat has devoted many years and considerable resources. Today, Promat is long recognised worldwide as a leading provider of passive fire protection systems, a reputation reinforced by more than six decades of cutting edge research and development.

Promat runs continual investigation programmes at the Promat Research & Technology Centre (PRTC) facilities in Belgium. The PRTC testing laboratories are accredited to EN45001. The PRTC furnaces are state-of-the-art and offer multiple possibilities for the testing of construction systems under development. Promat also has R&D facilities in

Australia and Malaysia which are used extensively to ensure all Promat systems are suited to the Asia Pacific markets.

All Promat materials are manufactured in accordance with accredited EN ISO9001: 2000 and ISO14001 quality and environmental management systems. Comprehensive testing of all Promat products and systems has been carried out by independent and nationally approved laboratories around the world in order to meet the relevant sections of BS476, AS1530, EN and ISO etc, as well as many other international test standards.

The accumulated knowledge and technical expertise is available to all clients and customers who specify Promat passive fire protection. Full technical and sales support teams are available to provide information and assistance to help in the design and installation of all Promat fire protection solutions.

CAFCO® 300

Vermiculite and gypsum based wet mix spray



Product description

CAFCO® 300 is a spray or trowel applied, single package factory controlled premix, based on vermiculite and gypsum.

Steel structures protected with CAFCO® 300 have undergone fire resistance tests up to 240 minutes in approved independent laboratories to recognised standards throughout the world, including:

- Australia (AS 1530: Part 4: 2005)
- Belgium (NBN S 21-202: 1980)
- France (August 1999 Ministry Decree)
- Germany (DIN 4102: 1977-2009 and DIN EN 1363-1: 1999-2010)
- Harmonised European Standard ENV 13381: Part 4: 2002
- UK (BS 476: Part 6: 1989, Part 7: 1997 and Part 21: 1987)
- USA (ASTM E119: 1998)

Material properties	
Color and finish	Off-white, monolithic, spray texture
Alkalinity	8.0-8.5pH
Cure	By hydraulic set
Initial set	2 to 6 hours without accelerator at 20°C (68°F) and 50% RH
Theoretical coverage	217m ² /tonne at 15mm thick
Packaging	20kg bag
Storage	Protected from frost, excessive heat (above 45°C) and strong radiant sunlight
Shelf life	months12

Physical Performance		
Density	ASTM E605	310kg/m ³ ±15% without accelerator, 310kg/m ³ -10% (approx.) with accelerator
Compressive strength	ASTM E761	1.22kg/cm ²
Deflection	ASTM E759	No cracking, delamination or spalling
Impact resistance	ASTM E760	No cracking or delamination
Corrosion resistance	ASTM E937	Does not promote corrosion of steel and does not require application over primed steel
Air erosion resistance	ASTM E859	No erosion

Reaction to Fire & Thermal Properties			
Combustibility		Surface burning	Thermal conductivity
Non-combustible:	BS 476 ASTM E136	Class 0 (flame spread & smoke developed):	ASTM C518: 0.078W/mK
		ASTM E84	

All physical and mechanical values are averages based on standard production and tested according to internal procedures. The typical values are given for guidance. The figures can change dependent on the test methods used. If a particular value is of prime importance for a specification, please consult Promat Technical Department. CAFCO® 300 is manufactured under a quality management system certified in accordance with ISO 9001: 2015.

Promat

Equipment

Mixer

A drum, paddle or ribbon-type plaster mixer (which matches the capacity of the pump and material volume) with a safety cover, rubber tipped blades and provision for quick dumping of mix directly into the pump hopper is required. Mixers with a 155 litres capacity or larger with minimum operating speeds of 35-40rpm are required.

A water-metering device is required to ensure constant water quality per mix. All water meters must be calibrated to ensure proper water to product ratio.



Air compressor

The product requires approximately 62 litres of atomised air for each kilogram of slurry sprayed. A compressor with a capacity of 260-560 litres/minute of free air is recommended for smaller jobs.

A compressor with a capacity of 850-1,130 litres/minute of free air is recommended for large projects. The compressor must be capable of providing a minimum of 4.1-5.5kgf/cm² of pressure at source and 2.7kgf/cm² at the nozzle.



Air hose

Air hoses should have a minimum 10mm (3/8") inside diameter.



Material hose

FOR PISTON PUMP

Material hoses for use in excess of 30m (central pumping):

Diameter	Maximum length
76mm	15m
51mm	61m
35mm	16m
32mm	8m
25mm	8m

NOTE: The use of hose lengths and diameters depends on the density of product application.

FOR ROTOR/STATOR PUMP

The material hose should be reinforced, smooth interior vulcanised rubber as used in the plastering industry. This hose should be capable of handling high pressures consistent with the pump being used. For example:

- 1) Flexible hose (whip hose) – when using 32-51mm inside diameter (ID) material hose, a 3m section of 25mm ID high-pressure hose may be used for sprayer mobility.
- 2) Hoses for use with up to 30 metres – 25mm diameter in 3m length, or 32mm diameter in 27m length.

Pump

PISTON PUMP

These pumps are the most versatile and can be used for low to high production applications. They should be equipped with a pressure release valve, blow-out cap and ball, rated for 54-68kg/cm³ at the manifold. Piston pumps have two means of operation, i.e. mechanical and hydraulic.



ROTOR/STATOR PUMP

These pumps are used for lower production rate jobs and on jobs where the equipment must be located on the floor to be sprayed. Only open throat, screw feed pumps with a soft rubber stator are recommended.



Hose couplings

Screw on type quick connect/disconnect couplings that do not restrict material flow are recommended. A constant inside diameter must be maintained. A long tapered reducer must be used when a reduction in hose diameter is necessary. A safety strap or sling should be used on all hose connections to prevent injury due to coupling failure.

NOTE: Brass or aluminium couplings and reducers should not be used.

Standpipe

Metal standpipe 65-75mm ID must be used when the pumping hose exceeds three storeys, 11m or when the required hose length exceeds 102m.

NOTE: Maximum standpipe height depends on the type of pump being used. Please ensure the standpipe height is compatible with the pump being used, and both standpipe and transfer hose are tightly secured and supported.

STANDPIPE COUPLINGS

Full taper threaded galvanised steel pipe clamped couplings with ground unions are recommended.

ELBOWS

Ninety degree rigid elbows with minimum 1m radius shall be provided from the standpipe to the hose.

Spray nozzle assembly

The spray nozzle assembly should consist of a minimum 25mm ID aluminium tube with a blow off tube with a blow off type nozzle cap, nozzle orifice, material and air control valves.

13-16mm diameter nozzle orifices with shroud are suitable. NOTE: For 310kg/m³ density a 16mm orifice with tip shroud is recommended.



Additional equipment

PUMP REMOTE CONTROL

A remote power line and switch (or air line and valve for the pneumatic feed control system) are necessary for on/off control of the sprayer.

POWER LEAD-IN CORD

When using electric equipment it is necessary to size the proper gauge wire to the maximum length of cord being used to prevent excessive voltage drops.

THICKNESS GAUGE

A CAFCO® designed thickness gauge should be used for measuring the sprayed material thickness. Inspection or applicator types are available. For central spray applications where the sprayman is out of voice contact with the loader, the use of radio contact is essential.

SCAFFOLDING

Rolling scaffold should be provided for applications not accessible from the floor. Scaffold should have large locking wheels that roll easily and a grated floor or platform with holes large enough to allow material through under the spray applicator's feet. Scaffolding should be equipped with safety railings around its perimeter approximately waist-high and be in compliance with all safety requirements.

TARPAULIN

The use of tarpaulins around the perimeter of the sprayed floor will prevent the sprayed materials from damaging valuable goods (e.g. vehicles) parked outside the immediate area.

Tarpaulins may also be used to enclose areas in cold weather. This procedure in conjunction with job site heat will maintain correct ambient temperatures. The tarpaulins help prevent overspray from being blown around during windy days thus minimising waste.

OTHER TOOLS

A lockable tool box is necessary on all projects. It should contain at least the following items, i.e. additional fuses, channel-locks, duct tape, dust masks, extra belts for machines, extra blow-out cap and ball, extra nozzle caps, extra remote control line, extra safety goggles/glasses, extra spray tips, extra water line and washers, fire extinguisher, grease gun, hard hats, mole grips, pipe wrenches, razor knife, scrapers, brooms, shovels, screwdrivers, spanners, sponges, volt/amp meter.

Project set-up

Efficient project set-up results in an economical installation. Please ensure all site requirements are met.

Equipment

Select a ground level location that is protected from weather, well drained, easily accessible to truckload deliveries, well ventilated (if using liquid fuel powered equipment) and easily accessible to power and potable water.

A stable platform should be built to allow the machine operator to easily feed the CAFCO® 300 into the mixer. CAFCO® 300 should be stacked off the ground so that it is protected from weather and moisture and is easily accessible to the mixer operator.

Standpipe

Select a standpipe location at either the exterior of a building, through a pipe chase, through an elevator shaft or through a stairwell in the interior of a building. Standpipe should be permanently located until all application works are completed. The standpipe should be erected in a well-supported vertical position. A minimum 1m radius elbow should be connected to the top and bottom of the standpipe. This will assist in an easy connection from the standpipe to the transfer hose and prevent the hose from kinking.

Transfer hose

Transfer hose must be 51-76mm in diameter.

The hoses should be kept as straight as possible, avoiding tight bends. Hose lengths should be kept to a minimum.

Tarpaulin

First, secure the tarpaulin to the bottom of the perimeter columns on the floor being sprayed. Next, the tarpaulins are draped down over the outside of the building and secured to the bottom of the perimeter columns on the floor being sprayed.

Repeat the procedure until the perimeter columns on the floor being sprayed are enclosed. Move the tarpaulins by unfastening the tarpaulin bottom and lifting it to the floor above the next one to be sprayed. Secure to the bottom of the perimeter columns on that floor.

Care must be taken to clean any materials from the tarpaulin surface so that they do not fall off the building when the tarpaulins are moved.

Continue the above sequence upward as the job progresses.

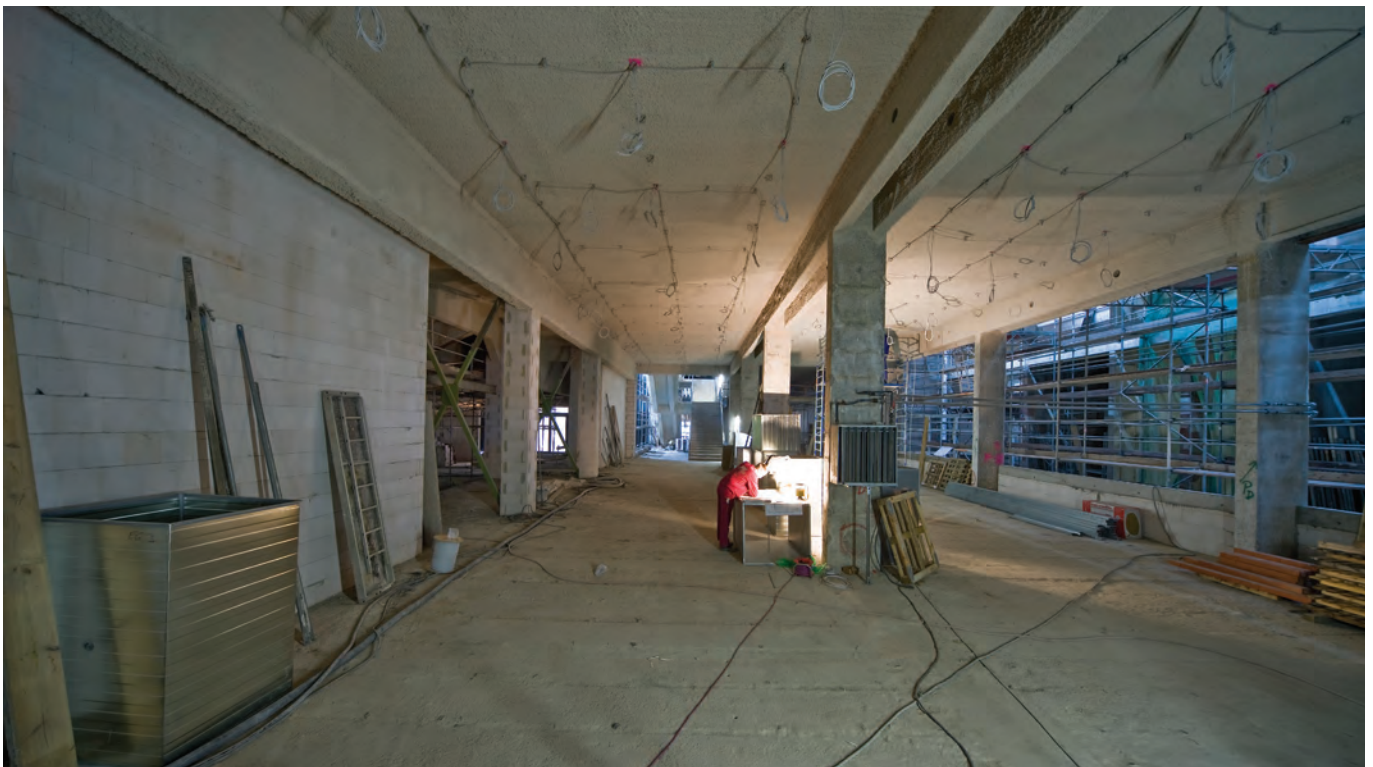
Masking

Mask any masonry or painted surface that may be exposed to CAFCO® 300 overspray. CAFCO® 300 overspray may stain masonry structure or corrode aluminium and anodised aluminium surfaces. Care should be taken to adequately avoid that. Polyethylene or polypropylene plastic film and duct tape are recommended for this purpose.

Remote control of application machine

Electrical lines for remote control of application machines should follow standpipe and hoses to nozzle.

A remote power line and switch (or air line and valve for the pneumatic feed control system) are necessary for on/off control be the sprayer.



Preparation of base surfaces

Cleaning substrates

Proper adhesion of CAFCO® 300 depends on clean substrates. Avoid the following conditions prior to the application of CAFCO® 300:

- Oily steel decks (residual roll oils). The presence of oil on a galvanised floor deck may be detected by spraying a fine mist of water onto the deck. If the water moves or collects into large "fish eye" droplets, there is probably an oil present. Please consult the steel deck manufacturer for methods of removing the oil.
- Loose mill scale, loose rust or dirt.
- Concrete form oils.
- Painted steel surfaces (excluding certain primer types).
- Other foreign materials that may prevent proper bonding to the substrate. Please consult the substrate manufacturer for cleaning recommendations.

Flexible substrates

Proper adhesion of CAFCO® 300 depends on rigid substrates and the absence of damaging forces such as impact or excessive deflection. Avoid the following conditions prior to the application of CAFCO® 300:

- Roof traffic before the CAFCO® 300 has set.
- Excessive vibration.
- Deck spans with greater than L/240 mid point deflection.

Recommendations of typical substrates

GALVANISED FLUTED FLOOR DECK

Galvanised fluted floor deck free of paint/primers, oil and coatings can receive direct application of CAFCO® 300. Do not apply CAFCO® 300 to structural steel prior to the completion of concrete work on the supported floor. Clips, hangers, supports, sleeves and other attachments to the substrate are to be placed by others prior to the application of CAFCO® 300.

SUSPENDED EQUIPMENT

Ducts, piping, conduit or other suspended equipment are to be installed after the application.

BARE (UNPAINTED OR UNPRIMED) STRUCTURAL MEMBERS

Bare steel structural members free of loose rust, loose mill scale or dirt can receive direct application of CAFCO® 300. Remove all loose rust, loose mill scale or dirt. These conditions are typically corrected by wire brushing or sandblasting.

METAL LATH

CAFCO® 300 may be applied directly to either painted or galvanised metal lath. Metal lath should be secured so that it is rigid. Non-rigid lath may cause delamination of CAFCO® 300. Refer to metal lath manufacturer's recommendations for installation instructions.

For substrates other than those listed above, please consult Promat.

Primed structural steel beams and columns

Primed or painted structural steel may adversely affect the bond of spray applied fire resistive material thus jeopardising the fire resistance provided by the material. When primed or painted structural steel is specified, please refer to Promat.

Wide flange steel beams and columns may receive direct protection provided all of the following conditions are met:

- For beams, the web depth does not exceed 650mm and the flange width does not exceed 325mm.
- Special consideration may have to be given for need of reinforcement or additional support if the sections as positioned on site do not allow for encapsulation or if there is no re-entrant detail. For greater details please refer to BS 8202: Part 1 or AS 3784: Part 1.
- Where the conditions of CAFCO® 300 application must be reinforced with a corrosion protected wire mesh aperture 25mm, 30mm or 50mm mesh x 0.9mm thick, the mesh should be secured to the structural member with welded pins at 500mm centres. The mesh should be approximately located in the middle third of the sprayed area.



Adhesive, sealer, pre-coat

Cafco BONDSEAL is a clear drying and water dispersible coating suitable as an adhesive and/or sealer in conjunction with application of CAFCO® 300.

Adhesive

As an adhesive, thoroughly mixed to a ratio of 3 : 1 (Cafco BONDSEAL : potable water) and applied as a continuous coating or as a strip of spatter application until the Cafco BONDSEAL begins to drip. Apply at a rate of 11.1m²/litre for non-porous surfaces or 7.4m²/litre for porous surfaces as mixed.

Whilst the adhesive is still tacky apply the first 10-13mm coating of CAFCO® 300. Allow to set overnight and then apply the remaining coats.

Sealer or pre-coat

As a sealer, thoroughly mixed to a ratio of 1 : 3 (Cafco BONDSEAL : potable water) and applied at a rate of 3.7m²/litre as mixed. Allow to dry.



Preparation of material mix

The application of CAFCO® 300 consists of mixing the material with potable water in a paddle or ribbon type mixer. The mixed material is then put into a pump hopper from where it is conveyed through the hose to a spray nozzle, where the slurry is broken up into a fan pattern by air and directed at the surface to be covered in an even, uninterrupted pattern.

Water requirement

The integrity and pumping properties of CAFCO® 300 are largely dependent upon maintaining the correct water amount when mixing.

The correct amount of water for mixing CAFCO® 300 is between 34 and 38 litres per bag. Water should be potable and between 10°C and 32°C. Low water temperature may affect the mixing time.

Mixing

CAFCO® 300 is delivered to site in 20kg bags. It is mixed by first measuring the appropriate amount of potable water into the mixer followed by adding the material into the mixer and mixing until the proper density is achieved.

The mixer speed should be set to 35-40rpm minimum. Notes:

- Low water-to-product ratio results in a mix that is too thick and difficult to pump. Cavitation in the hopper usually occurs and results in an inconsistent, pulsating spray pattern. High densities are characteristic.
- High water-to-product ratio results in a thin mix that pumps and sprays at a faster rate, but yields thinner coats of material and a rough surface texture. Low densities, material sliding and delaminations are characteristic, so does cracking to the surface of the material.
- Mix the CAFCO® 300 material until the optimum mixer slurry density is achieved at a range of 665-770kg/m³ per 1 litre cup. This typically requires three minutes of mixing based on a mixer speed of 40rpm.
- After three minutes of mixing, fill a container of known volume. Weigh and determine the density (weight per unit volume) of the slurry.
- If the slurry density is lower than 665kg/m³, decrease the mixing time and/or increase the water content.
- If the slurry density is higher than 770kg/m³, increase the mixing time and/or decrease the water content.
- Final in place density should be 310kg/m³ ± 20%. Time frame for checking the final density depends on measuring a wet or dry density. Dry density can be checked faster by heating the sample at 60°C.

Application

Pumping

It is essential that all pumps and material hoses be primed with water at the beginning of the application in order to ensure a trouble free operation.

CAFCO® 300 pumped through a dry hose will result in blockages in the hose or nozzle. Nozzle orifices must have a 13-16mm internal diameter.

CAFCO® 300 is discharged from the mixer into the pump hopper through a fixed safety grid. After the material is poured into the hopper, check and ensure that it will form a homogeneous slurry without cavitation.

Spraying method

Open the air valve typically located on the spray gun and turn on the pump (by remote switch, if available). Spray into a pail until the water exits thoroughly and a full pressure builds up. Set the air adjustment to achieve an even fan pattern of CAFCO® 300 using the minimum quantity of air pressure possible. Generally 10psi is recommended.

When the system is correctly set it should give out a dull buzzing sound. If the system is emitting a whistle, the air pressure is too high.

After the system has been purged it is probable that the first priming mix will be too sloppy. Reject this and wait until the material achieves an even consistency.

Make sure that there is no restriction of material. Hold the nozzle perpendicular to the substrate at a distance of 0.3-0.6m. Move the nozzle in a smooth, left-to-right motion to achieve a full, even pattern. Always position the nozzle perpendicular to the substrate. For coating small sections, a circular movement would be appropriate.

NOTE: Avoid excessive air pressure as it will increase density and decrease yield.

Spraying distance

Regardless of the substrate being sprayed, it is important to maintain the proper distance between the nozzle and the substrate surface. This distance will vary according to the type of equipment and nozzle in use but should be between 0.3m and 0.6m ideally.

Thickness

Apply CAFCO® 300 approximately 13-17mm for the initial coating (depending on the water content or orientation of substrate) and 19-25mm on subsequent coatings until the final thickness is achieved. Allow the material to set between coatings. If the surface of the applied CAFCO® 300 is dry, pre-wet this surface with a water mist before applying the next coating.

The Hp/A thickness of the CAFCO® 300 shall be established by reference to the specified period of protection, temperature failure point and period of protection (see [pages 14 - 19](#)).

Proper thickness should be confirmed by using a Promat approved thickness gauge before leaving a floor or sprayed area. Excessive thickness may result in delamination and/or prolonged drying time and is the most common reason for reduced yield and excessive shrinkage.

Set time

CAFCO® 300 will obtain an initial set in approximately 3-6 hours depending on temperature and humidity. Use a proprietary gypsum aluminium sulphate (alum) of which 1% is added to the CAFCO® 300 materials to reduce the set time.

The accelerator is applied with a chemical metering pump that conveys the solution through a hose to the wet mix nozzle where it is mixed with the CAFCO® 300 material.

If the concentration of alum is raised to 2%, this will effectively reduce the density of the sprayed CAFCO® 300 material by approximately 10% without harming its fire proofing efficiency.

NOTE: CAFCO® 300 contains hydraulically setting materials. Avoid re-temper the initial set.

Aluminium sulphate (alum)

The alum is supplied in powder form 25kg bags for site mixing.

Equipment	Plastic storage tank, agitator and adjustable flow pump with inlet and outlet hoses.
Mix	25kg bags of alum per 52.5 litres of water.
Mixing time	5 minutes for 100kg using high speed mixer.
Application	Determine the rate of CAFCO® 300 to be sprayed in an hour and adjust the flow rate of alum in accordance with the mixing rate tabulated on page 17. The alum should be introduced at the spray nozzle.
Temperature	Maintain a substrate and ambient temperature of +4°C prior to, during and after 24 hours of application.

Cautions:

- Do not add the alum to the CAFCO® 300 mixer or pump.
- The alum is slippery. Use of this product could cause local skin irritation. Wear loose fitting clothes and gloves to protect skin. Wash these safety gears separately from other garments.

Aluminium sulphate (alum)

- Cautions:
- To prevent irritation to the eyes or respiratory tract from articles that may become airborne when using the alum, wear dust masks and safety goggles.
- The alum may stain or discolour aluminium/metal doors, metal window frames, window glass or other surfaces. Provide masking on these structures prior to accelerating.
- Mixed CAFCO® 300 material is not suitable for application directly to concrete. If protection is required concrete Apply 8mm of non mixed CAFCO® 300 material as an initial coat to protect the concrete and allow it to set prior to application of the accelerator mix.
- The alum should be dissolved in water at the rate of 52.5 litres to 1 x 25kg bag and introduced into the CAFCO® 300 gun head at below mixing rate.

Mixing rate

20kg bags of CAFCO® 300 per hour	Volume of CAFCO® 300 per hour	Aluminium sulphate (alum ml per minute) to be added	
		1% *	2% **
5 bags	100kg	38ml	76ml
10 bags	200kg	76ml	152ml
15 bags	300kg	115ml	229ml
20 bags	400kg	153ml	305ml
25 bags	500kg	197ml	381ml
30 bags	600kg	229ml	457ml
35 bags	700kg	267ml	533ml
40 bags	800kg	305ml	610ml
45 bags	900kg	343ml	686ml
50 bags	1,000kg	381ml	762ml
55 bags	1,100kg	419ml	838ml
60 bags	1,200kg	457ml	914ml

* The additional 1% of alum will reduce the set time of CAFCO® 300 to approximately 20 minutes.

** The additional 2% of alum will reduce the set time to 20 minutes and lower the density by approximately 10%.

Usages of percentages of alum greater than those specified above may be harmful to the intended CAFCO® 300 sprayed coating fire protection.

Above performance data is a reflection of the expectations from Promat based on tests conducted in accordance with the recognised standard methods. The marketing of these performances shall be subject to the sale terms and conditions set forth in Promat invoices. No agents, employees or representatives of any Promat company, its subsidiary or its affiliated companies are authorised to modify the terms and conditions.

Density

Density must be in accordance with specification requirements. To control and obtain the proper density, the following parameters must be controlled to:

- Distance of spray nozzle from substrate
- Water-to-product ratio
- Mix time
- Length of standpipe and hose
- Amount of air used at nozzle
- Angle of nozzle to substrate
- Proper orifice size
- Speed (rpm) of mixer

Finish

Spray application of CAFCO® 300 results in a bold textured finish. If a smoother finish is desired, the final sprayed coating of CAFCO® 300 can either be lightly trowelled or the air spraying pressure of which can be increased. Such will improve the appearance but at the cost of a heavier density.

When spraying beams, it is noteworthy that the top side of the lower flange should be sprayed first. Thereafter the section can be sprayed in any order.

Project shutdown

Terminating spray application

- Turn off the pump by remote switch.
- Close material valve (if used).
- Shut off air valve. Leave air valve one quarter open if material valve is not used.
- The maximum time the nozzle can be shut off is 45 minutes, with the nozzle submerged in water to avoid blockage.

Cleaning equipment

MIXER

After removing the remaining CAFCO® 300 material, flush the mixer clean with water.

Remove any hardened build-up of the material on blades and sides of the mixer. Build-up of used material will affect and reduce the working life span of fresh material.

PUMP

Allow sufficient volume of water to be pumped through the system (hose and nozzle) until it is flushed clean. Disconnect the hose at the pump exit and insert a small sponge in the hose. After the nozzle and 25mm whip hose are removed, commence pumping water and the sponge) through the hose. Always maintain some air flow to avoid blockage in the air hose.

Precaution

- Never allow the pump to run dry.
 - Keep hoses to a practical, minimum length.
 - For electric motors, use heavy duty extension cords with length compatible for electrical requirements. Always ground the machine for safety; avoid circuits where other power equipment is being used. Observe all health and safety requirements.
 - Do not operate petrol or diesel powered equipment in closed, poorly ventilated room areas. If an exhaust system is used make sure it works adequately. All engine exhaust must be vented to the outside.
 - To avoid blockage and rupture in the hoses, the following equipment can be considered:
 1. Rotor stator machine with manually operated dump valve and pressure gauge.
 2. Piston pump machine with pressure relief valve, blow out cap and ball rated at 54-68kgf/cm³ fixed at the manifold.
- Extreme precaution must be exercised that any connection of the hoses should not reduce their inside diameter; improper connection will cause blockage in the hoses.
- In hot, dry conditions particularly where strong sunlight or wind is present, it is necessary to protect the surface of the applied CAFCO® 300 material from rapid evaporation. Excessive evaporation of water does not permit full hydration of the binders and will not help develop the full strength of the product. Measures to overcome excessive drying conditions are:
 1. Avoid project areas exposed to direct sunlight. Evening or early morning hours are most ideal for working.
 2. Cooling the substrate by spraying with water prior to application of CAFCO® 300 material.
 - Provide natural or mechanical ventilation to a level of four air changes per hour to allow proper drying of the CAFCO® 300 material after application.
 - During short interruptions in spraying, either shut down the pump or direct the slurry back into a suitable container. Do not crimp the hose as this may result in water separation and blockage in the hose.
 - Mixer should be covered during work and approved safety gear and/or mask must be exercised on the applicators to minimise dust inhalation. Keep the mixer clean at all times after use.

Troubleshooting

Possible or potential areas of problems resulting from improper application of CAFCO® 300 material or failure of equipment are identified as follows:

Unapproved or disqualified equipment

- Nozzle not held perpendicular to substrate.
- Nozzle orifice too big for air volume.
- Insufficient or excessive atomising of air at the nozzle.
- Hoses too lengthy or the hose size too small (<25mm).
- Previous coatings not sufficiently set.
- Water ratio too high.

Causes of blockage in the nozzle/hose

- Pump not properly primed.
- Nozzle, material hose or mixer not cleaned properly or kept in clean condition after use.
- Nozzle orifice too small for air volume.
- Hoses too lengthy.
- Air valve closed at start of spray.
- Air stem pushed too far in.
- Aged, hardened material build-up accumulated and not removed in the pump hopper drain or the mixer.
- Short bell reducers.
- Water ratio too low.

Malfunctioned pump

Decreased productivity is often traced directly to worn leathers, balls and seats in a piston pump or worn stators in a rotor/stator pump. All pumps must be maintained properly and ensured that the pump pressures are inspected regularly.

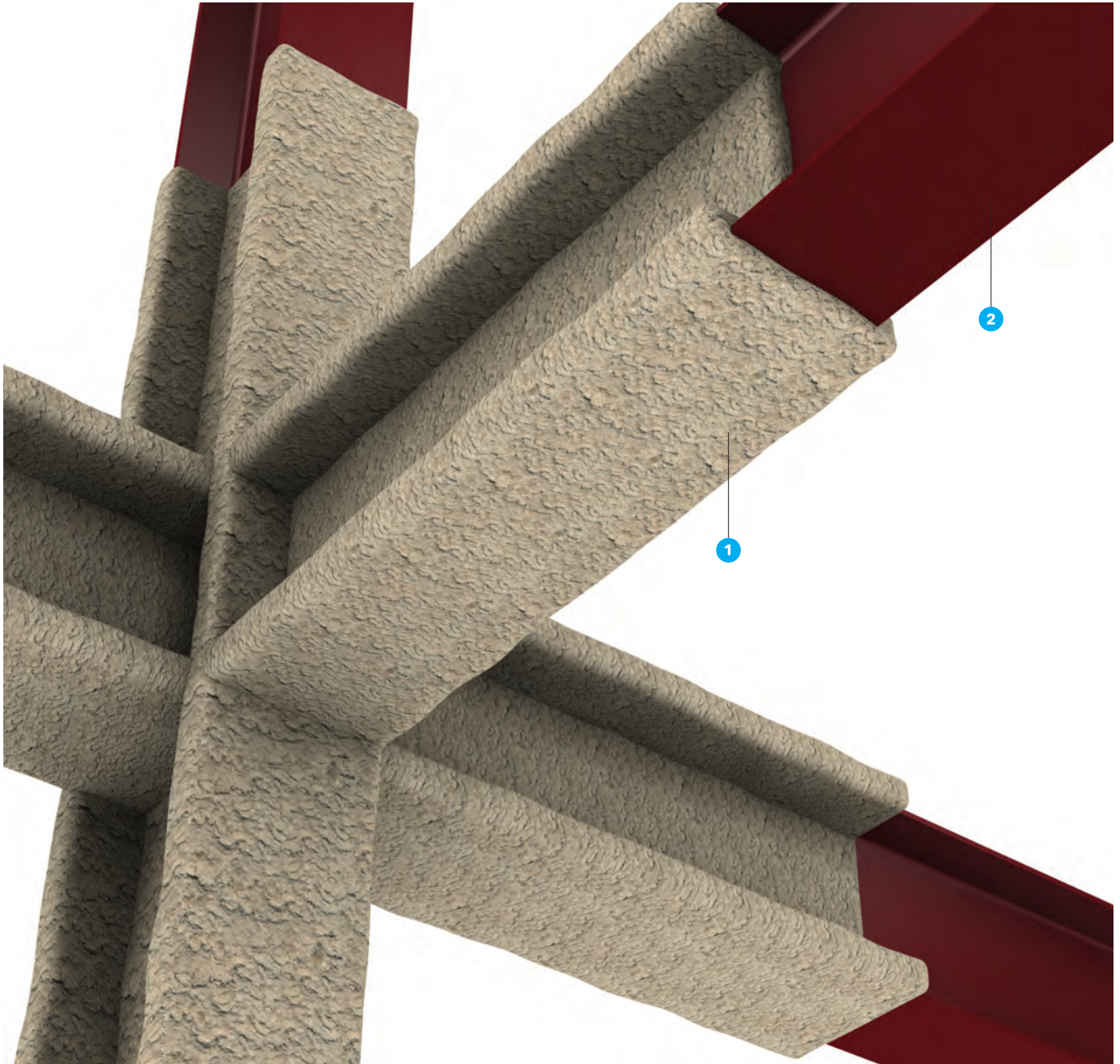
Repair

Damaged CAFCO® 300 product existing on the substrate may be repaired with freshly mixed material by spraying or hand trowelling onto the affected areas. Maximum measurement allowed to be patched by hand trowelling is 0.3m²; larger affected areas are more efficient to be repaired with spraying. Multiple coatings are necessary if the required thickness of the patch is greater than 13mm.

Ensure the remaining coatings and reinforcements are kept tight. Use water spray to pre-wet area prior to repair procedures. Previous surface of the coatings should be rough in texture for maximising adhesion results.

CAFCO® 300 240 minutes fire protection sprayed coating for steel column & beam

Up to 240/- fire resistance in accordance with the requirements of BS 476: Part 21: 1987, AS 1530: Part 4: 2005 and ASTM E119: 2007



1. Sprayed or hand trowelled CAFCO® 300 vermiculite and gypsum based wet mix material, thickness in accordance with tables on next page
2. Primed structural steel surfaces with compatible primer approved by Promat; substrate to be clean, dry and free from dust, loose mill scale, loose rust, oil and any other conditions that may prevent from good adhesion

For thickness calculations on hollow sections, cellular beams, castellated sections, composite floors, upgrading of concrete slabs and more complex structural situations, please consult Promat.

* Please consult Promat for application in accordance with the requirements of ASTM E119: 2007

Required thickness (mm) of CAFCO® 300 for a fire resistance period of 30 minutes

Section factor (m ⁻¹)	Design temperature (°C)							
	350	400	450	500	550	600	620	650
85	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
90	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
95	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
100	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
105	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
110	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
115	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
120	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
125	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
130	11.8	11.7	11.7	11.7	11.7	11.7	11.7	11.7
135	11.8	11.7	11.7	11.7	11.7	11.7	11.7	11.7
140	11.8	11.7	11.7	11.7	11.7	11.7	11.7	11.7
145	11.9	11.7	11.7	11.7	11.7	11.7	11.7	11.7
150	11.9	11.7	11.7	11.7	11.7	11.7	11.7	11.7
155	11.9	11.7	11.7	11.7	11.7	11.7	11.7	11.7
160	12.0	11.7	11.7	11.7	11.7	11.7	11.7	11.7
165	12.0	11.7	11.7	11.7	11.7	11.7	11.7	11.7
170	12.0	11.7	11.7	11.7	11.7	11.7	11.7	11.7
175	12.0	11.7	11.7	11.7	11.7	11.7	11.7	11.7
180	12.1	11.7	11.7	11.7	11.7	11.7	11.7	11.7
185	12.1	11.7	11.7	11.7	11.7	11.7	11.7	11.7
190	12.1	11.7	11.7	11.7	11.7	11.7	11.7	11.7
195	12.1	11.7	11.7	11.7	11.7	11.7	11.7	11.7
200	12.2	11.7	11.7	11.7	11.7	11.7	11.7	11.7
205	12.2	11.7	11.7	11.7	11.7	11.7	11.7	11.7
210	12.2	11.7	11.7	11.7	11.7	11.7	11.7	11.7
215	12.2	11.7	11.7	11.7	11.7	11.7	11.7	11.7
220	12.2	11.7	11.7	11.7	11.7	11.7	11.7	11.7
225	12.2	11.7	11.7	11.7	11.7	11.7	11.7	11.7
230	12.3	11.7	11.7	11.7	11.7	11.7	11.7	11.7
235	12.3	11.7	11.7	11.7	11.7	11.7	11.7	11.7
240	12.3	11.7	11.7	11.7	11.7	11.7	11.7	11.7
245	12.3	11.7	11.7	11.7	11.7	11.7	11.7	11.7
250	12.3	11.7	11.7	11.7	11.7	11.7	11.7	11.7
255	12.3	11.7	11.7	11.7	11.7	11.7	11.7	11.7
260	12.3	11.7	11.7	11.7	11.7	11.7	11.7	11.7
265	12.3	11.7	11.7	11.7	11.7	11.7	11.7	11.7
270	12.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7
275	12.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7
280	12.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7
285	12.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7
290	12.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7
295	12.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7
300	12.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7
305	12.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7
310	12.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7
315	12.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7
320	12.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7
325	12.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7
330	12.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7
335	12.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7
340	12.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7
341	12.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7

Required thickness (mm) of CAFCO® 300 for a fire resistance period of 60 minutes

Section factor (m ⁻¹)	Design temperature (°C)							
	350	400	450	500	550	600	620	650
85	19.9	18.4	17.5	16.0	14.4	13.0	12.3	11.7
90	20.1	18.6	17.6	16.1	14.5	13.1	12.4	11.7
95	20.2	18.8	17.7	16.2	14.6	13.2	12.5	11.7
100	20.3	18.9	17.8	16.3	14.7	13.3	12.6	11.7
105	20.4	19.0	17.8	16.4	14.8	13.3	12.7	11.7
110	20.5	19.1	17.9	16.4	14.9	13.4	12.8	11.7
115	20.6	19.2	18.0	16.5	15.0	13.5	12.9	11.8
120	20.7	19.3	18.1	16.6	15.0	13.6	12.9	11.8
125	20.8	19.4	18.1	16.6	15.1	13.6	13.0	11.9
130	20.9	19.5	18.2	16.7	15.2	13.7	13.0	11.9
135	21.0	19.6	18.2	16.7	15.2	13.7	13.1	12.0
140	21.0	19.7	18.3	16.8	15.3	13.8	13.1	12.0
145	21.1	19.7	18.3	16.8	15.3	13.8	13.2	12.1
150	21.2	19.8	18.4	16.9	15.4	13.9	13.2	12.1
155	21.2	19.8	18.4	16.9	15.4	13.9	13.3	12.1
160	21.3	19.9	18.4	16.9	15.5	14.0	13.3	12.2
165	21.3	20.0	18.5	17.0	15.5	14.0	13.3	12.2
170	21.4	20.0	18.5	17.0	15.5	14.0	13.4	12.2
175	21.4	20.1	18.5	17.0	15.6	14.1	13.4	12.3
180	21.5	20.1	18.6	17.1	15.6	14.1	13.4	12.3
185	21.5	20.1	18.6	17.1	15.6	14.1	13.5	12.3
190	21.5	20.2	18.6	17.1	15.7	14.2	13.5	12.3
195	21.6	20.2	18.6	17.1	15.7	14.2	13.5	12.4
200	21.6	20.3	18.7	17.2	15.7	14.2	13.5	12.4
205	21.7	20.3	18.7	17.2	15.7	14.2	13.6	12.4
210	21.7	20.3	18.7	17.2	15.8	14.3	13.6	12.4
215	21.7	20.4	18.7	17.2	15.8	14.3	13.6	12.4
220	21.7	20.4	18.8	17.2	15.8	14.3	13.6	12.5
225	21.8	20.4	18.8	17.3	15.8	14.3	13.6	12.5
230	21.8	20.5	18.8	17.3	15.9	14.3	13.7	12.5
235	21.8	20.5	18.8	17.3	15.9	14.4	13.7	12.5
240	21.9	20.5	18.8	17.3	15.9	14.4	13.7	12.5
245	21.9	20.5	18.8	17.3	15.9	14.4	13.7	12.5
250	21.9	20.6	18.9	17.3	15.9	14.4	13.7	12.6
255	21.9	20.6	18.9	17.4	16.0	14.4	13.8	12.6
260	21.9	20.6	18.9	17.4	16.0	14.4	13.8	12.6
265	22.0	20.6	18.9	17.4	16.0	14.5	13.8	12.6
270	22.0	20.7	18.9	17.4	16.0	14.5	13.8	12.6
275	22.0	20.7	18.9	17.4	16.0	14.5	13.8	12.6
280	22.0	20.7	18.9	17.4	16.0	14.5	13.8	12.6
285	22.0	20.7	19.0	17.4	16.0	14.5	13.8	12.6
290	22.1	20.7	19.0	17.4	16.1	14.5	13.8	12.6
295	22.1	20.8	19.0	17.5	16.1	14.5	13.9	12.7
300	22.1	20.8	19.0	17.5	16.1	14.6	13.9	12.7
305	22.1	20.8	19.0	17.5	16.1	14.6	13.9	12.7
310	22.1	20.8	19.0	17.5	16.1	14.6	13.9	12.7
315	22.1	20.8	19.0	17.5	16.1	14.6	13.9	12.7
320	22.1	20.8	19.0	17.5	16.1	14.6	13.9	12.7
325	22.2	20.9	19.0	17.5	16.1	14.6	13.9	12.7
330	22.2	20.9	19.0	17.5	16.2	14.6	13.9	12.7
335	22.2	20.9	19.1	17.5	16.2	14.6	13.9	12.7
340	22.2	20.9	19.1	17.5	16.2	14.6	14.0	12.7
341	22.2	20.9	19.1	17.5	16.2	14.6	14.0	12.7

Required thickness (mm) of CAFCO® 300 for a fire resistance period of 90 minutes

Section factor (m ⁻¹)	Design temperature (°C)							
	350	400	450	500	550	600	620	650
85	28.6	27.0	25.3	23.6	21.6	20.1	19.4	18.5
90	28.8	27.2	25.4	23.7	21.8	20.3	19.6	18.7
95	29.0	27.4	25.6	23.9	21.9	20.4	19.8	18.8
100	29.2	27.6	25.7	24.0	22.1	20.6	19.9	18.9
105	29.4	27.8	25.8	24.1	22.2	20.7	20.0	19.1
110	29.5	28.0	25.9	24.2	22.3	20.8	20.1	19.2
115	29.7	28.1	26.0	24.3	22.5	20.9	20.2	19.3
120	29.8	28.2	26.1	24.4	22.6	21.0	20.4	19.4
125	29.9	28.4	26.2	24.5	22.7	21.1	20.4	19.4
130	30.1	28.5	26.3	24.6	22.8	21.2	20.5	19.5
135	30.2	28.6	26.3	24.6	22.8	21.3	20.6	19.6
140	30.3	28.7	26.4	24.7	22.9	21.4	20.7	19.7
145	30.4	28.8	26.5	24.8	23.0	21.5	20.8	19.7
150	30.4	28.9	26.5	24.8	23.1	21.5	20.8	19.8
155	30.5	29.0	26.6	24.9	23.1	21.6	20.9	19.8
160	30.6	29.1	26.6	24.9	23.2	21.6	20.9	19.9
165	30.7	29.2	26.7	25.0	23.3	21.7	21.0	20.0
170	30.7	29.2	26.7	25.0	23.3	21.8	21.1	20.0
175	30.8	29.3	26.8	25.1	23.4	21.8	21.1	20.0
180	30.9	29.4	26.8	25.1	23.4	21.9	21.2	20.1
185	30.9	29.4	26.9	25.1	23.5	21.9	21.2	20.1
190	31.0	29.5	26.9	25.2	23.5	22.0	21.2	20.2
195	31.0	29.6	26.9	25.2	23.6	22.0	21.3	20.2
200	31.1	29.6	27.0	25.3	23.6	22.0	21.3	20.2
205	31.1	29.7	27.0	25.3	23.6	22.1	21.4	20.3
210	31.2	29.7	27.0	25.3	23.7	22.1	21.4	20.3
215	31.2	29.8	27.1	25.4	23.7	22.1	21.4	20.3
220	31.3	29.8	27.1	25.4	23.7	22.2	21.5	20.4
225	31.3	29.9	27.1	25.4	23.8	22.2	21.5	20.4
230	31.3	29.9	27.2	25.4	23.8	22.2	21.5	20.4
235	31.4	29.9	27.2	25.5	23.8	22.3	21.6	20.5
240	31.4	30.0	27.2	25.5	23.9	22.3	21.6	20.5
245	31.5	30.0	27.2	25.5	23.9	22.3	21.6	20.5
250	31.5	30.1	27.3	25.5	23.9	22.4	21.6	20.5
255	31.5	30.1	27.3	25.5	24.0	22.4	21.7	20.5
260	31.5	30.1	27.3	25.6	24.0	22.4	21.7	20.6
265	31.6	30.2	27.3	25.6	24.0	22.4	21.7	20.6
270	31.6	30.2	27.3	25.6	24.0	22.5	21.7	20.6
275	31.6	30.2	27.4	25.6	24.0	22.5	21.8	20.6
280	31.7	30.2	27.4	25.6	24.1	22.5	21.8	20.6
285	31.7	30.3	27.4	25.7	24.1	22.5	21.8	20.7
290	31.7	30.3	27.4	25.7	24.1	22.5	21.8	20.7
295	31.7	30.3	27.4	25.7	24.1	22.6	21.8	20.7
300	31.8	30.4	27.4	25.7	24.1	22.6	21.8	20.7
305	31.8	30.4	27.5	25.7	24.2	22.6	21.9	20.7
310	31.8	30.4	27.5	25.7	24.2	22.6	21.9	20.7
315	31.8	30.4	27.5	25.8	24.2	22.6	21.9	20.8
320	31.8	30.5	27.5	25.8	24.2	22.6	21.9	20.8
325	31.9	30.5	27.5	25.8	24.2	22.7	21.9	20.8
330	31.9	30.5	27.5	25.8	24.3	22.7	21.9	20.8
335	31.9	30.5	27.5	25.8	24.3	22.7	22.0	20.8
340	31.9	30.5	27.6	25.8	24.3	22.7	22.0	20.8
341	31.9	30.5	27.6	25.8	24.3	22.7	22.0	20.8

Required thickness (mm) of CAFCO® 300 for a fire resistance period of 120 minutes

Section factor (m ⁻¹)	Design temperature (°C)							
	350	400	450	500	550	600	620	650
85	37.3	35.5	33.0	31.1	28.8	27.2	26.5	25.7
90	37.6	35.8	33.2	31.3	29.0	27.5	26.8	25.9
95	37.9	36.1	33.4	31.5	29.3	27.7	27.0	26.1
100	38.1	36.3	33.6	31.7	29.5	27.9	27.2	26.3
105	38.3	36.6	33.8	31.8	29.6	28.0	27.3	26.5
110	38.5	36.8	33.9	32.0	29.8	28.2	27.5	26.6
115	38.7	37.0	34.0	32.1	30.0	28.4	27.6	26.7
120	38.9	37.2	34.1	32.2	30.1	28.5	27.8	26.9
125	39.1	37.3	34.3	32.3	30.2	28.6	27.9	27.0
130	39.2	37.5	34.4	32.4	30.4	28.8	28.0	27.1
135	39.3	37.7	34.5	32.5	30.5	28.9	28.1	27.2
140	39.5	37.8	34.5	32.6	30.6	29.0	28.2	27.3
145	39.6	37.9	34.6	32.7	30.7	29.1	28.3	27.4
150	39.7	38.0	34.7	32.8	30.8	29.2	28.4	27.5
155	39.8	38.2	34.8	32.8	30.9	29.3	28.5	27.6
160	39.9	38.3	34.9	32.9	30.9	29.3	28.6	27.6
165	40.0	38.4	34.9	33.0	31.0	29.4	28.7	27.7
170	40.1	38.5	35.0	33.0	31.1	29.5	28.7	27.8
175	40.2	38.6	35.0	33.1	31.2	29.6	28.8	27.8
180	40.3	38.7	35.1	33.2	31.2	29.6	28.9	27.9
185	40.3	38.7	35.2	33.2	31.3	29.7	28.9	27.9
190	40.4	38.8	35.2	33.3	31.4	29.8	29.0	28.0
195	40.5	38.9	35.3	33.3	31.4	29.8	29.1	28.1
200	40.5	39.0	35.3	33.4	31.5	29.9	29.1	28.1
205	40.6	39.0	35.3	33.4	31.5	29.9	29.2	28.2
210	40.7	39.1	35.4	33.4	31.6	30.0	29.2	28.2
215	40.7	39.2	35.4	33.5	31.6	30.0	29.3	28.2
220	40.8	39.2	35.5	33.5	31.7	30.1	29.3	28.3
225	40.8	39.3	35.5	33.6	31.7	30.1	29.3	28.3
230	40.9	39.3	35.5	33.6	31.8	30.1	29.4	28.4
235	40.9	39.4	35.6	33.6	31.8	30.2	29.4	28.4
240	41.0	39.5	35.6	33.7	31.8	30.2	29.5	28.4
245	41.0	39.5	35.6	33.7	31.9	30.3	29.5	28.5
250	41.1	39.5	35.7	33.7	31.9	30.3	29.5	28.5
255	41.1	39.6	35.7	33.7	31.9	30.3	29.6	28.5
260	41.2	39.6	35.7	33.8	32.0	30.4	29.6	28.6
265	41.2	39.7	35.7	33.8	32.0	30.4	29.6	28.6
270	41.2	39.7	35.8	33.8	32.0	30.4	29.7	28.6
275	41.3	39.8	35.8	33.8	32.1	30.5	29.7	28.6
280	41.3	39.8	35.8	33.9	32.1	30.5	29.7	28.7
285	41.3	39.8	35.8	33.9	32.1	30.5	29.7	28.7
290	41.4	39.9	35.9	33.9	32.2	30.5	29.8	28.7
295	41.4	39.9	35.9	33.9	32.2	30.6	29.8	28.7
300	41.4	39.9	35.9	34.0	32.2	30.6	29.8	28.8
305	41.5	40.0	35.9	34.0	32.2	30.6	29.9	28.8
310	41.5	40.0	35.9	34.0	32.3	30.6	29.9	28.8
315	41.5	40.0	36.0	34.0	32.3	30.7	29.9	28.8
320	41.5	40.1	36.0	34.0	32.3	30.7	29.9	28.8
325	41.6	40.1	36.0	34.0	32.3	30.7	29.9	28.9
330	41.6	40.1	36.0	34.1	32.3	30.7	30.0	28.9
335	41.6	40.2	36.0	34.1	32.4	30.7	30.0	28.9
340	41.6	40.2	36.1	34.1	32.4	30.8	30.0	28.9
341	41.6	40.2	36.1	34.1	32.4	30.8	30.0	28.9

Required thickness (mm) of CAFCO® 300 for a fire resistance period of 180 minutes

Section factor (m ⁻¹)	Design temperature (°C)							
	350	400	450	500	550	600	620	650
85	54.8	52.5	48.6	46.2	43.2	41.5	40.7	40.1
90	55.2	53.0	48.9	46.5	43.6	41.9	41.1	40.4
95	55.6	53.4	49.2	46.8	43.9	42.2	41.4	40.7
100	55.9	53.8	49.4	47.0	44.2	42.5	41.7	41.0
105	56.2	54.1	49.7	47.3	44.5	42.8	42.0	41.3
110	56.5	54.4	49.9	47.5	44.7	43.0	42.2	41.5
115	56.8	54.7	50.1	47.7	45.0	43.2	42.4	41.7
120	57.1	55.0	50.2	47.8	45.2	43.4	42.6	41.9
125	57.3	55.3	50.4	48.0	45.4	43.6	42.8	42.1
130	57.5	55.5	50.6	48.2	45.5	43.8	43.0	42.3
135	57.7	55.7	50.7	48.3	45.7	44.0	43.2	42.4
140	57.9	55.9	50.8	48.4	45.9	44.2	43.3	42.6
145	58.1	56.1	51.0	48.6	46.0	44.3	43.5	42.7
150	58.2	56.3	51.1	48.7	46.2	44.5	43.6	42.8
155	58.4	56.5	51.2	48.8	46.3	44.6	43.8	43.0
160	58.5	56.6	51.3	48.9	46.4	44.7	43.9	43.1
165	58.7	56.8	51.4	49.0	46.6	44.8	44.0	43.2
170	58.8	56.9	51.5	49.1	46.7	45.0	44.1	43.3
175	58.9	57.1	51.6	49.2	46.8	45.1	44.2	43.4
180	59.1	57.2	51.6	49.3	46.9	45.2	44.3	43.5
185	59.2	57.3	51.7	49.3	47.0	45.3	44.4	43.6
190	59.3	57.5	51.8	49.4	47.1	45.3	44.5	43.7
195	59.4	57.6	51.9	49.5	47.1	45.4	44.6	43.7
200	59.5	57.7	51.9	49.5	47.2	45.5	44.7	43.8
205	59.6	57.8	52.0	49.6	47.3	45.6	44.8	43.9
210	59.7	57.9	52.1	49.7	47.4	45.7	44.8	44.0
215	59.7	58.0	52.1	49.7	47.5	45.7	44.9	44.0
220	59.8	58.1	52.2	49.8	47.5	45.8	45.0	44.1
225	59.9	58.1	52.2	49.8	47.6	45.9	45.0	44.2
230	60.0	58.2	52.3	49.9	47.7	45.9	45.1	44.2
235	60.0	58.3	52.3	49.9	47.7	46.0	45.2	44.3
240	60.1	58.4	52.4	50.0	47.8	46.1	45.2	44.3
245	60.2	58.5	52.4	50.0	47.8	46.1	45.3	44.4
250	60.2	58.5	52.5	50.1	47.9	46.2	45.3	44.4
255	60.3	58.6	52.5	50.1	47.9	46.2	45.4	44.5
260	60.4	58.7	52.5	50.2	48.0	46.3	45.4	44.5
265	60.4	58.7	52.6	50.2	48.0	46.3	45.5	44.6
270	60.5	58.8	52.6	50.2	48.1	46.4	45.5	44.6
275	60.5	58.8	52.7	50.3	48.1	46.4	45.6	44.7
280	60.6	58.9	52.7	50.3	48.2	46.5	45.6	44.7
285	60.6	59.0	52.7	50.3	48.2	46.5	45.7	44.7
290	60.7	59.0	52.8	50.4	48.3	46.6	45.7	44.8
295	60.7	59.1	52.8	50.4	48.3	46.6	45.7	44.8
300	60.8	59.1	52.8	50.4	48.3	46.6	45.8	44.9
305	60.8	59.2	52.9	50.5	48.4	46.7	45.8	44.9
310	60.8	59.2	52.9	50.5	48.4	46.7	45.9	44.9
315	60.9	59.3	52.9	50.5	48.4	46.7	45.9	45.0
320	60.9	59.3	52.9	50.6	48.5	46.8	45.9	45.0
325	61.0	59.3	53.0	50.6	48.5	46.8	46.0	45.0
330	61.0	59.4	53.0	50.6	48.5	46.8	46.0	45.0
335	61.0	59.4	53.0	50.6	48.6	46.9	46.0	45.1
340	61.1	59.5	53.0	50.7	48.6	46.9	46.0	45.1
341	61.1	59.5	53.0	50.7	48.6	46.9	46.1	45.1

Required thickness (mm) of CAFCO® 300 for a fire resistance period of 240 minutes

Section factor (m ⁻¹)	Design temperature (°C)							
	350	400	450	500	550	600	620	650
85	72.2	69.5	64.2	61.3	57.6	55.8	54.9	54.5
90	-	70.1	64.6	61.7	58.1	56.3	55.4	54.9
95	-	70.7	64.9	62.1	58.6	56.7	55.8	55.4
100	-	71.2	65.3	62.4	58.9	57.1	56.2	55.7
105	-	71.7	65.6	62.7	59.3	57.5	56.6	56.1
110	-	72.1	65.8	63.0	59.6	57.8	56.9	56.4
115	-	72.5	66.1	63.2	60.0	58.1	57.2	56.7
120	-	-	66.3	63.5	60.2	58.4	57.5	56.9
125	-	-	66.5	63.7	60.5	58.7	57.8	57.2
130	-	-	66.7	63.9	60.7	58.9	58.0	57.4
135	-	-	66.9	64.1	61.0	59.1	58.2	57.6
140	-	-	67.1	64.3	61.2	59.4	58.5	57.8
145	-	-	67.3	64.4	61.4	59.6	58.7	58.0
150	-	-	67.4	64.6	61.6	59.8	58.8	58.2
155	-	-	67.6	64.7	61.8	59.9	59.0	58.4
160	-	-	67.7	64.9	61.9	60.1	59.2	58.5
165	-	-	67.8	65.0	62.1	60.3	59.3	58.7
170	-	-	68.0	65.1	62.2	60.4	59.5	58.8
175	-	-	68.1	65.2	62.4	60.6	59.6	59.0
180	-	-	68.2	65.3	62.5	60.7	59.8	59.1
185	-	-	68.3	65.5	62.6	60.8	59.9	59.2
190	-	-	68.4	65.6	62.8	60.9	60.0	59.3
195	-	-	68.5	65.6	62.9	61.1	60.1	59.4
200	-	-	68.6	65.7	63.0	61.2	60.3	59.5
205	-	-	68.7	65.8	63.1	61.3	60.4	59.6
210	-	-	68.7	65.9	63.2	61.4	60.5	59.7
215	-	-	68.8	66.0	63.3	61.5	60.6	59.8
220	-	-	68.9	66.1	63.4	61.6	60.6	59.9
225	-	-	69.0	66.1	63.5	61.7	60.7	60.0
230	-	-	69.0	66.2	63.6	61.8	60.8	60.1
235	-	-	69.1	66.3	63.6	61.8	60.9	60.2
240	-	-	69.2	66.3	63.7	61.9	61.0	60.2
245	-	-	69.2	66.4	63.8	62.0	61.1	60.3
250	-	-	69.3	66.4	63.9	62.1	61.1	60.4
255	-	-	69.3	66.5	63.9	62.1	61.2	60.4
260	-	-	69.4	66.6	64.0	62.2	61.3	60.5
265	-	-	69.4	66.6	64.1	62.3	61.3	60.6
270	-	-	69.5	66.7	64.1	62.3	61.4	60.6
275	-	-	69.5	66.7	64.2	62.4	61.5	60.7
280	-	-	69.6	66.8	64.2	62.5	61.5	60.7
285	-	-	69.6	66.8	64.3	62.5	61.6	60.8
290	-	-	69.7	66.8	64.4	62.6	61.6	60.8
295	-	-	69.7	66.9	64.4	62.6	61.7	60.9
300	-	-	69.7	66.9	64.5	62.7	61.7	60.9
305	-	-	69.8	67.0	64.5	62.7	61.8	61.0
310	-	-	69.8	67.0	64.6	62.8	61.8	61.0
315	-	-	69.9	67.0	64.6	62.8	61.9	61.1
320	-	-	69.9	67.1	64.7	62.9	61.9	61.1
325	-	-	69.9	67.1	64.7	62.9	62.0	61.2
330	-	-	70.0	67.1	64.7	62.9	62.0	61.2
335	-	-	70.0	67.2	64.8	63.0	62.1	61.2
340	-	-	70.0	67.2	64.8	63.0	62.1	61.3
341	-	-	70.0	67.2	64.8	63.0	62.1	61.3

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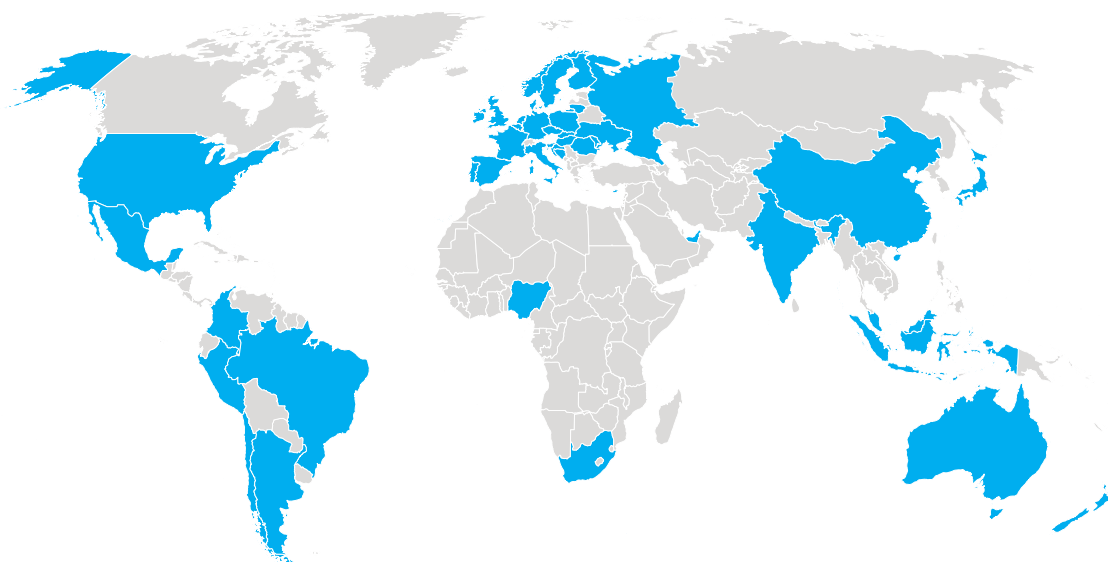
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