Structural Steel Fire Protection specification
NULLIFIRE SC902 Intumescent Coating up to 2 hours
PERLIFOC HP ECO + vermiculite spray alternative up to 4 hours
PYROCRETE 60 External Cementitious Spray up to 4 hours

Issued By: Chris Partington

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Structural Steel Elements for Protection:

NULLIFIRE SC902 Intumescent Specified Fire Resistance Level up to 120/--/--

Steelwork fire rated up to 120 minutes, non-visible up to C1 Internal Environment
Steelwork fire rated up to 120 minutes. Visible up to C2 internal Environment
Steelwork fire rated up to 120 minutes. Visible up to C3 external Environment
Steelwork fire rated up to 120 minutes. Visible up to C4 external Environment
Galvanised Steelwork fire rated up to 120 minutes Visible up to C4 Environment
Swimming pool Steelwork fire rated up to 120 minutes. Visible up to C3 Environment

PERLIFOC HP ECO + (sustainable certified alternative to vermiculite spray)
Internal Steelwork fire rated up to 240/-/- non-visible up to C2 Environment

PYROCRETE 60 Cementitious Spray
External Steelwork fire rated up to 240/-/- up to C4 Environment

Specified Environments: C1, C2, C3 and C4
AS1851 Guidelines the intumescent system should have annual Inspection and maintenance as required

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For Waterproofing, flooring or glazing information please visit www.tremco.com.au
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NULLIFIRE and CARBOLINE are product brands incorporated into the global brands portfolio of RPM International Inc, a world leader in intumescent coatings, passive fire protection, speciality coatings and sealants.

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Surface Preparation and Application

Pre-treatment:

Degrease surface using biodegradable degreasing solution as per AS 1627.1 to remove all grease, oils, fats, etc. Remove all salt deposits and degreaser residue by low pressure water washing (upwards of 300 bar) using potable water. Grind all sharp edges and corners to a radius of 2mm. Remove all weld slag, spatter, and grind all welds and high spots smooth.

Steel Preparation:

Abrasive blast all surfaces to a minimum Sa 2½ blast as per AS1627.4. Using angular and cleaned Steel Grit, or virgin Blast One Garnet to achieve an angular surface shape and minimal abrasive embedment A surface profile of 40-70 microns shall be achieved. Remove all blast residues. All blasted surfaces shall be coated immediately, before any flash rusting or contamination occurs. Substrate must be sound, clean, and dry before application of coatings.

Galvanized Steel: PLEASE CONTACT NULLIFIRE FOR A PROJECT SPECIFIC SPECIFICATION ON GALVANISED STEEL

Galvanizing requires a roughened surface for optimum adhesion/performance of epoxy primers. Remove any contaminants per SP1, AS 1627.1; ensure there are no chemical treatments that may interfere with adhesion; and mechanical abrade using bristle blaster or sweep abrasive blast the surface to establish a suitable roughness (typically 40 microns). Avoid aggressive preparation that may remove the zinc coating.

Cleaned and roughened galvanizing should be coated immediately after preparation, particularly in humid conditions above 50% RH. Do not allow adhesion-compromising zinc hydroxide to form before application.

Repair of Damaged Galvanized Steel: Apply Carboline Carbozinc 15-625 to spot areas to achieve 75 microns DFT and overcoat with Carboguard 635.

Procedure: - All surfaces to be coated should be clean, dry with oil and grease being removed in accordance with AS1627.1 solvent cleaning.

Where galvanizing is removed and bare steel is exposed, mechanically power tool clean to SSPC-SP11-87T all corroded and damaged galvanized areas.

All cleaned bare metal should be free of oil, grease, dirt, soil, salts and other contaminants.

The bare prepared surface must not be buffed or polished smooth.

Edges of galvanizing must be well feathered to a sound clean edge.

Surface defects revealed by the preparation process, should be ground, pad welded and ground smooth, or treated in the appropriate manner.

Clean to remove all grit dust and debris and ensure the surface is dry.

Apply a spot coat of Carboline Carbozinc 15-625 @ 75 microns DFT, to all bare steel areas overlapping a minimum of 10mm onto sound galvanizing; taking care to achieve a uniform finish.

Existing Coatings:

The existing coatings will need to be removed by chemical stripping, abrading, high pressure hydro or induction heating paint stripping. Chemicals can be messy and difficult to work with so abrading or induction heating paint stripping the primer off might be the easiest solution.

The use of a bristle blaster for installed steel is acceptable to achieve Sa 2½. Another option for installed steel would be the induction heating paint stripping method by ACR Tech http://acrtech.com.au/ which is ideal if the steel is already installed onsite and the use of chemical stripping or blasting/sanding may be an OH&S issue.

A surface profile of 40-70 microns shall be maintained and all blast/primer residue must be removed. All blasted/stripped surfaces shall be coated immediately in a Permax approved primer before any flash rusting or contamination occurs. Substrate must be sound, clean and dry before application of coatings.

Nullifire SC902 Factory or Site Intumescent Coating Application

NULLIFIRE SC902 Finish Standard Required		Location				Finish Required	
		Internal Steelwork Non-Visible C1 FRL up to 120/-/-				To Be Confirmed by Client.	
	PRODUCT	DATA SHEET NO.	MINIMUM FILM THICKNESS (MICRONS)	FRL	APPLICATION METHOD	SPOT/ FULL/ STRIPE COAT	THINNER REQUIRED
Primer Coat	Carboguard 635	Carboguard 635	75 Microns Dry Film Thickness	N/A	Airless Spray	FULL	As per TDS
Intumescent Coat	NULLIFIRE SC902	NULLIFIRE SC902	AS PER LOADING SCHEDULE	120/--/--	Airless Spray	FULL	Carboline #10 100% Xylene
Optional Topcoats	Carbothane 133LH	Carbothane 133LH	100 Microns Dry Film Thickness	NA	Roller/Brush/Spray	FULL	As per TDS
NOTES	Level of Finish to be approved by the Architect prior to the start of the project. Optional topcoat required if the steelwork is to be left in an open construction phase for longer than 3 months. A Stripe coat of Carboguard 635 at 75 microns dft should be applied over the primer coat to all corners, edges, joints etc. Topcoat thicknesses are minimum requirement **For shop application of Nullifire SC902 the use of Carboquick 200 topcoat will give a more durable finish during transportation and construction Carboquick 200 can only be spray applied – brush and roller for minor touch up**						

NULLIFIRE SC902 Finish Standard Required	Location	Finish Required
	Internal Steelwork Visible up to C2 FRL up to 120/-/-	To Be Confirmed by Client.

	PRODUCT	DATA SHEET NO.	MINIMUM FILM THICKNESS (MICRONS)	FRL	APPLICATION METHOD	SPOT/ FULL/ STRIPE COAT	THINNER REQUIRED
Primer Coat	Carboguard 635	Carboguard 635	75 Microns Dry Film Thickness	N/A	Airless Spray	FULL	As per TDS
Intumescent Coat	NULLIFIRE SC902	NULLIFIRE SC902	AS PER LOADING SCHEDULE	120/--/--	Airless Spray	FULL	Carboline #10 100% Xylene
Compatible Topcoat	Carbothane 133 LH	Carbothane 133LH	75 Microns Dry Film Thickness	N/A	Roller/Brush/Spray	FULL	As per TDS
Compatible Topcoat	Carbothane 133LH	Carbothane 133LH	75 Microns Dry Film Thickness	N/A	Roller/Brush/Spray	FULL	As per TDS
NOTES	Level of finish to be approved by Architect prior to start of project. Topcoat also required if the steelwork is to be left in an open construction phase for longer than 3 months maximum A Stripe coat of Carboguard 635 at 75 microns dft should be applied over the primer coat to all corners, edges, joints etc An additional coat of Carbothane 133LH may be required depending upon colour of finish chosen Topcoat thicknesses are minimum requirement **For shop application of Nullifire SC902 the use of Carboquick 200 topcoat will give a more durable finish during transportation and construction Carboquick 200 can only be spray applied – brush and roller for minor touch up**						

NULLIFIRE SC902 Finish Standard Required	Location	Finish Required
	External Steelwork Visible Max C3 FRL up to 120/-/-	To Be Confirmed by Client.

	PRODUCT	DATA SHEET NO.	MINIMUM FILM THICKNESS (MICRONS)	FRL	APPLICATION METHOD	SPOT/ FULL/ STRIPE COAT	THINNER REQUIRED
Primer Coat	Carbozinc 15-625	Carbozinc 15-625	75 Microns Dry Film Thickness	N/A	Airless Spray	FULL	As per TDS
Intumescent Coat	NULLIFIRE SC902	NULLIFIRE SC902	AS PER LOADING SCHEDULE	120/--/--	Airless Spray	FULL	Carboline #10 100% Xylene
Compatible Topcoat	Carbothane 133LH	Carbothane 133LH	75 Microns Dry Film Thickness	N/A	Roller/Brush/Spray	FULL	As per TDS
Compatible Topcoat	Carbothane 133LH	Carbothane 133LH	75 Microns Dry Film Thickness	N/A	Roller/Brush/Spray	FULL	As per TDS
NOTES	Level of finish to be approved by Architect prior to the start of project Topcoat also required if the steelwork is to be left in an open construction phase for longer than 3 months maximum A Stripe coat of Carbozinc 15-625 at 50 microns DFT should be applied over the primer coat to all corners, edges, joints etc A stripe coat of Carbothane 133LH at 75 microns DFT should be applied over the NULLIFIRE SC902 to all corners, edges, joints etc. Topcoat thicknesses are minimum requirement **For shop application of NULLIFIRE SC902 the use of Carboquick 200 topcoat will give a more durable finish during transportation and construction Carboquick 200 can only be spray applied – brush and roller for minor touch up**						

NULLIFIRE SC902 Finish Standard Required	Location	Finish Required
	External Steelwork Visible FRL up to 120/-/- Max C4	To Be Confirmed by Client.

	PRODUCT	DATA SHEET NO.	MINIMUM FILM THICKNESS (MICRONS)	FRL	APPLICATION METHOD	SPOT/ FULL/ STRIPE COAT	THINNER REQUIRED
Primer Coat	Carbozinc 15-625	Carbozinc 15-625	75 Microns Dry Film Thickness	N/A	Airless Spray	FULL	As per TDS
INTERMEDIATE	Carboguard 635	Carboguard 635	75 Microns Dry Film Thickness	N/A	Airless Spray	Full	As per TDS
Intumescent Coat	NULLIFIRE SC902	NULLIFIRE SC902	AS PER LOADING SCHEDULE	120/--/--	Airless Spray	FULL	Carboline #10 100% Xylene
Compatible Topcoat	Carboquick 200	Carboquick 200	100 Microns Dry Film Thickness	N/A	Roller/Brush/Spray	FULL	As per TDS
Compatible Topcoat	Carboquick 200	Carboquick 200	100 Microns Dry Film Thickness	N/A	Roller/Brush/Spray	FULL	As per TDS
NOTES	Level of finish to be approved by Architect prior to the start of project. Topcoat also required if the steelwork is to be left in an open construction phase for longer than 3 months maximum. A Stripe coat of Carboguard 635 at 50 microns dft should be applied over the primer coat to all corners, edges, joints etc A stripe coat of Carboquick 200 at 75 microns dft should be applied over the NULLIFIRE SC902 to all corners, edges, joints etc Topcoat thicknesses are minimum requirement **Carboquick 200 can only be spray applied – brush and roller for minor touch up**						

NULLIFIRE SC902 Finish Standard Required	Location	Finish Required
	Swimming pool Steelwork Visible FRL up to Max C3 120/-/-	To Be Confirmed by Client.

	PRODUCT	DATA SHEET NO.	MINIMUM FILM THICKNESS (MICRONS)	FRL	APPLICATION METHOD	SPOT/ FULL/ STRIPE COAT	THINNER REQUIRED
Primer Coat	Carboguard 635	Carboguard 635	100 Microns Dry Film Thickness	N/A	Airless Spray	Full	As per TDS
Intumescent Coat	NULLIFIRE SC902	NULLIFIRE SC902	AS PER LOADING SCHEDULE	120/--/--	Airless Spray	FULL	Carboline #10 100% Xylene
Compatible Topcoat	Carboquick 200	Carboquick 200	100 Microns Dry Film Thickness	N/A	Roller/Brush/Spray	FULL	As per TDS
Compatible Topcoat	Carboquick 200	Carboquick 200	100 Microns Dry Film Thickness	N/A	Roller/Brush/Spray	FULL	As per TDS
NOTES	Level of finish to be approved by Architect prior to the start of project. Topcoat also required if the steelwork is to be left in an open construction phase for longer than 3 months maximum. A Stripe coat of Carboguard 635 at 50 microns dft should be applied over the primer coat to all corners, edges, joints etc A stripe coat of Carboquick 200 at 75 microns dft should be applied over the NULLIFIRE SC902 to all corners, edges, joints etc Topcoat thicknesses are minimum requirement						

NULLIFIRE SC902 Finish Standard Required		Location		Finish Required		
		External Galvanized Steelwork Visible MAX C4 FRL up to 120/-/-		To Be Confirmed by Client.		
PRODUCT		DATA SHEET NO.	MINIMUM FILM THICKNESS (MICRONS)	APPLICATION METHOD	SPOT FULL STRIPE COAT	THINNER REQUIRED
❖ Galvanized Steel Repair	Carbozinc 15-625	Carbozinc 15-625	75 Microns Dry Film Thickness	Airless Spray	SPOT	As per TDS
Primer Coat	Carboguard 635	Carboguard 635	75 Microns Dry Film Thickness	Airless Spray	FULL	As per TDS
Intumescent Coat	NULLIFIRE SC902	NULLIFIRE SC902	AS PER LOADING SCHEDULE	Airless Spray	FULL	Carboline #10 100% Xylene
Compatible Topcoat	Carbothane 133LH	Carbothane 133LH	100 Microns Dry Film Thickness	Roller/Brush/Spray	FULL	As per TDS
Compatible Topcoat	Carbothane 133LH	Carbothane 133LH	100 Microns Dry Film Thickness	Roller/Brush/Spray	FULL	As per TDS
NOTES	Level of finish to be approved by Architect prior to the start of project. Topcoat also required if the steelwork is to be left in an open construction phase for longer than 3 months maximum. A stripe coat of Carbothane 133LH at 100 microns DFT should be applied over the NULLIFIRE SC902 to all corners, edges, joints etc. ❖ Refer to Surface Preparation & Application Guide for galvanized steel repair procedure. ❖ **For shop application of Nullifire SC902 the use of Carboquick 200 topcoat will give a more durable finish during transportation and construction Carboquick 200 can only be spray applied – brush and roller for minor touch up**					

PERLIFOC HP ECO+ Sustainable certified #leed #breeam #well #C2C #EPD alternative to vermiculite spray

PERLIFOC HP ECO+		Location			Finish Required		
		Internal Steelwork Non-Visible C2 FRL up to 240/-/-			To Be Confirmed by Client.		
	PRODUCT	DATA SHEET NO.	MINIMUM FILM THICKNESS (MICRONS)	FRL	APPLICATION METHOD	SPOT/ FULL/ STRIPE COAT	THINNER REQUIRED
VERMICULITE SPRAY ALTERNATIVE	PERLIFOC HP ECO+	PERLIFOC HP ECO+	AS PER LOADING SCHEDULE	240/--/--	GITO machine or similar approved	FULL	N/A
NOTES	**If a primer is required due to corrosion requirements, then Carboguard 635 at 75 microns should be applied – tbc by the project engineer** **PERLIFOC HP ECO+ Sustainable certified #leed #breeam #well #C2C #EPD alternative to vermiculite spray** **A primer may need upgrading or not required depending upon the project corrosion requirements** **Consult technical data sheets for additional information including mesh requirements**						

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PYROCRETE 60 EXTERNAL CEMENTITIOUS SPRAY FRL up to 240/-/-

PYROCRETE 60		EXTERNAL Steelwork FRL up to 240/-/- C4		Finish Required To Be Confirmed by Client.		
	PRODUCT	MINIMUM FILM THICKNESS (MICRONS)	FRL	APPLICATION METHOD	SPOT/ FULL/ STRIPE COAT	THINNER REQUIRED
CEMENTITIOUS SPRAY	PYROCRETE 60	AS PER LOADING SCHEDULE	240/--/--	GITO machine or similar approved	FULL	N/A
NOTES	**If a primer is required due to corrosion requirements, then Carboguard 635 at 75 microns should be applied as a minimum TBC by the project engineer** **A topcoat may also be required 2 coats of Carbothane 133 LH at 75 microns dft per coat** **The primer may need upgrading or not required depending upon the project corrosion requirements** **Consult technical data sheets for additional information including mesh requirements**					

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As per AS2312 Guidelines our standard 10-year warranty is offered on the above systems
If longer or more specific warranty conditions are required, they should be requested prior to the project starts as this may change the specification issued, inspections etc

*** Warranty documentation can only be requested prior to commencement of works**

Intumescent Coating: Apply NULLIFIRE SC902 to meet the DFT requirement for the fire rating specified and in accordance with the product loading schedule provided. Refer to Permax for surface preparation of RHS, SHS and CHS members.

Technical Note: An intumescent coating expands in a fire scenario, please consult Permax prior to fixing any material directly to, or hard up against the coated substrate as expansion gap up to 100 mm maybe required

Note: Galvanized bolts require no further preparation other than solvent de-greasing and NULLIFIRE SC902. **(Intumescent bolt caps are also an approved system for fire protection for bolted connections – compliant to AS1530.4-2014 – contact Permax for additional details)**

Note: Existing structural steelwork that has been identified as being previously coated with lead-based paint is not suitable for an intumescent coating to be applied to. Lead based paint must first be completely removed by an approved method carried out by a suitably qualified contractor.

Note: Nullifire SC902 can only be installed by approved applicators. Applicators also need to hold the necessary qualifications to enable certification of the installed system in accordance with the relevant State regulations.

Notes
All materials, primer, intumescent, topcoat shall be obtained from the joint system NULLIFIRE & CARBOLINE
All corners, edges, bolted connections, difficult access should have a stripe coat
All products should be applied as per technical data sheets and application guides
The total primer thickness should not be greater than 150 microns dft
Two topcoats may be required to achieve level of finish and full opacity
Level of intumescent and coating finish should be approved before full application
The intumescent coating shall have been assessed in accordance with the requirements of AS 1530.4 – 2014 and AS 4100-2020
The potential for heat transfer from unprotected structural steel into protected structural steel must be considered. It is considered good practice to protect the adjoining 500mm of 'unprotected' structural steel to limit unwanted heat transfer.
All systems should be stored and the project design to be free from ponding and pooling water
All intumescent coating products used shall be documented in the independent NATA laboratory assessment (i.e. Branz)
All bolted connections should be suitably protected with fire rated bolt caps (Assessed to AS1530.4) refer to Permax for supply
The intumescent system should have annual Inspection and maintenance as per AS1851guidelines
An independent 3rd party inspector should be employed on the project, minimum NACE 2 Qualified
For a warranty to be issued full QA / QC documentation is required for the complete system, surface preparation, primer, Nullifire, topcoats
Concrete filled hollow sections intumescent thicknesses should be calculated in accordance with AS/2327 / EN 13381-6

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NULLIFIRE SC902 – TECHNICAL DATA

KEY BENEFITS

- Fast cure, early weather resistance, shower proof within 1 hour.
- Achieves external durability with an approved top seal.
- Cures below 0° and fully dry by the following day.
- Self-priming system tolerant of light rusting to steel, up to 2 weeks post blasting.
- High build potential with all ratings in one application.
- **Fire rating up to 120 minutes assessed in accordance with AS1530.4- 2014 and AS4100-1998**

Product Description
Nullifire SC902 is a fast track on-site low VOC, single application, high build system, based on patented technology.

Usage / Purpose
Nullifire SC902 provides a fast curing effective structural fire performance, for steelwork up to 120 minutes fire rating.

Finish
A lightly textured smooth finish. A compatible top-seal can be applied if a decorative finish is required.

Colours
Part A White **Part B** Black **Mixed** White **Cured** White

Packaging
Part A & Part B supplied in 25kg kit.

Environmental Consideration
Low VOC and no solvent entrapment or prolonged solvent odour once fully cured. Cetec VOC Content Test Certificate CV140407a to Green Building Council of Australia Green Star Office Design Specification V3 IEQ-13

Availability / Approved Applicators
Only available to Permax approved contractors
(Refer to Permax for approved applicators.)

USAGE GUIDELINE

Surface Preparation
- No primer required for most internal and semi-exposed environments (refer to Permax for specification advice).
- All surfaces to be coated should be clean, dry and free from loose friable materials and any other contaminants likely to impair adhesion. Steelwork should be blast cleaned in dry atmospheric conditions using abrasive of suitable type and size, free from fines, moisture and oil. **The system is not suitable for use over single pack primers.** For use over galvanised surfaces or other substrates please contact Nullifire Australia.

Application Conditions
- Ensure adequate through ventilation during application.
- Application temperature range 0° to 35°C, relative humidity <95% and steel surface temperature at least 3°C above dew point temperature.
- Maximum steel temperature 35 Deg C

Application Equipment
- Airless Spray Unit – (Refer to Permax for advice regarding appropriate equipment)

Application Advice
- For application advice contact Permax

Coverage Rates
- Theoretical coverage of 1,750 g/m² based on an applied 1.00mm dry film thickness.

Cleaning
- Flushing of equipment should be carried out within 90 minutes of mixing the final kit using Xylene containing **No** alcohol or water.

Storage
- Store in a secure, dry warehouse conditions between 0°C and 35°C

Health & Safety Precautions
Product Health and Safety Data Sheets must be read and understood before use.

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Technical Service
Please contact Permax for technical advice.

Guarantee / Warranties are available but the specific project requirements should be discussed with Permax / Nullifire prior to the project starting otherwise it will not be able to be issued.

TECHNICAL INFORMATION

Property	**Result**
Composition	A Low VOC, high build formulation based on advanced hybrid technology.

Performance

"Prohesion" Cyclic Corrosion Test to ASTM G85:2009 Annex A5
At 1000 hours Maximum extent of undercut corrosion 6.00mm from scribe mark.
Note: The above test was carried out on a primer-less steel substrate.

Properties	**Typical Values**
Specific Gravity	Part A 1.55 ± 0.02 Part B 0.99 ± 0.01 Part C 1.49 ± 0.02
Volume Solids	85% ± 3%
VOC	137 g/litre
Viscosity	Part A 220 ± 10% (Spindle 7@50 rpm) Part B 9 ± 10% (Spindle 7@50 rpm) Part C 110 ± 10% (Spindle 7@50 rpm)
Pot Life	60 minutes

NOTE:

- **In open construction, Nullifire SC902 can remain exposed for up to 3 months without top sealing**
  Nullifire SC902 can resist normal weather conditions for up to 4 months without top sealing i.e.during the construction phase but should be free from ponding and pooling of water. Once an approved top seal has been applied as appropriate to the prevailing conditions, then durability will be substantially enhanced.
- **Steelwork coated with Nullifire SC902 should be free of water pooling and provision of drainage addressed in design and also provided for in storage prior to erection.**
- **Nullifire SC902 should be cured prior to the application of any topcoat**
- **Nullifire SC902 applied up to 3mm dft, requires a minimum of 24 hours curing at 25 Deg C before topcoat is applied**
- **Nullifire SC902 above a total dft of 3mm, requires a minimum of 48 hours curing at 25 Deg C before topcoat is applied**

The information in this document is intended for guidance only and is based upon practical experience and laboratory tests which Tremco CPG Australia Pty Ltd believes are reliable. It is the responsibility of the Buyer and/or subsequent users to determine the suitability of the product for its own particular use. Tremco CPG Australia Pty Ltd has no control over the quality or condition of substrate, or the many factors that can affect the use and application of the product, and as such Tremco CPG Australia Pty Ltd accepts no liability for any loss, injury or damages resulting from such use. To the extent permitted by law, all warranties whether implied or otherwise are excluded. Variations in application conditions, procedures and steelwork environments can cause unsatisfactory results, always refer to the application instructions or Nullifire Technical Services before use for guidance. Tremco CPG Australia Pty Ltd reserves the right to alter product specifications without prior notice, in line with Company policy of continuous development and improvement The English language version of this document prevails over any other translated version.

TREMCO
Construction Products Group

Application Company:
Project:
Specification Reference:
Date:

1. Checking Coating & Abrasive Materials and Compressed Air

Storage Conditions for Coatings etc suitable: Yes / No
Identify Coating Material is Correct: Yes / No
Paint Shelf Life Acceptable: Yes / No
Identify Abrasive Type & Size Correct: Yes / No
Check Abrasive for Salt Contamination: OK / Not OK
Check Comp. Air for Oil/Moisture: OK / Not OK

2. Ambient and Surface Conditions

Date	Time	Air Temp (°C)	Surface Temp (°C) **(Must be 3^0C above DP before painting)**	Relative Humidity (%)	Dew Point (°C) **[DP]**	**OK To Paint (Y/N)**

3. Coating Materials & Thinners

Material Storage Temp (°C):

Manufacturer	Product Name	Batch Number		Thinners	
		Part "A"	Part "B"	Type	% Added

4. Surface Preparation

Acceptance of Surface Cleanliness Immediately Prior to C7 Application: Yes / No

Method	Abrasive/Grade	Date	Clean. Class	Profile (µm)	Time to Prime (Hrs)

5. Coating Application & Thickness

Controlled / Open Air: C / OA
Is Application within Encapsulated Area: Yes / No
Nullifire DFT Specified, copy of MTO?
Mesh applied Hollow sections Yes / No……
Deficiency: Yes / No
Location/s, size of rework area:
Rectification Procedure:

Coat	Application				Mix Ratio		WFT (µm)	Dry Film Thickness, µm			
	Method	Date	Time	Mat'l Temp (°C)	Part "A"	Part "B"		Min	Max.	Av'ge.	No. of Reading
Primer											
Primer											
IC											
Top 1st											
Top 2nd											

6. Special Comments

Inspector / Company: **Dates:**
Signature: **Issue of NCR (No):** **Corrected:** **Passed:**
Signature: **Date:**

Application Instructions

Nullifire SC900 Series - Hybrid Intumescents

Nullifire Smart Protection

Specification

Before the application commences, the application contractor should have a copy and be familiar the coating specification to be applied.

The coating specification should be constructed to give the required level of protection against the correctly classified environments in both the construction and completed phases of the project.

The coating specification will generally consist of:

- A primer system at a dry film thickness (DFT) dependent on the environmental conditions, corrosion, and lifetime expectations. **The primer system shall not exceed 150 microns DFT total, with an absolute maximum allowable in overlap areas of 200 microns DFT. Overlap areas are not on flat surfaces, but limited to corners, connections, and attachments, and shall not extend into the adjacent area by more than 100mm.**
- An intumescent base coat at a DFT dependent on the individual steel structure to be protected, derived in accordance with the Product Loading Tables.
- A topcoat system at a DFT dependent on the environmental conditions, aesthetic, and lifetime expectations.

Only primers and topcoats that are specifically approved by Nullifire are suitable for use with Nullifire Intumescent coatings.

Application Site Conditions

On-site application is the general term given to projects where the application of the intumescent coating takes place during the site construction of the building. As well as environments in accordance with ISO12944-2 (i.e., C1, C2, C3, etc.,), this may be internal, semi-exposed or exposed dependent on the stage, size and phasing of construction. This must be understood to provide a suitable specification, and should consider the most severe environment, even if for only a short amount of time. Due to environmental considerations, SC902 Hybrid systems shall be used where increased environmental tolerance is required.

Off-site or in-shop application is the general term given to projects where the application of the intumescent coating takes place in a fabrication or coatings workshop in smaller pieces (such as modular or stick steel) before being transported to site for assembly. Solvent based coatings are generally used for this type of application due to the consistency of drying and less impact from climatic conditions, such as humidity or air movement.

Construction phase – weather resistance performance of the intumescent coating or scheme is given in terms of during the construction phase. This is in reference to the ability of the coating to resist the weather once through dry after achieving the final specified DFT. This is specifically in relation to light water flow (as from rainwater) moving over the surface of the coating without being allowed to accumulate.

Under no circumstances should condensation, ponding, pooling or standing water be allowed to build on the surface of the intumescent. Heavy running water and fresh concrete run-off must also be avoided. Methods to prevent this include, but are not limited to, shelters or physical manipulation of the substrate to prevent this.

Surface Preparation

New steel shall require the removal of all oil, dirt and grease.

1. Blast clean in dry atmospheric conditions using abrasive of suitable type and size, free from fines, moisture and oil, continue blasting until finish complies with BS EN8501:2007, preparation grade Sa 2½, with an average surface profile of 75 microns, and a minimum of 40 microns.
2. Surface profile measurements should be taken and recorded to ensure correct surface profile has been achieved.
3. Remove abrasive residues and all traces of moisture by blowing with clean, dry, oil free compressed air.
4. Apply the specified primer as soon as possible, and before any rust bloom appears or rust rashing occurs. This is recommended as within 4 hours of blasting. If this is not possible, or rust bloom or rust rashing appears, re-blasting should take place.

Daily Records

Before, during and after application, record all environmental conditions, including but not limited to:

1. Air temperature
2. Substrate temperature
3. Relative humidity
4. Dew point
5. Paint temp

- This should be carried out minimum 4 times per application shift and recorded. Best practice would be to use automatic data loggers for continuous recording.

Application Method

Nullifire intumescent coatings are designed to suit airless spray application through electrical or pneumatic equipment. The best aesthetic finish will be achieved using such equipment, with specific guidelines given on the appropriate product Technical Data Sheets.

All equipment should be in good condition. Poor cleanliness and condition can lead to inefficient pump transfer leading to pressure losses affecting spray properties or meaning that higher than recommended and potentially unsafe pressures are needed.

Application by brush or roller is also possible for small areas but will require more application coats to build to the same ultimate DFT as would be achieved by airless spray. the aesthetic finish achieved is also less than that achieved by airless spray.

Application Instructions

Nullifire SC900 Series - Hybrid Intumescents

Nullifire Smart Protection

Primer

1. If all environmental conditions are within the manufacturer's guidelines, application may proceed. If conditions are outside the guidelines, application must not proceed until conditions change.
2. Apply the primer to the specified DFT and inspect all freshly applied surfaces for missed areas/imperfections and carry out appropriate reinstatement measures.
3. When the primer has dried, conduct a dft survey to ensure the specified dft has been achieved and record all readings highlighting any low/high points. Areas of low DFT may need to be increased to meet the specification.
4. If the primer DFT is higher than the maximum allowable (i.e. 150 microns DFT), application of the intumescent should not proceed until corrected and within allowable tolerances. Rectification may include use of power tools to remove coating, or even complete re-blast. Any remediation carried out should still comply with the original specification outlined.

Intumescent

1. Remove all surface contamination (dirt, dust, oil, etc.) from the primed steel surfaces.
2. If the intumescent applicator/contractor is different from the primer applicator, they should ensure that the primer is applied to the correct specification and in line with the guidance above before proceeding.
3. The applicator should visually check for any areas on the primed steel surface that look high in gloss, and any such areas must be abraded/sanded to a matt finish in order to create a good anchor point (surface profile) before the intumescent is applied. Any residue should be removed before progressing, i.e., with clean, dry compressed air or a lint free cloth damped with solvent.
4. Inspect the primed steel sections for any signs of damage caused by erection and transport.
5. If damage is present, carry-out surface preparation and repair as per primer manufacturers guidelines. When all damage has been repaired and areas are clean, dry and free from contamination, application of the intumescent can proceed. ***Caution**: environmental conditions may change unexpectedly. SC900 series intumescent are designed to deliver shower resistance after a short period of drying. This is intended as short periods of light rain only, and not prolonged periods of heavy rain. All precautions must be taken to prevent the build-up of ponding or standing water which may damage the coating and affect performance. Such precautions may include sheltering and position of the substrate to allow run-off.*
6. Consideration needs to be taken when conducting application if the relative humidity is higher than 85%. The higher atmospheric water content will cause the SC900 series intumescent to react faster. This will lead to a shortening of the working pot life. The applied coating will also dry faster.
7. It is recommended as best practice that a small test patch or area be prepared before commencing the full area to ensure that there are no issues with compatibility, adhesion or drying, etc.
8. Onto the primed surface apply the intumescent and conduct Wet Film Thickness (WFT) checks to ensure correct thickness is achieved.
9. Any further coats can be applied after a 4-hour duration, or when the underlying coating is sufficiently dry, dependant on the local environmental conditions. Sufficiently dry can be assessed as the underlying coating is resistance to light pressure when touched.
10. 16-24hrs after the final coat has been applied, conduct a DFT survey to assess if the specified DFT has been achieved. If not, continue until the specified DFT is achieved to the agreed tolerances.
11. When the intumescent specified DFT is achieved, if a topcoat is required, it is recommended to follow the guidelines below:

Hybrid intumescent topcoat recommendation		
Intumescent DFT	<3 mm	24 hours
	>3 mm	48 hours

Thinning

Nullifire Intumescents are designed to be suitable for application without the need for thinning, as long as they are mechanically stirred until homogenous prior to application. However, should the need arise, it is permissible to add thinners to the SC900 series. The thinner type and maximum amount will be indicated on the relevant product Technical Data Sheet. However, the addition of thinners should only be done if absolutely necessary and may impact the ability of the coating to achieve the targeted WFT's. Excessive thinning may lead to longer drying times, potential solvent entrapment or soft coatings, and may lead to defects such as blisters sagging, runs. Any thinner with a water or alcohol content over 0.2% will cause the mixed intumescent reaction to speed up considerably, resulting in an unusable working pot life.

Topcoat

1. Once the intumescent has been applied to the specified DFT, it can be top coated/top sealed in line with the drying recommendations above as long as the intumescent is 'thumb-nail 'resistant.
2. Ensuring the intumescent coating surface is clean, dry, and free from contamination, the topcoat may be applied in line with the specification, ensuring that the manufacturers technical guidance is followed.
3. Particular attention to the thickness and number of coats given in the specification. For higher classified environments (i.e. C3, C4), it may be recommended to apply 2 x 75 micron DFT layers of the same topcoat. This is technically preferred to a single layer of 150 microns, as it is unlikely to have the same defects such as pinholes, cissing, or misses, as it is in a single layer.

Construction Products Group Europe

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2022-03

Application Instructions

Nullifire SC800 Series - Water Based Intumescents

Nullifire Smart Protection

4. It is recommended as best practice that a small test patch or area be prepared before commencing the full area to ensure that there are no issues with compatibility, adhesion or drying, etc. Issues could be encountered from many factors such as changes in formulations since approval was give, unnoticed contamination, etc.

Damage Repair

The procedure for damage repair will depend on the extent of the damage. For large areas, such as full structural elements, it may require return to the original application process.
For smaller areas, the following procedure may be used:

Topcoat only damage:

1. Remove all loose or unsound coating to a firm edge and chamfer the edges using abrasive paper.
2. All surfaces should be clean, dry and free from contamination.
3. The original topcoat should be reinstated in compliance with the original specification.

Intumescent (and topcoat) only - primer is intact:

1. Remove all loose or unsound coating to a firm edge and chamfer the edges using a sharp knife, making sure not to damage the primer, or abrasive paper.
2. The primer surface must be lightly abraded.
3. All surfaces should be clean, dry and free from contamination.
4. The original specification should be reinstated in compliance with the recommended DFT's and overcoating windows.

Damage to substrate – primer is damaged:

1. Remove all loose or unsound coating to a firm edge and chamfer the edges using a sharp knife.
2. All corrosion products must be removed.
3. Prepare the substrate to an appropriate level, ensuring that the surface is not polished if hand tools are used.
4. For C3, C4, you must reinstate the primer to the original specification ensuring that there is no overcoating of any adjacent intact intumescent coating.
5. Continue to reinstate the original specification in compliance with the recommended DFT's and overcoating windows.

Equipment

1. If spray application has to stop for more than 15 minutes, the spray equipment must be cleaned.
2. It is also recommended that the spray equipment is cleaned after the application of every 6-8 kits.
3. Both of these help to prevent damage to the application equipment from reacted intumescent in areas of low movement such as dead spots or cavitations.
4. At the end of use, care should be taken that the equipment is fully cleaned with no dirty solvent left in the equipment. Any dirty solvent with only a small amount of residual SC900 series intumescent may still react to a gel overnight.

Transport and Storage

1. Once the specification has been achieved, the protected steelwork may be stored internally, protected from weathering until transport is required.
2. If storage is to be external, the full coating system must be fully dried and cured.
3. Storage should be done in a way that minimises damage to the coating system. This can be achieved using wooden batons between pieces rather than face to face contact and storing on the flange tips to minimise the surface area of any potential damage.
4. Lifting should be done using lifting points, D shackles and lifting eyes wherever possible. Lifting chains should be avoided, and slings used preferentially.
5. Any damage sustained in storage or transport should be corrected as soon as possible, reinstating the original specification.

Technical Service

Tremco CPG UK Limited has a team of experienced Technical Sales Representatives who provide assistance in the selection and specification of products. For more detailed information, service and advice, please call Customer Services on 01942 251400.

Disclaimer

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Please note the information in this document is intended for guidance only, and it is the responsibility of the Buyer to determine the suitability of the product for its own particular use. Tremco CPG UK Limited has no control over the quality or condition of substrate, or the many factors that can affect the use and application of the product, and as such Tremco CPG UK Limited accept no liability for any loss, injury or damages resulting from such factors. Variations in application conditions, procedures, and steelwork environments can cause unsatisfactory results, therefore always refer to the application instructions or Nullifire Technical Services before use for guidance.
Tremco CPG UK Limited reserves the right to alter product specifications without prior notice, in line with Company policy of continuous development, improvement and any regulatory or legal compliance requirements.
The English language version of this document shall prevail over any other translated version.

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2022-03

Perlifoc HP Eco+

PRODUCT DATA SHEET

SELECTION & SPECIFICATION DATA

Generic Type	Medium density gypsum and EPS based fire resistant mortar with thermal insulation properties for passive fire protection.
Description	Fireproof and ecological mortar for the passive fire protection of steel, concrete, composite concrete-steel sheet slab structural elements, fire compartmentation and fire stop partitions. Fire resistance of up to 4 hours depending on the construction system.
Features	• CE Marked & ETA 20/0894 • High performance filler-based formula • Non-combustible • Best thermal conductivity amongst spray-applied gypsum-based mortars • Asbestos free – Complies with regulations 2003/18/EC and RD 396/2006 • Good adhesion on a variety of substrates • Better efficiency of the consumables in spray equipment due to less abrasive nature of the mortar • Best-in-class loadings for fire ratings up to 4 hours **Environmental Certifications** EPD - Environmental Product Declaration Cradle to Cradle (C2C) Certification VOC content and emission (EN 16516) LEED Compliance (VOC Emission)
Color	Antique white
Finish	Textured Can be troweled
Primer	PERLIFOC HP Eco+ can be applied directly on bare steel and on primed steel. The ETA document highlights compatibility of Berlin with a wide range of primers. For application on galvanised steel, concrete and masonry surface no priming or bond sealer is required. Contact Carboline Technical Service for further information. PERLIFOC HP Eco+ does not promote or prevent corrosion.
Application Thickness	30 mm maximum thickness per coat
Theoretical Coverage Rates	3.5 ± 15% Kg/m2/cm (DISCONTINUOUS machine)[1] 4.1 ± 15% Kg/m2/cm (CONTINUOUS machine)[2] [1] Average value obtained under laboratory conditions, with a mixing speed of 60 rpm for 90 seconds. If any of these parameters are changed, both the final density and the performance could vary. Lower density at higher speed, and higher density with a shorter mixing time. [2] Average value obtained under laboratory conditions.
Limitations	It is not designed for exterior exposure beyond the normal construction phases and timescales. It must not be exposed to the rain or running or pond water. It is not recommended as a refractory mortar or where continuous operating temperatures exceed 90°C.
Topcoats	Generally not necessary. In highly corrosive atmospheres, consult Carboline Technical Service for the selection of the most appropriate coating for the work environment.

SUBSTRATES & SURFACE PREPARATION

General	Before application, the substrates must be clean and free of loose particles, dirt, oil, grease, condensation or any other substance that may affect the adhesion. Contact Carboline Technical Service for further information.
Galvanized Steel	PERLIFOC HP Eco+ can be directly applied to galvanised steel without the need for priming or an adhesion promoter. Ensure that the substrate is clean, free of loose particles, dirt, grease, condensation or salts that could affect the adhesion. Contact the Carboline Technical Service for further information.
Concrete	PERLIFOC HP Eco+ can be directly applied to concrete without the need for priming or an adhesion promoter. Ensure that the substrate is clean, free of loose particles, decorative paints, dirt, grease or condensation that could affect the adhesion. If there are doubts about the condition of the substrate or it has an old coating, the use of a metal mesh prior to the application of the mortar is recommended. Contact the Carboline Technical Service for further information.
Painted/Primed Structural Steel	If the steel structure is not primed, it must be cleaned using an abrasive material to an Sa 2 ½ grade of cleanliness, in accordance with ISO 8501 or equivalent. If it is primed, this must be clean, free of loose particles, dirt, grease or condensation that could affect the adhesion. Furthermore, it must be ensured that the existing primer is compatible with the PERLIFOC HP Eco+ mortar, in accordance with the CE marking. Mesh is not required as per testing standards, however, its use is recommended on beam flanges wider than 500 mm, on columns with only one sprayed face and profiles subject to high deformations. Contact Carboline Technical Service for further information.

PERFORMANCE DATA

All test data was generated under laboratory conditions. Field testing results may vary.

Test Method	Results
Adhesion	> 0.1 MPa (In accordance with EGOLF SM/5)
Asbestos	Does not contain asbestos
Flexural Strength	> 0.2 MPa
Hardened Density	> 480 ± Kg/m^3 (BATCH-MIX machine)[1)] 550 ± 15% Kg/m^3 (CONTINUOUS machine)[2]
Powder Density	350 ± 15% Kg/m^3
Reaction to Fire	A1 (In accordance with EN 13501-1)
Resistance to Compression	> 0.2 MPa
Sound Absorption	aw=0.2 (In accordance with UNE-EN-ISO 354 and 20 mm thickness) NRC=0.2 (In accordance with ASTM C423 and 20 mm thickness)
Thermal Conductivity	0.087 W/mK

MIXING & THINNING

Mixer	1. BATCH-MIX. Use a gypsum mortar mixer or similar with a capacity of at least 100 litres and capable of rotating at 60 rpm with rubber-tipped blades that wipe the sides of the hopper. 2. CONTINUOUS. Contact Carboline Technical Service for recommendations. Densities may vary when using this type of mixing equipment.

MIXING & THINNING

Mixing	Always mix with clean drinking water. The mixer should be kept clean and free of any previously mixed material which could cause premature setting of the product. A 2 bag mix with discontinuous machines is recommended. The mixing time should be approximately 1.5 minutes when mixing at 60 rpm. Use 15.3 ± 1.7 litres of water per 17 kg bag. First add water to the hopper with the blades stopped. With the mixer on, add mortar to the water and start to mix.
Density	To obtain information and recommendations on how to obtain adequate density and performance, contact Carboline Technical Service.
Working Time	1 hour at 20°C, the higher the temperature the shorter the usage time. These times are for guidance and can vary depending on the ambient humidity and air currents. The useful life of the material ends when it hardens and becomes unusable.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Pump	This material may be pumped with a wide range of piston, rotor, stator and compressor pumps designed for pumping cement and plaster materials, including: PFT – model # ZP 3 L Multimix (Batch-mix) Putzmeister – model # S5EV (Batch-mix) Wall Goe – model # JP70-L. (Batch-mix) Putzmeister – model # MP25 (Continuous) PFT – model # G4 Smart (Continuous) Essick – model # FM9/FM5E (Continuous) Hy-Flex – model # HZ-30E (Continuous)
Ball Valves	Ball valves must be fitted on at least one end of the spray hose to facilitate cleaning.
Hose Length	Use a flexible spray hose of between 5 and 10 m in length and at least 25 mm inner diameter. Working pressure at least 30 bar.
Nozzle/Gun	From 10 to 16 mm depending on the desired finish.
Compressor	The pump compressor must be capable of maintaining a minimum of 2 bar (30 psi) and from 250 to 300 l/min at the nozzle.
Air Line	Use a line with an inner diameter of 16 mm. Hose with a minimum burst pressure of 7 bar (100 psi).
Spray Lance	Minimum length of 600 mm and minimum inner diameter of 25 mm. With material shut-off ball valve and air shut-off valve.

APPLICATION PROCEDURES

General	Thicknesses of 30 mm or less can be applied in one pass. When additional coats are required to reach the specified thickness, it is recommended to apply the subsequent coats once the previous coat has started to set. If the previous coat has set and is dry, wet the surface with water before applying additional coats. Contact Carboline Technical Service if further information is required.
Finishing	Normally the finish is a sprayed texture.

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	3°C (37°F)	3°C (37°F)	3°C (37°F)	0%
Maximum	38°C (100°F)	52°C (126°F)	43°C (109°F)	90%

The air and ambient temperatures must be maintained 24 hours before, during and after the application. Gypsum-based mortars are sensitive to water and therefore must be adequately protected. For additional recommendations, contact Carboline Technical Service.

CURING SCHEDULE

Surface Temp.	Dry to Recoat
25°C (77°F)	2 Hours

The overcoat application times are for guidance only and could vary depending on the ambient conditions and air currents. In enclosed areas with little ventilation (basements, confined spaces, etc.), for the mortar to dry properly, it is recommended that the RH does not exceed 60% and there is adequate ventilation, which means at least 4 complete changes of air per hour until the material is dry (or for at least 2 weeks after the end of the application).

CLEANUP & SAFETY

Cleanup	The case, mixer and the hoses should be cleaned with drinking water. Pass sponges or plenty of water through the hoses to remove any material residue that remains in them. Excess wet sprayed mortar should be cleaned with clean drinking water. Dry sprayed mortar may require scraping off to remove it.
Safety	Follow all the safety precautions described in the safety data sheet for the mortar. The use of personal protective equipment is recommended, including overalls, gloves and eye protection.
Overspray	Adjacent surfaces should be protected against damage and splashing. Sprayed fireproof materials can be difficult to remove from surfaces and can damage architectural finishes.
Ventilation	In enclosed areas, ventilation must be no less than 4 complete air exchanges per hour until the material is dry.

TESTING / CERTIFICATION / LISTING

EN Standards	*Fire Resistance to EN standards conducted in accredited laboratories:* **Protection of structural steel elements (EN 13381-4)** Open beams and columns and tubular profiles up to R240 **Protection of structural concrete elements (EN 13381-3)** Columns, beams, slabs and walls up to REI 240 **Protection of concrete/profiled sheet steel composite members (EN 13381-5)** Protection of mixed slabs up to REI 180 **Non loadbearing divisions (EN 1364-1)** Vertical compartment walls classified up to EI 120 **Fire break strips (following the Spanish Ministry of industry)** Strap anchored system up to EI 180 *Reaction to Fire to EN standards conducted in accredited laboratories:* **Reaction to Fire (Classification to EN 13501-1)** Classification A1

PACKAGING, HANDLING & STORAGE

Shelf Life	12 months
Shipping Weight (Approximate)	17 kg/bag (42 bags/pallet)
Storage	Store indoors and in dry environments between 0°C and 50°C. Material must be kept dry or clumping of material may occur.
Packaging	17kg/bag 42 bags/pallet

WARRANTY

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance, injuries or damages resulting from use. Carbolines sole obligation, if any, is to replace or refund the purchase price of the Carboline product(s) proven to be defective, at Carbolines option. Carboline shall not be liable for any loss or damage. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. All of the trademarks referenced above are the property of Carboline International Corporation unless otherwise indicated.

PYROCRETE 60

PRODUCT DATA SHEET

SELECTION & SPECIFICATION DATA

Generic Type	Fireproof mortar for passive fire protection of metal and concrete structures
Description	Portland cement based, low density, fireproof mortar, with high performance against fire for the protection of metal and concrete structures. Density 375 Kg/m3 . High fire performance, optimised consumption and savings in consumables. Suitable for the architectural and construction market.
Features	• Formulation with high performance light fillers. • Non-combustible. • High durability. • It is recommended to be projected with a discontinuous machine to optimise performance. • Asbestos free. Complies with regulations 2003/18/CE and RD 396/2006. • High adhesion on metal and concrete substrates. • Lightweight and low abrasive with projection equipment. Savings in consumables. • Low protection thickness. • Tolerates a wide range of weather conditions.
Color	Grey. Product colour may vary due to variations in the colour of Portland cement.
Finish	Rough. Can be smoothed
Primer	Pyrocrete 60 can be applied directly to concrete or primed metal and is compatible with different families of primers. No pre-priming or bonding is required for application to concrete. Please contact Carboline Technical Service for further information. Pyrocrete 60 neither promotes nor prevents corrosion.
Application Thickness	Maximum thickness per layer 25 mm on concrete substrate and maximum thickness per layer 15 mm on steel. Not recommended for use as a refractory mortar or where normal operating temperatures exceed 90 °C.
Theoretical Coverage Rates	Average value obtained in laboratory conditions, with a kneading speed of 60 rpm and a time of 90 s. If any of these parameters are modified, both the final density and the yield could be altered.
Topcoats	Generally not necessary. In highly corrosive atmospheres, contact Carboline Technical Service for the selection of the most suitable coating for the required exposure.

SUBSTRATES & SURFACE PREPARATION

General	Prior to application, the substrate must be clean and free of loose particles, dirt, oil, grease, condensation or any other substance that may affect adhesion. Contact Carboline Technical Service for more information.
Steel	Apply a suitable anticorrosive primer, preparing the steel as indicated in the product data sheet. Contact Carboline Technical Service for a list of approved primers.
Concrete	Can be applied directly to concrete, no primer or bonding bridge is required.

MIXING & THINNING

Mixer	**Machine:** Discontinuous. Use a plaster mortar mixer or similar with a capacity of at least 100 litres and capable of rotating at 60 rpm with rubber-tipped blades that clean the sides of the hopper. Continued. Contact Carboline Technical Service for recommendations. Densities and yields may vary when using this type of mixing equipment.
Mixing	Always mix with clean potable water. The mixer must be kept clean and free of any previously mixed material that may cause premature setting of the product. Mixing of 2 bags with batch machines is recommended. Mixing time should be approximately 1.5 minutes per mix at 60 rpm. Use 15 litres of water per 15.5 kg bag. Add water to the hopper first with the blades stopped. With the mixer on, add mortar to the water and begin mixing.
Pot Life	1 hour at 20°C, the higher the temperature, the shorter the use time. These times are approximate and may also vary depending on ambient humidity and draughts. The service life of the material ends when it hardens and becomes unusable.
Density	Target paste density: 550 - 650 kg/m³. Paste density measurements are critical to obtain adequate hardened mortar densities. When verifying paste densities, use the following procedures: Equipment required: -1 litre (1000 cc) plastic cup or known volume. -Small metal spatula. -Scale accurate to 1 gram. -Determination of the paste density of PYROCRETE 60: -Weigh the empty glass and then tare the scale. -Use the spatula to fill the beaker completely with kneaded mortar (do not deform the beaker). -Remove excess material from the top of the vessel by placing the vertical edge of the trowel on the top edge of the vessel. Use a sawing motion to level the mortar. PYROCRETE 60 mixed flush with the top of the glass. Weigh the beaker filled with mortar to the nearest gram. Record the weight of the material in grams. This value is equal to the paste density in kg/m³ (g/l). For more information and recommendations on how to get the right density and performance, please contact your Carboline representative.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Pump	This material can be pumped with a wide range of piston, rotor, stator and compressor pumps designed to pump cement and gypsum materials, including: PFT - model # ZP 3 L Multimix (Discontinued) Putzmeister - model # S5EV (Discontinued) Wall Goe - model # JP70-L. (Discontinued) Putzmeister - model # MP25 (Continued) PFT - model # G4 Smart (Continued) Essick - model # FM9/FM5E (Continued) Hy-Flex - model # HZ-30E (Continued) Ball valves should be located at least at the end of the spray hose to facilitate cleaning.
Material Hose	Use flexible spray hose of 5 to 10 m length and at least 25 mm inner diameter. Working pressure at least 30 bar. Minimum length of the spray lance 300 mm and minimum inside diameter 25 mm. With ball valve for material shut-off and air shut-off valve.
Nozzle/Gun	From 10 to 16 mm depending on the desired finish.
Compressor	The pump compressor must be capable of maintaining a minimum of 2 bar (30 psi) and 250 to 300 l/min at the nozzle.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Air Line | Use an internal diameter of 16 mm. Hose with a minimum burst pressure of 100 psi (7 bar).

APPLICATION PROCEDURES

General | Thicknesses of 25 mm or less can be applied in one pass. When additional coats are required to achieve the specified thickness, it is recommended that subsequent coats be applied after the previous coat has begun to set. If the previous coat has set and is dry, dampen the surface with water before applying additional coats. Contact Carboline Technical Service for further information.

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	4°C (39°F)	4°C (39°F)	4°C (39°F)	0%
Maximum	38°C (100°F)	52°C (126°F)	43°C (109°F)	90%

Fresh Pyrocrete 60 must be protected from rain or running water for 24 hours after application. In conditions of low humidity, high temperature, direct sun or wind, the surface of PYROCRETE 60 should be kept moist for at least 12 hours after application by water mist or plastic sheeting to control water loss.
Caution: Do not start spraying if the ambient temperature is expected to drop below 2 °C within 24 hours after application.
For additional recommendations contact Carboline Technical Service.

CURING SCHEDULE

Surface Temp.	Dry to Topcoat
21°C (70°F)	4 Hours

CLEANUP & SAFETY

Cleanup | The liner, mixer and hose must be cleaned with potable water at least once every 4 hours at 21 °C or more often at higher temperatures. Sponges or plenty of water should be passed through the hose to remove any remaining material in the hose. Excess wet sprayed Pyrocrete 60 mortar should be cleaned up with clean potable water. Dry mortar due to spraying may require scraping to remove.

Safety | Follow all safety precautions described in the mortar safety data sheet. The use of personal protective equipment, including application suits, gloves and eye protection is recommended.

Overspray | Adjacent surfaces must be protected from damage and splashing. Sprayed-on fireproofing materials can be difficult to remove from surfaces and may damage architectural finishes.

Ventilation | In enclosed areas, ventilation should not be less than 4 full air exchanges per hour until the material is dry.

TESTING / CERTIFICATION / LISTING

General	Pyrocrete 60 has been tested by: **EN 1363-1.** Fire resistance tests. Part 1: General requirements and Standard. **EN 13381-3.** Test methods for determining the contribution to the fire resistance of structural members Applied protection to concrete members Applus Laboratories. **EN 13381-4.** Test methods for determining the contribution to the fire resistance of structural members Applied passive protection products to steel members by Applus Laboratories.

PACKAGING, HANDLING & STORAGE

Shelf Life	12 to 24 months maximum, provided the product is stored under the recommended conditions.
Storage	Store indoors and in a dry environment. The material must be kept dry or lumps may occur.
Packaging	15 kg bag, 42 bags per pallet.

WARRANTY