Application Instructions

Nullifire SC800 Series - Water Based 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 basecoat 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 in order 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, water based coatings are commonly used, but solvent based coating may 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

1. New steel shall require the removal of all oil, dirt and grease.
2. 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 2.5, with an average surface profile of 75 microns, and a minimum of 40 microns.
3. Surface profile measurements should be taken and recorded to ensure correct surface profile has been achieved.
4. Remove abrasive residues and all traces of moisture by blowing with clean, dry, oil free compressed air.
5. 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, reblasting 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.

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Primer

1. If all environmental conditions are within the manufacturers 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. All precautions must be taken against such events to prevent the build up of ponding or standing water which may damage the coating and affect performance. Such precautions may include delay, shelter and position of the substrate to allow run-off. Any prolonged contact with water after application of the intumescent will have a negative effect that is likely to result in rectification being required. Dependant on the particular product being used, there may be some resistance to flowing rain water in the construction phase only, but this will be identified on the Technical Data Sheet, and is only applicable once the particular intumescent is sufficiently dried.*
6. It is recommended that the application is carried out in areas of good air movement, avoiding direct sunlight.
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. Issues could be encountered from many factors such as changes in formulations since approval was given, unnoticed contamination, etc.
8. Onto the primed surface apply the intumescent in coats of no more than 1000 microns Wet Film Thickness (WFT) per coat, with a single coat per shift or day, depending on the local environmental conditions. This will ensure the Intumescent dries thoroughly as multiple thinner coats will achieve the same level of through dry faster than a single thicker layer.
9. Care should be taken to minimise building excess coating in corners, as this can lead to aesthetic issues on drying, which do not affect the fire performance properties.
10. During the drying process, the following may result in defects in the intumescent coating which may include blisters and mudcracking and should be avoided:
    - Sustained high levels of air movement
    - Direct sunlight
    - Temperatures in excess of 25°C
11. The coating must be 'thumb-nail' dry before applying a subsequent coat. This may be between 1-24 hours dependant on thickness applied and local environmental conditions, particularly air movement and relative humidity.
12. 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.
13. When the intumescent specified DFT is achieved, if a topcoat is required, it is recommended to apply as soon as possible once the intumescent is suitably dried.

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, consult Nullifire for advice.

Topcoat

1. Once the intumescent has been applied to the specified DFT, it can be topcoated/ topsealed 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 should be paid to the thickness and number of coats given in the specification. For higher classified environments (i.e. C3), 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.

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. Any and 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. Reinstate the primer specification ensuring that there is no overcoating of any adjacent sound intumescent coating.
5. Continue to reinstate the original specification in compliance with the recommended DFT's and overcoating windows.

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 by the use of 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 to transport should be corrected as soon as possible, reinstating the original specification.

Concrete Protection

Products within the SC800 range have been tested, assessed and certified for use in the upgrade or restoration of concrete for structural fire protection. Consult the relevant Technical Datasheet for information on approvals held for each product. Preparation of concrete substrates differs from structural steel considerably and the following steps are advised:

1. If possible, determine the date when concrete was poured.
2. Ensure concrete is not wet. Check moisture level of concrete. Before application can commence, the moisture content must be below 5%.
3. Remove any loose or friable material from the concrete surface.
4. Inspect the concrete for damage or defects, such as holes, cracks, etc., and repair any damage or defects with a suitable cement based concrete repair material.
5. Apply a compatible sealer coat/primer to the concrete surface. Tremco CPG recommend the use of Carboguard 1340, Peran Primer W or Hydraseal DPM. For other options, consult Tremco CPG.
6. When all the above steps have been completed, primer is cured and results are acceptable, application of the intumescent can commence.
7. If a topcoat is required for the specification, the same topcoats as recommended for structural steel can be used

Galvanised Steel

1. If galvanised steel needs to be fire protected, intumescent coatings can be used.
2. The guidance given is for fresh or aged galvanised steel.
3. The surface preparation required is dependent on the environment and is applicable to all Nullifire intumescent systems.
4. For specifications for C1 to C3 Internal environments, the surface preparation recommended is application of a mordant wash or etch primer as per manufacturers recommendations, or a sweep blast to produce a surface profile of 40 microns minimum.
5. Where mordant wash or sweep blasting is used, the use of an approved primer is recommended at 25-50 microns. For etch primer, it depends on the specific product used - consult Nullifire.

6. For specifications of C3 External and higher environments, only a sweep blast is recommended to produce a surface profile of 40 microns minimum. A standard specification should then be installed as per Nullifire guidance.

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

Tremco CPG UK Limited products are manufactured to rigid standards of quality. The remedies available for any product which has been applied (a) in accordance with Tremco CPG UK Limited written instructions and (b) in any application recommended by Tremco CPG UK Limited, but which is proved to be defective, are set out in the relevant warranty, a copy of which can be provided on request.
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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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