PPG STEELGUARD®

Application guidelines

CONTENTS

PPG STEELGUARD®

Application guidelines

1. INTRODUCTION

The purpose of this manual is to ensure consistent and correct installation (application) of PPG STEELGUARD intumescent coatings. For the safe handling and use of PPG STEELGUARD reference must also be made to both the latest Product Data and Material Safety Data Sheets.

It should be noted that PPG STEELGUARD intumescent coating systems applied and used may vary on a project-by-project basis and on the certification or standard required.

PPG STEELGUARD intumescent coatings are internationally tested and certified and whilst this manual is not intended as a source for the determination of PPG STEELGUARD loadings or other specification criteria, such information is available to design architects and engineers on request.

The information contained in this manual is based upon independent test data, comprehensive research and field experience, and is considered to be accurate at the time of publication. However, the contents will be subject to revision from time to time due to our policy of continuously improving our products, processes and service.

PPG STEELGUARD comprises a range of solvent-based and water-based single pack intumescent coatings and epoxy-based 2 pack intumescent coatings for onsite and offsite application.

1.1 What is PPG STEELGUARD and where is it used?

The products of the PPG STEELGUARD range are used to enhance the fire resistance of structural materials by providing a layer of insulation, which is formed as a result of a chemical reaction initiated by fire. This insulation reduces the rate of heat transfer and extends the time period for which the structural material can resist the weakening effects of the heat.

Passive fire protection is predominantly used to insulate structural steel elements against damage or collapse, maintaining the load bearing properties of a structure thus allowing evacuation and firefighting measures to be affected.

The aim of these guidelines is to provide relevant technical information to the applicator of PPG STEELGUARD intumescent coatings, helping to ensure that the completed application is fit for purpose.

Since product failure could threaten life in an emergency fire situation, applicators must not deviate from these guidelines without written agreement from PPG.

1.2 Product quality assurance

PPG operates quality systems to ISO 9001. All raw materials are subjected to quality testing before being released for manufacture. Representative batches of the PPG STEELGUARD products are routinely selected from production and subject to factory production control and third-party certification.

1.3 Technical support

PPG has a technical support network second to none in the industry. Our Protective and Marine Coatings business unit, staffed by engineers, chemists, former applicators and other industry professionals, coordinates the front line technical and sales focus for the PPG STEELGUARD product line. To support our customers in the field, we have experienced Field Technical Service personnel working in conjunction with a dedicated Fire Research Department.

PPG STEELGUARD®
Application guidelines

2. SURFACE PREPARATION AND PRIMING

2.1 Conditions of steelwork prior to surface pre-treatment
Prior to blast cleaning the steelwork shall be prepared to ISO 8501-3 P3.

2.2 Blast cleaning of steel substrates
The standard required for abrasive blasting is according to ISO 8501-01. Immediately prior to painting, the minimum acceptable standard will be ISO Sa 2½. The blast profile (Rz) must be in accordance with product system sheet and / or product data sheets recommendations. Blasting abrasive shall be clean, dry, sharp angular, free of clay, salt, oil and other foreign matter. Abrasive other than steel or iron grit shall not be recycled. Recycled abrasives shall be replaced at a rate necessary to maintain a sharp angular profile within the range specified for the product being applied over the blasted surface. Moisture content for abrasives delivered in bags shall not exceed 0.5% by weight. The conductivity of abrasives prior to treatment should not be higher than 300 µS/cm (see Information Sheet 1491). After blasting and immediately prior to coating, the blasting dust and abrasives shall be removed by using a high pressure air blow off and followed by vacuum cleaning.

2.3 Galvanized steel
Galvanizing should be considered as a special type of surface treatment that requires extra care and attention in its preparation prior to the application of PPG STEELGUARD intumescent coatings.

Ensure the galvanized surface is correctly applied and fit for purpose.

The galvanizing process onto structural steel can result in either a dull matt grey finish, which is most common for heavy weight steel, or to less of an extent, glossy, spangled, metallic silver finish on lightweight sections. On exposure to moisture/ weather, zinc salt formation will start to form on their surfaces at varying rates depending on conditions to form a tough layer which can be tightly adhered to the galvanized zinc layer. The galvanizing process may also leave behind oil/grease on the surface. It is important that ALL contamination is removed prior to any coating application for this we recommend the use of Prep 88 with the assistance of abrasive pads such as Scotchbrite to remove stubborn, often invisible, salt contamination, rinsing after with fresh clean water and allow to dry before proceeding.

PPG only recommend sweep blasting as pre-treatment of galvanized steel prior to the application of our PPG STEELGUARD intumescent coatings.

Once you have achieved a clean, dry and sound galvanized substrate:
- Sweep blast surface to provide adequate profile and remove any stubborn contamination. NB: finish may not resemble a bright silver but a darker shade, it is advised that the visual standard of surface preparation is agreed upon prior to commencement of work.
- Apply a mist coat of the selected primer, thinned 25 to 30% by volume with Thinner 91-92 to seal the surface.
- Apply by airless spray a full coat of selected primer to full PDS thickness.

PPG STEELGUARD®

Application guidelines

24 Cast iron

Although not as widely used today as structural elements, cast iron may be found in many historic buildings during restoration work. It is not possible to cover all surface preparation scenarios, therefore each project must be considered individually. It is likely that the cast iron will have been coated with multiple layers of various paints, some of which may be lead-containing, so relevant safety precautions must be taken to remove these. Cast iron is a porous material with the pores likely be contaminated with, for example, salts therefore additional care should be taken.

Once you have achieved a clean, dry and sound cast-iron substrate:

- Sweep blast surface to provide adequate profile and remove any stubborn contamination. NB: finish may not resemble a bright silver but a darker shade, it is advised that the visual standard of surface preparation is agreed upon prior to commencement of work.
- Apply a mist coat of the selected primer, thinned 25 to 30% by volume with Thinner 91-92 to seal the surface.
- Apply by airless spray a full coat of selected primer to full PDS thickness.

25 Thermal metal (Zinc/Aluminium) sprayed coatings (for use with solvent-based and epoxy-based PPG STEELGUARD only)

Thermal metal sprayed coatings must be correctly applied as described in ISO 2063. These coatings are porous and require sealing immediately after application. Seal the thermal metal spray porosity using a mist coat of thinned PPG SIGMACOVER 280 (thinned 25 to 30% by volume with Thinner 91-92) by airless spray. Once the mist coat has cured and solvent evaporated, apply a full coat of PPG SIGMACOVER 280 to achieve 60µm dry film thickness. The surface is now ready to receive PPG STEELGUARD intumescent coatings.

PPG STEELGUARD®
Application guidelines

3 APPLICATION

3.1 Storage of materials
The storage temperature for solvent-based PPG STEELGUARD intumescent materials should be between 5-40°C (41-104°F) and for water-based products between 10-30°C (50-86°F). Waterborne products should be protected from frost and freezing temperatures.

3.2 General environmental conditions
The surface temperatures should be in the range of 5-40°C (41-104°F) for solvent-based and 10-40°C (50-104°F) for water-based intumescent products, and at least 3°C above dew point. The maximum relative humidity shall not exceed 85% for solvent-based and epoxy-based, and 80% for water-based intumescent products during application and drying. For primers and topcoats, please refer to the relevant product data sheets.

3.3 Primer selection and application
All primers used in conjunction with intumescent coatings MUST be approved by PPG. A list of approved PPG primers can be found in Information Sheet 1224, relevant UL263 certification or European CE Mark DoP. For the recommended surface preparation, application conditions and overcoating intervals please see the relevant product data sheets.

Should the primer have been supplied by a third party or not be listed on Information Sheet 1224, please contact PPG.

3.3.1 Primer approval
Any unlisted primer to be used with PPG STEELGUARD intumescent coatings MUST have the approval of PPG. As a minimum the product data sheet and the material safety data sheet will be required to allow for an evaluation. In some cases, a wet sample will be necessary additionally so compatibility can be investigated by laboratory testing prior to an approval.

3.4 Intumescent coating application
Before the application of the intumescent coating the following conditions shall be met:

- The primer must have been applied in accordance with the relevant Product Data Sheet
- The primer shall be within its stated overcoating period
- The primer shall be intact and free from damage and degradation
- The primer shall be clean, dry and free from any contamination

The application shall be carried out preferably by airless spray and in accordance with the relevant product data sheet. The dry film thicknesses to be applied depend on the fire scenario, the steel section types and certification specified for the project. More than one coat may be required to achieve the specified dry film thickness.

3.4.1 Primer-less application (non UL263/European CE MARK)
For offsite application of PPG STEELGUARD 550, 701, 751, 801, 802, 803, 851 and 951, the intumescent coating may be applied direct to a steel substrate prepared as prescribed in paragraph 2, provided the DFT exceeds 350µm and the steelwork will be exposed to dry internal (C1) conditions only (up to C3 in the case of PPG STEELGUARD 951).

3.4.2 Touch-dry times and overcoating intervals
All drying times and overcoating intervals stated in the tables are valid for non-thinned material only. These figures are given as a guide only. Factors such as air movement and humidity must also be considered.

When using the following tables, the highest measured dry film thickness (not the specified dry film thickness) must be used for determination of touch dry times and overcoating intervals.

High dry film thicknesses often occur in overlap areas, such as web/flange interfaces.

PPG STEELGUARD®

Application guidelines

Table 1: Touch dry time for PPG STEELGUARD 550, 701 and 751					
DFT	**Substrate temperature**				
	5°C (41°F)	10°C (50°F)	15°C (59°F)	20°C (68°F)	30°C (86°F)
Up to 700 µm (28 mils)	120 minutes	90 minutes	60 minutes	30 minutes	20 minutes

Note: The times stated above are indicative and assume good ventilation and relative humidity below 85%

Table 2: Touch dry time for PPG STEELGUARD 801, 802, 803 and 851					
DFT	**Substrate temperature**				
	5°C (41°F)	10°C (50°F)	15°C (59°F)	20°C (68°F)	30°C (86°F)
Up to 700 µm (28 mils)	60 minutes	45 minutes	20 minutes	15 minutes	10 minutes

Note: The times stated above are indicative and assume good ventilation and relative humidity below 85%

Table 3: Touch dry time for PPG STEELGUARD 651					
DFT	**Substrate temperature**				
	5°C (41°F)	10°C (50°F)	15°C (59°F)	20°C (68°F)	30°C (86°F)
Up to 700 µm (28 mils)	Not recommended	4 hours	2 hours	2 hours	1 hour

Note: The times stated above are indicative and assume good ventilation and relative humidity below 80%

Table 4: Overcoating intervals for PPG STEELGUARD 550, 701 and 751						
Overcoating with…	**Interval**	**5°C (41°F)**	**10°C (50°F)**	**15°C (59°F)**	**20°C (68°F)**	**30°C (86°F)**
Itself	Minimum	12 hours	10 hours	8 hours	6 hours	4 hours
	Maximum	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited

Notes:
- The minimum times stated above are indicative and assume good ventilation and relative humidity below 85%
- Secondary surface pre-treatment may be required to ensure the coating is dry, sound and free from any contamination

Table 5: Overcoating intervals for PPG STEELGUARD 801, 802, 803 and 851						
Overcoating with…	**Interval**	**5°C (41°F)**	**10°C (50°F)**	**15°C (59°F)**	**20°C (68°F)**	**30°C (86°F)**
Itself	Minimum	10 hours	8 hours	6 hours	4 hours	3 hours
	Maximum	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited

Notes:
- The minimum times stated above are indicative and assume good ventilation and relative humidity below 85%
- Secondary surface pre-treatment may be required to ensure the coating is dry, sound and free from any contamination

PPG STEELGUARD®
Application guidelines

Table 6: Overcoating intervals for PPG STEELGUARD 651 with itself						
Overcoating with…	**Interval**	**5°C (41°F)**	**10°C (50°F)**	**15°C (59°F)**	**20°C (68°F)**	**30°C (86°F)**
Itself	Minimum	Not recommended	24 hours	20 hours	16 hours	12 hours
	Maximum	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited

Notes:
- The minimum times stated above are indicative and assume good ventilation and relative humidity below 80%
- Secondary surface pre-treatment may be required to ensure the coating is dry, sound and free from any contamination

3.4.3 Exposure of PPG STEELGUARD intumescent coatings without topcoat

PPG STEELGUARD intumescent coatings do not require any topcoat for certain internal exposure conditions, except for esthetic reasons – refer to Information Sheet 1226, UL263 certification or DoP/European CE Mark products. PPG PPG STEELGUARD 550, 701, 751, 801, 802, 803 and 851 may be exposed to weathering for a limited period without topcoat, provided:

- A suitable primer had been applied
- The intumescent coating had been applied at a minimum dry film thickness of 170 µm
- The intumescent coating is not exposed to running and pooling water, hot humid climates, constant condensation or immersion conditions

PPG STEELGUARD 951 does not require topcoat for any exposure conditions.

Table 7: Minimum drying times prior to outdoor exposure of PPG STEELGUARD 550, 701 and 751						
DFT	**Number of coats**	**5°C (41°F)**	**10°C (50°F)**	**15°C (59°F)**	**20°C (68°F)**	**30°C (86°F)**
≤ 1000 µm (40 mils)	1	60 hours	50 hours	40 hours	30 hours	24 hours
1001-1400 µm (40-56 mils)	2	72 hours	60 hours	48 hours	36 hours	30 hours
1401-2100 µm (56-84 mils)	3	84 hours	72 hours	60 hours	48 hours	36 hours
> 2100 µm (84 mils)	4+	> 96 hours	> 84 hours	> 72 hours	> 60 hours	> 48 hours

Notes:
- The times stated above are indicative and assume good ventilation and relative humidity below 85%

Table 8: Minimum drying times prior to outdoor exposure of PPG STEELGUARD 801, 802, 803 and 851						
DFT	**Number of coats**	**5°C (41°F)**	**10°C (50°F)**	**15°C (59°F)**	**20°C (68°F)**	**30°C (86°F)**
≤ 1000 µm (40 mils)	1	40 hours	28 hours	20 hours	12 hours	10 hours
1001-1400 µm (40 – 56 mils)	2	48 hours	36 hours	24 hours	16 hours	12 hours
1401-2100 µm (56-84 mils)	3	60 hours	48 hours	36 hours	24 hours	16 hours
> 2100 µm (84 mils)	4+	> 72 hours	> 60 hours	> 48 hours	> 36 hours	> 24 hours

Notes:
- The times stated above are indicative and assume good ventilation and relative humidity below 85%

PPG STEELGUARD®
Application guidelines

Table 9: Maximum direct outdoor exposure of PPG STEELGUARD intumescent coatings	
Product	**Exposure time**
PPG STEELGUARD 651	Not suitable
PPG STEELGUARD 550, 701, 751, 801, 802, 803, 851	up to 12 months
PPG STEELGUARD 951	Indefinite

3.4.4 Application and curing of xylene-based products (PPG STEELGUARD 700 series) in tropical conditions / temperatures constantly above 25°C (77°F)

When applying solvent-based intumescent coatings at temperatures constantly above 25°C (77°F) it is important that solvent entrapment due to paint skin formation is avoided. This is especially important where DFTs >1000 microns are concerned. To avoid this issue, it is recommended to apply multiple thinner coats of 750 microns DFT rather than the maximum DFT/coat stated in the product datasheet. A minimum overcoating interval of 24 hours is required. Direct exposure to sunlight should be avoided.

3.5 Topcoat selection and application

Before the application of the topcoat the following conditions shall be met:

- The intumescent coating must have been applied in accordance with the relevant product data sheet.
- The intumescent coating shall be within its stated overcoating period for the maximum dry film thickness achieved on a single member.
- The intumescent coating must have been applied at the specified dry film thickness because the intumescent coating thickness cannot be topped up after the topcoat has been applied.
- The intumescent coating shall be intact and free from damage and degradation.
- The intumescent coating shall be clean, dry and free from any contamination.

All topcoats applied on PPG STEELGUARD intumescent coatings have to be approved by PPG and have to be applied according to the relevant Product Data Sheet and within the approved dry film thickness range.

A list of approved PPG topcoats can be found on Information Sheet 1226, UL263 certification or DoP/European CE MARK.

Table 10: Minimum overcoating intervals for PPG STEELGUARD 550, 701 and 751 with PPG STEELGUARD 2458						
DFT	**Number of coats**	**5°C (41°F)**	**10°C (50°F)**	**15°C (59°F)**	**20°C (68°F)**	**30°C (86°F)**
≤ 1000 µm (40 mils)	1	4 hours	2 hours	90 minutes	60 minutes	45 minutes
1001 - 1400 µm (40 - 56 mils)	2	6 hours	4 hours	3 hours	2 hours	90 minutes
1401 - 2100 µm (56 - 84 mils)	3	10 hours	8 hours	6 hours	3 hours	2 hours
> 2100 µm (84 mils)	4+	> 20 hours	> 16 hours	> 8 hours	> 4 hours	> 3 hours

Notes:
- The times stated above are indicative and assume good ventilation and relative humidity below 85%

PPG STEELGUARD®

Application guidelines

Table 11: Minimum overcoating intervals for PPG STEELGUARD 801, 802, 803 and 851 with PPG STEELGUARD 2458						
DFT	**Number of coats**	**5°C (41°F)**	**10°C (50°F)**	**15°C (59°F)**	**20°C (68°F)**	**30°C (86°F)**
≤ 1000 µm (40 mils)	1	2 hours	90 minutes	60 minutes	30 minutes	20 minutes
1001 - 1400 µm (40 - 56 mils)	2	4 hours	3 hours	2 hours	60 minutes	45 minutes
1401 - 2100 µm (56 - 84 mils)	3	8 hours	6 hours	4 hours	2 hours	90 minutes
> 2100 µm (84 mils)	4+	> 16 hours	> 8 hours	> 6 hours	> 3 hours	> 2 hours

Notes:
- The times stated above are indicative and assume good ventilation and relative humidity below 85%

Table 12: Minimum overcoating intervals for PPG STEELGUARD 550, 701 and 751 with other approved PPG topcoats						
DFT	**Number of coats**	**5°C (41°F)**	**10°C (50°F)**	**15°C (59°F)**	**20°C (68°F)**	**30°C (86°F)**
≤ 1000 µm (40 mils)	1	3 days	3 days	60 hours	24 hours	24 hours
1001 - 1400 µm (40 - 56 mils)	2	12 days	9 days	5 days	3 days	48 hours
1401 - 2100 µm (56 - 84 mils)	3	18 days	12 days	9 days	7 days	3 days
> 2100 µm (84 mils)	4+	> 24 days	> 21 days	> 12 days	> 7 days	> 5 days

Notes:
- The times stated above are indicative and assume good ventilation and relative humidity below 85%

Table 13: Minimum overcoating intervals for PPG STEELGUARD 801, 802, 803 and 851 with other approved PPG topcoats						
DFT	**Number of coats**	**5°C (41°F)**	**10°C (50°F)**	**15°C (59°F)**	**20°C (68°F)**	**30°C (86°F)**
≤ 1000 µm (40 mils)	1	1 days	60 hours	48 hours	24 hours	24 hours
1001 - 1400 µm (40 - 56 mils)	2	7 days	5 days	3 days	48 hours	36 hours
1401 - 2100 µm (56 - 84 mils)	3	9 days	7 days	5 days	3 days	48 hours
> 2100 µm (84 mils)	4+	> 12 days	> 9 days	> 7 days	> 5 days	> 4 days

Notes:
- -The times stated above are indicative and assume good ventilation and relative humidity below 85%

PPG STEELGUARD®
Application guidelines

Table 14: Minimum overcoating intervals for PPG STEELGUARD 651 with other approved PPG topcoats						
DFT	**Number of coats**	**5°C (41°F)**	**10°C (50°F)**	**15°C (59°F)**	**20°C (68°F)**	**30°C (86°F)**
≤ 700 µm (28 mils)	1	Not recommended	24 hours	20 hours	18 hours	14 hours
701 – 1250 µm	2	Not recommended	24 hours	20 hours	18 hours	14 hours

Notes:
- The times stated above are indicative and assume good ventilation and relative humidity below 80%

3.6 Bolted connections

Correct surface preparation of all areas prior to painting is critical to ensure performance of the coating system and the correct preparation of bolt heads is no exception, however, it is appreciated that abrasive blast cleaning is impractical. All bolts and connectors must be prepared in accordance with the correct PPG coatings specification. Generally, bolts/ fasteners are supplied in one of the following conditions:

Black/self-color bolts – untreated steel bolts
Zinc-plated bolts – electro zinc plated bolts
Galvanized bolts – hot-dipped galvanized steel bolts
Sherardized bolts – zinc coated bolts

Due to the increased mass of steel around connection points, the critical steel failure temperature in these areas (in fire conditions) are normally lower than the rest of the steel member. The DFT of PPG STEELGUARD intumescent coatings applied in these connection areas should however be the same as for the whole parent section.

Bolt Type	Environment (ISO12944)	Surface preparation & pretreatment immediately prior to application of PPG STEELGUARD intumescent
Black / Self-colour Bolts	C1 - C4	Ensure surfaces to be coated are clean, dry, sound and free from contamination prior to coating. As part of this process apply and remove PPG PREP 88 cleaner/degreaser. Mechanically prepare to ISO 8501-1 St 3 standard Apply suitable approved surface tolerant primer @ 50µm minimum DFT prior to application of PFP
Zinc Plated & Sheradised Bolts	C1 – C4	Ensure surfaces to be coated are clean, dry, sound and free from contamination prior to coating. As part of this process, apply and remove PPG PREP 88 cleaner/degreaser. PPG STEELGUARD solvent borne coatings can then be applied directly to zinc-plated bolts for C1 and C2 internal conditions. For C2 external, C3 and C4 environments, apply suitable approved surface-tolerant primer at 50µm minimum DFT prior to application of PFP. Waterborne coatings are only suitable for C1 and C2 internal conditions, however, a suitable approved surface-tolerant primer at 50µm minimum DFT is required prior to application of PFP.
Galvanized Bolts	C1 – C4	Ensure surfaces to be coated are clean, dry, sound and free from contamination prior to coating. As part of this process, apply and remove PPG PREP 88 cleaner/degreaser with the assistance of abrasive pads such as Scotchbrite to remove stubborn, often invisible, salt contamination. Wash down and allow to dry. All PPG STEELGUARD coatings will require the application of a tie coat such as PPG SIGMACOVER 280 at 50µm DFT prior to application.

PPG STEELGUARD®
Application guidelines

3.7 Shear studs
Other than for aesthetic requirements there is no requirement to repair damage from correctly installed shear studs

4. THICKNESS CONTROL OF THE INTUMESCENT COATING

4.1 Wet film thickness measurement
Wet film thickness (WFT) measurements shall be taken as necessary during the application using a wet film gauge. WFT measurements indicate the thickness of individual coats. On subsequent coats, care should be taken with single pack coatings as readings may be misleading due to the gauge sinking into a softened previous coat. For PPG STEELGUARD 951, the WFT measurement will be the same as the DFT measurement due to it being 100% solids.

4.2 Dry film thickness measurement – general guidance
Instruments for dry film thickness (DFT) measurement use the magnetic induction principle. They shall have a range appropriate to the specified DFTs and capable of storing data. The instruments shall be calibrated prior to use. DFT readings shall be taken when the intumescent coat is sufficiently hard and dry to prevent the probe indenting the surface. The use of shims placed on the surface to check the DFT of subsequent coats is recommended.

The final DFT applied (allowing for the primer) shall be in accordance with the specification.

The readings shall be taken as follows:

I-section, T-sections and channels

Webs	two readings per meter length on each face
Outer flanges	two readings per meter length on each face
Inner flanges	one readings per meter length on each face

Square hollow sections and angles
Two readings per meter length on each face

Circular hollow sections
Eight readings per meter length spread evenly around the section

No readings taken within 25mm of a flange edge or web-flange junction shall be used for the purposes of assessing adequacy.

Where members are less than 2m in length, three sets of readings shall be taken, one at each end and at the center of the member. Each set shall comprise the number of readings on each face given above, as appropriate.

PPG STEELGUARD®
Application guidelines

4.3 Dry film thickness acceptance criteria

The acceptance criteria shall be as follows, based on the specified DFT being a nominal value:

a) The average DFT applied to each element shall be greater than or equal to the specified nominal value.
b) The average measured DFT on any face of any member shall not be less than 80% of the specified nominal value.
c) DFT values less than 80% of the specified nominal value are acceptable, provided that such values are isolated and that no more than 10% of the readings on a member are less than 80% of the specified nominal value. Where any single thickness reading is found to be less than 80% of the specified nominal value, a further two, or where possible three, readings shall be taken within 150 to 300mm of the low reading. The initial reading may be considered isolated if all the additional readings are at least 80% of the specified nominal value. If one or more of the additional readings are less than 80% of the specified nominal value, further readings shall be made to determine the extent of the area of under thickness. In such cases, low thickness areas identified should be brought up to the required thickness before proceeding to the next application stage.
d) All DFT shall be at least 50% of the nominal value.
e) The average measured DFT of any face of any member should not exceed the certified maximum thickness for the particular member shape and orientation.
f) For CE Marked products, refer to specific product Declaration of Performance (DoP) for approved primer and topcoat thicknesses.

4.4 Quality control

All records should identify the areas inspected with reference to the relevant drawings, and should include:

a) Environmental conditions – air and substrate temperature, relative humidity and dew point.
b) DFT per coat and for the full fire protection system, for each element of the structure. Measurements should include:
   - The member identification mark
   - The number of readings taken
   - Maximum coating thickness recorded
   - Minimum coating thickness recorded
   - Average coating thickness
   - Any supplementary readings taken to establish if low readings (below 80% of specification) are limited and isolated areas.
c) Variations, corrective actions or concessions carried out in relation to environmental conditions or dry film thicknesses.

PPG STEELGUARD®
Application guidelines

5. HANDLING OF COATED STEEL SECTIONS – STORAGE, TRANSPORTATION AND ERECTION

Where the intumescent designed for off-site application the following precautions should be taken.

5.1 Handling
The use of harnesses, nylon slings, webbing, etc. should be used to reduce damage.
Note: wire slings or chains must not be used.

5.2 Storage and transportation
During transportation, separators shall be provided to prevent steel-to-steel contact, and these shall be adequate for their intended use. Clean, smooth timbers have been used successfully on previous projects. The additional use of strips of heavy gauge Visqueen-type damp proof membrane may assist in reducing damage at contact points.

During transportation, lashings shall be used in such a way as to minimize damage, subject to the constraints of safety. Special lifting harnessed, nylon slings, webbing etc. should be used to help spread loads over a larger surface area, thereby reducing damage to the coatings.

During transportation, intumescent coated surfaces shall not be placed in direct contact with each other or in contact with bare steel surfaces.

Intumescent coating systems must be protected from ponding water at all times.

5.3 Stacking
The number of layers in a stack shall be limited to a maximum of three. The bottom layer shall be laid on separators raised above the ground and the splash zone.

When stacking, intumescent coated surfaces shall not be placed in direct contact with each other or in contact with bare steel surfaces.

Where appropriate, adequate covering shall be provided to stacked coated steelwork to minimize exposure to adverse weather conditions.

The intumescent coating system must be protected from ponding water at all times.

5.4 Erection
The use of harnesses, nylon slings, webbing etc. should be used to reduce damage.
Note: wire slings or chains must not be used.

PPG STEELGUARD®

Application guidelines

6. TOUCH UP AND REPAIR

6.1 Damage back to bare steel

a) Cut out the coating system to 10-20mm from the damaged area in all directions.
b) Prepare the steel to ISO 8501-1 St3. The substrate should be dry, sound and free from all contaminations and provide a sufficient roughness for the specified primer.
c) Apply the primer to the specified DFT. The primer has to be approved for use under PPG STEELGUARD intumescent coatings and must be suitable for ISO 8501-1 St3 prepared steel substrates.
d) After curing of the primer, slightly abrade 25-30mm of the surrounding sound coating system to remove the existing topcoat.
e) Reinstate the specified DFT of the intumescent coating using the original PPG STEELGUARD product. Take care not to excessively overlap the existing intumescent coating or topcoat.
f) If the intumescent coating had been top coated, overcoat the repaired areas with the original topcoat to the specified DFT, overlapping the sound finish by 50mm.

6.2 Damage to the intumescent coating

a) If the intumescent coating systems had been top coated, remove all loosely adhered topcoat and slightly abrade.
b) Ensure the exposed areas of intumescent coating are sound, dry and clean from any contamination.
c) Reinstate the specified DFT of the intumescent coating using the original PPG STEELGUARD product. Take care to not excessively overlap the existing intumescent coating or topcoat.
d) If the intumescent coating had been top coated, overcoat the repaired areas with the original topcoat to the specified DFT, overlapping the sound finish by 50mm.

LIMITATION OF LIABILITY