PPG PITT-CHAR® NX APPLICATION GUIDELINES

CONTENT

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1 INTRODUCTION

1.1 Scope

The purpose of these application guidelines is to provide information regarding how to consistently and correctly apply the PPG PITT-CHAR NX, including the reinforcement mesh requirements. These guidelines are not intended as a source for the determination of the PITT-CHAR NX loadings or other specification criteria.

For the safe handling and use of the PITT-CHAR NX, reference should also be made to both the Product Data Sheets (PDS) and the Safety Data Sheets (SDS) available on-line.

These guidelines are subject to the following:

1. Compliance with all applicable standards, regulations and legislation of governmental bodies
2. All equipment used is fully serviced and suitable for use with the PITT-CHAR NX and all health & safety recommendations of the equipment manufacturer followed.
3. All applicators should be trained, competent and qualified in the application of the PITT-CHAR NX for the type of application being undertaken – please refer to the QAP program.

The information contained in these guidelines is based upon independent test data, research and field experience, and is believed by PPG to be accurate at the time of publication. However, the contents are not to be construed as warranties to performance or results and will be subject to review and revision from time to time due to our policy of continuously improving our products, processes and service.

The information provided in these application guidelines is not intended to be exhaustive; any person applying the product, by any method, or in any circumstance other than that specifically recommended in these application guidelines, should first obtain PPG's written confirmation as to the suitability of the proposed method. Additionally, there are many factors that can affect the application of the PITT-CHAR NX, which PPG cannot control or account for in these guidelines, such as the quality or condition of the substrate. Accordingly, the applicator is responsible for ensuring that the PITT-CHAR NX is correctly applied given the specific factors affecting the applicator's use of the PITT-CHAR NX.

These guidelines are a minimum set of requirements, and additional and/or higher-level requirements may be set in clients' specifications or project specifications; in which case the additional and/or higher-level requirements should be adopted.

In the event of any doubt or lack of understanding, PPG Technical Support should be consulted for clarification.

1.2 Definitions

The following definitions are used throughout this document:

Word	Definition
Should	A preferred course of action
May	Indicates one acceptable course of action
Minimum	Indicates a mandatory requirement

International standards (ISO) and metric units (SI Units) are used generally throughout these guidelines; where other standards and units are used these are for guidance purposes only and typically the nearest convenient unit will be used e.g. 1 meter as a measure of length may be approximated to 3 feet where such use is appropriate.

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1.3 Acronyms and Abbreviations

The following Acronyms and Abbreviations are used throughout these guidelines:

Acronym or Abbreviation	Meaning
DFT	Dry Film Thickness
FTS	Field Technical Service
Mil	One thousandth of an inch
PDS	Product Data Sheet
PF	Plural Feed
PFP	Passive Fire Protection
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
SDS	Safety Data Sheet
Thou	One thousandth of an inch
WFT	Wet Film Thickness

1.4 Health & Safety

The PITT-CHAR NX requires due care when handling. Warnings presented on PPG product labels, SDS's and in this manual should be heeded. This manual is intended to serve as a supplement to SDS and label information. Refer and become familiar with all precautionary information prior to use of these products. Always follow manufacturer's recommendations with respect to spray equipment and any other equipment used.

Although the product is normally applied solvent-free, solvents are also used for rolling & finishing and cleaning of tools and equipment. Due consideration should be made with regards to health and safety.

1.4.1 Personal Protective Equipment (PPE)

The tasks and worksite should be evaluated with a risk assessment to determine what hazards are present, or likely to be present, based on the product handling, use and application conditions. All identified hazards should be removed where possible with the use of personal protective equipment (PPE) being a last resort to mitigate the remaining risks. Appropriate PPE, suitable
for the work to be performed, should then be selected based on the hazards or potential hazards identified. Employees should be trained on the proper use and limitations of PPE used. Refer to the SDS for a selection of appropriate PPE for all materials used. Use of eye protection, gloves, respiratory protection and protective clothing should be considered for your particular use conditions when using the PITT-CHAR NX.

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1.4.2 First Aid

Skin and eye contact with PITT-CHAR NX material should be addressed by flushing the affected area(s) with large quantities of clean water as soon as possible. Proper eye wash facilities should be immediately accessible to employees. The location and proper operation of the nearest eyewash and safety shower should be established before any job is started. Always consult the product safety data sheet on what first aid measures are required.

1.5 Environmental

It is important that PPG products be stored and used safely. However, we are especially concerned with the issue of disposal of waste from the use of our products. We believe that all paint-related waste materials should be disposed of properly in a way that poses minimal risks to people and our environment. For this reason, only those quantities necessary for application should be used on the job site. For the disposal of PITT-CHAR NX material refer to applicable laws and regulations and/or seek the advice of specialist waste disposal providers. PPG recommends that unmixed materials are mixed prior to disposal.

1.6 Field Technical Support

PPG has a global Field Technical Service (FTS) network available to assist with any queries and provide project specific technical advice to aid with the application of the PITT-CHAR NX, however FTS are not accountable as project inspectors and all application work, quality control and inspection remains the responsibility of the applicator. Please consult the regional PPG FTS in the first instance for technical support. PPG also recommend there also be a QA/QC inspector instructed by the owner/applicator for each project. All party's involvement should be agreed during a project kick-off meeting.

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2 MATERIAL HANDLING AND STORAGE

2.1 Pack Sizes

The PITT-CHAR NX is available in the following standard pack sizes: (Note: the application of PITT-CHAR NX is based on an applied density and measured by weight not volume).

PPG PITT CHAR NX Kit	Details
Plural Feed (PF) Kit 	• Supplied in bulk filled containers suitable for machine filling of a heated plural feed spray machine • Consists of 2 pails of base (2 x 22.92 kg each) and 1 pail of hardener (14.16 kg) = 60 kg (132.3 lbs.) kit size
Single Feed (SF) Kit 	• Supplied in partial filled containers to allow mixing within the pail for application by single feed airless spray pump with follower plate or trowel application. • Consists of 1 pail of base (15.28 kg) and 1 pail of hardener (4.72 kg) = 20 kg (44.1 lbs) kit size

2.2 Storage Environment

PITT-CHAR NX materials should be stored indoors and out of direct sunlight, the following storage temperature ranges should be maintained:

- General Storage: minimum 0°C (32°F) and maximum 30°C (86°F)
- Preconditioning of material before application is recommended. Please refer to the relevant application method in Section 6 of this document for more details.

NOTE: Where storage conditions deviate from these limits' advice should be sought from PPG's FTS

In order to achieve the correct temperatures listed above it may be necessary to use heated or cooled storage units, especially in cold or hot temperate climates. It is recommended that where the material has been stored at low temperatures, i.e. less than 5°C (41°F), that the temperature should be raised gradually to application temperature over a period of 48 hours.

Such storage units are typically built from standard site storage containers. The container will generally be lined with thermal insulation and should be suitably ventilated.

Accelerated methods of heating PITT-CHAR NX pails prior to use, such as electrical heaters in direct contact with the pail or hot water baths are not permitted. Such methods can cause overheating of the outer layers of material in the pail, which may produce undesirable changes to its properties (including a shorter pot life).

3 SUBSTRATES AND SURFACE PREPARATION

3.1 Surface Preparation

All surfaces to be protected by the PITT-CHAR NX should be correctly prepared and primed. Surface preparation and coating should be carried out in line with 'best industry practice' as indicated in many publications by organizations such as ISO, AMPP, ICORR, FROSIO, etc.

The standards of surface preparation contained herein are to be considered minimum requirements. Where other client or project specifications demand a higher level, then the higher level should be adopted.

3.2 Substrate Types

The PITT-CHAR NX is suitable for the protection of, and application on, the following substrates:

- Carbon (Mild) Steel
- Galvanized Steel
- Aluminium
- Stainless Steel and Duplex

Please contact PPG regarding other substrates.

3.3 Environmental Conditions

In addition to other specified environmental parameters, coating should only take place in the following conditions:

- Substrate temperature: Minimum 10°C (50°F) and at least 3°C (5°F) above dew point during application and curing. Maximum 60°C (140°F)
- Relative humidity: Maximum 85%
- Environment temperature: During application and curing should be above 10°C (50°F)

Environmental conditions should be monitored through the working shift as weather conditions can vary greatly. Where these environmental conditions cannot be met or maintained advice should be sought from PPG.

Curing time will be significantly extended below 10°C (50°F) and will effectively cease below 0°C (32°F); however, curing will recommence when temperature rises again. Conversely, curing time will be reduced at temperatures above 10°C (50°F). Please refer to PDS for curing times. Lower ambient temperatures may affect the application rate - consult PPG for further information.

Wet Film Thicknesses can be limited at higher temperatures.

3.4 Surface Defect Repair

Before the application of any paint or PFP to the surface, it should be inspected for any defects in accordance with ISO 8501-3.

All surface defects, including weld spatter, cracks, surface delamination and deep pitting which are likely to be detrimental to the protective paint system should be removed.

All fins at saw cuts, burrs and sharp edges should be removed by grinding to a minimum radius of 2 mm (0.08 in).

Welds should be inspected for their condition, as these are often a source of corrosion. Undercut welds, blow holes, discontinuous seams and other defects should be rectified. As uneven welds are likely to be the source of corrosion, they will need to be ground smooth, it is not necessary to grind flush.

Due to the criticality of PFP it is recommended that level P3 (Very Thorough Preparation) is achieved, however for rolled edges level P2 (Thorough Preparation) is generally acceptable. Any deviation from this should be in agreement with the client and PPG or as per project specification.

3.5 Degreasing and Cleaning

All surfaces to be coated should be clean, dry and free of all oil, grease, dirt, dust and other contaminants; this should be carried out as per ISO 8504-1 (SSPC SP1) guidelines. ISO 8502-3, *"Preparation of steel substrates before application of paints and related products–Tests for the assessment of surface cleanliness–Part 3: Assessment of dust on steel surfaces prepared for painting (pressure-sensitive tape method)"* provides a method of determining the amount of dust on a surface prior to coating. Dust, blast abrasives, etc. should be removed from the surface after blast cleaning such that both the particle quantity rating and the particle size do not exceed rating 2 of ISO 8502-3.

3.6 Blast Cleaning

3.6.1 Introduction

Prior to the application of PITT-CHAR NX it is essential that the surface is suitably cleaned to remove any mill scale, rust or existing coating system and that the surface is roughened to provide a suitable anchor pattern to ensure a strong bond to the substrate.

In most circumstances abrasive grit blast cleaning is the preferred method of preparation, and the aim is to produce a suitably cleaned roughened surface with optimum profile depth and a sharp, dense, angular profile. The blast media should be chosen to produce a sharp, dense, angular profile with sufficient peak count.

The surface profile depth should be in the target range of 50 to 75 µm (2 to 3 mils); locally minimum spot depth reading no lower than 30 µm are acceptable so long as majority of the surface is within target range. Depths greater than 75 µm, up to typically 100 µm are acceptable but do not provide additional benefit and risk not being fully covered by the primer with subsequent risk of rust bloom.

In addition to profile depth, blast cleaning should produce a sufficient peak count. Optimum adhesion will be achieved when the peak count is in the range of 40 to 60 peaks per cementer (100 to 150 peaks/inch).

Surface profile should be measured in accordance with a recognized standard such as ASTM D4417 using a combination of comparator gauges (see figure 1) and profile depth measurements (using probe type gauges and/or composite plastic tapes). Stylus type gauges are also acceptable but are difficult to use in the field, however, can be used on coupons to establish parameters such as grit type, pressures, distances, etc.

Figure 1: Surface Comparator Gauges

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Alternate surface preparation methods may be acceptable on a project-by-project basis and in agreement with PPG's FTS. Detailed information on surface preparation is provided in SSPC-SP COM *"Surface Preparation Commentary"* and associated referenced document, such as SSPC-PA 17, *"Procedure for Determining Conformance to Steel Profile/Surface Roughness/Peak Count Requirements"*, and these should be referred to accordingly.

3.6.2. Carbon Steel Substrates
Abrasive grit blast cleaning should be carried out to a near white metal standard in accordance with ISO 8501-1 Visual standard Sa2½ or SSPC SP 10 / NACE 2.

3.6.3. Stainless and Duplex Steels and Non-Ferrous Substrates
Brush-off blast cleaning in accordance with SSPC-SP16 should be used for preparation of stainless and duplex steels, however the requirements for surface profile depth should be increased in line with section 3.6.1. This is best achieved using a dense, hard grit such as garnet.

3.6.4 Galvanized Steel Substrates
PITT-CHAR NX is a thick film epoxy PFP coating system that provides a full barrier anti-corrosion protection system, as such the use of galvanizing with it is not regarded as necessary. However, many owners and engineering companies choose to use galvanizing, and it is normally not possible to differentiate the areas that require PFP early enough so typically all the steel is galvanized up front and subsequently surface preparation undertaken on those areas where PFP will be applied. There are many variables in galvanizing of carbon steel and key factors that need considered in its preparation for coating; these are covered in standards such as ASTM A123, ASTM A143. ASTM A143, ASTM A385, ASTM D6386, etc. and in guidance from industry bodies such as the American Galvanizers Association (https://galvanizeit.org/) who provide guidance on matters such as design and fabrication and specification and inspection.

Preparation of galvanized bolts:

1. 100% remove grease and any debris from the galvanized nuts and bolts.
2. Wire brush the galvanized nuts and bolts
3. Solvent clean the galvanized nuts and bolts
4. Apply epoxy primer if bolts are exposed for long periods of time.
5. Apply PITT-CHAR NX PFP

3.6.5 Wet blasting (Slurry/Vapor blasting)
This is a technique of wet abrasive blasting using a relatively low volume of water, grit and air pressure. The technique is very controllable with little interference to 'other trades', not producing sparks and therefore can be used in zoned environments (e.g., offshore or on a live petrochemical plant) and provides a blast profile similar to that obtained with dry grit blasting. Where wet blasting is used for surface preparation a suitable wet blast/surface tolerant primer from the PITT-CHAR NX primer list should be used.

3.6.6 Hydro blasting (UHP water jetting)
This method of surface preparation uses water at pressures typically in excess of 2,400 bar (35,000 psi). As it cannot produce a blast profile, it is not suitable for new, previously un-blasted steel. This method is commonly used in maintenance situations to remove old paint or PFP coatings prior to the application of the PITT-CHAR NX, in such circumstances the surface profile should be inspected after removal of the old coating and if necessary, a sweep blast undertaken to achieve the required surface profile. Where hydro blasting is used for surface preparation a suitable wet blast/ surface tolerant primer from the PITT-CHAR NX primer list should be used.

3.6.7 Dry-Ice blasting
Dry ice blasting is an alternative to hydro-blasting and likewise does not produce a blast profile and has the same requirements as Section 3.6.6 above.

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3.6.8 Power Tool Cleaning

Power tool cleaning is suitable for small areas such as repair/touch-up where blast cleaning is not possible. It is recommended that power tool cleaning is carried out in accordance withISO-8504-3 (SSPC SP11) to achieve a surface cleaning level to ISO 8501-1 to a visual standard ST3 and to achieve a surface profile of a minimum of 50 µm (2 mil). Where power tool cleaning is used for surface preparation a suitable surface tolerant primer from the PITT-CHAR NX primer list should be used.

Suitable power tools should be used but wire brushes are not recommended as they can cause surface polishing.

3.7 Water-soluble Salt Contamination

Soluble salts are known to be detrimental to the life of coating systems and it is recommended that their level is reduced as low as reasonably practical to ensure the performance of the coating is maximized. Prior to coating application, the steel substrate should be assessed for soluble-salt level in accordance with ISO 8502-6 and ISO 8502-9.

The required limits vary depending on factors including region, environment, end use, etc. For oil, gas and petrochemical projects the two most commonly specified requirements are those set out in Norwegian Standard NORSOK M-501 and in the International Association of Oil and Gas Producers (IOGP) specification S-715; these both specify a maximum level of 20 mg/m² as Sodium Chloride [NaCl].

However, this may not be practical, or necessary, to achieve in all situations e.g. in maintenance situations or for use in more benign environment. In these situations, guidance should be taken from the project specifications or in agreement with the client prior to commencement of the project.

Where no specific level is provided, PPG recommends that the following maximum values should be used:

Recommended maximum limits of water-soluble salts on steel substrate prior			
Conductivity	**As Chloride [Cl]**	**As Sodium Chloride [NaCl]**	**As Mixed Salts**
10 µS/cm	36 mg/m²	60 mg/m²	50 mg/m²

The above figures are based on PPG practical experience and product knowledge; more details can be found on PPG's Information Sheet 1490.

Where testing shows higher levels than acceptable it is recommended that the surface should be re-cleaned with potable water until the acceptance criterion is met followed by re-blasting.

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4 PRIMER SELECTION

4.1 Purpose

The selection of suitable primer system for use with the PITT-CHAR NX is critical for both the fire performance and the long-term life and corrosion protection of the system. The choice of which primer system to use will be dependent on many factors including: substrate material and condition, preparation techniques employed, environmental conditions, application conditions, local regulations, project specification and individual client preferences.

The compatibility of the PITT-CHAR NX with the primer should be verified; for this reason, only primer and coating systems satisfactorily tested and qualified by PPG should be used under the PITT-CHAR NX.
Ideally, the PITT-CHAR NX should be used in conjunction with PPG primers as compatibility of primer and performance are readily verified. Please contact PPG for recommended primers that are compatible with the PITT-CHAR NX.

4.2 Primer Condition

It is the applicator's responsibility to ensure that the primed surface and the primer itself are in an acceptable condition for over-coating with the PITT-CHAR NX. Factors such as ageing of the primer (degradation and surface chalking), contamination, zinc salt formation, rust, bloom, etc. should be considered when determining a surface's suitability before over- coating with the PITT-CHAR NX.

In all situations the surface of the primer should be clean, dry and free of all contaminants immediately prior to over-coating with the PITT-CHAR NX. Care should be taken to ensure that primer systems have reached sufficient levels of cure prior to over-coating with the PITT-CHAR NX, please refer to primer PDS for specific details. Consult the relevant primer PDS for minimum and maximum over-coating times.

4.3 Primer Types

4.3.1 Zinc Rich Epoxy Primers

Zinc rich epoxy primers are commonly specified for use with epoxy intumescent PFP systems for carbon steel and is the recommended system in accordance with the NORSOK M-501 standard.

Zinc salts may occur if epoxy zinc primers are exposed to humid or outdoor conditions prior to application of PITT-CHAR NX. These will need to be removed prior to application of the PITT-CHAR NX. Typically, this is achieved by high pressure water-washing at a minimum of 170 bar (2500 psi). If stubborn salts persist, then brushing or another abrasive method will need to be included with the water washing. Industry best practice recommends that zinc epoxy primers should be sealed with a tie-coat to prevent the formation of zinc salts that are detrimental to adhesion of the PITT-CHAR NX if application of NX cannot happen in sufficient time.

4.3.2 Epoxy Primers

Two-component epoxy-based primers are frequently used with PITT-CHAR NX. Over galvanized and non- ferrous substrates, such as stainless and duplex steels, a suitable epoxy primer should be used.

With certain epoxy-based coating systems, especially when applied under low-temperature and/or high humidity conditions, the formation of amine bloom or blushing may occur; this can be detrimental to inter-coat adhesion and should be checked for and removed prior to over-coating. Amine bloom formation on the primer surface can be removed by high pressure water-washing at a minimum of 170 bar (2500 psi) combined with the use of abrasive pads.

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4.3.3 Zinc Phosphate Epoxy Primers

Epoxy zinc phosphate primers are commonly specified in corrosion protection systems and suitably qualified zinc phosphate primers are compatible with PITT-CHAR NX.

4.3.4 Inorganic Zinc Silicate Primers

Inorganic zinc silicate primers can be used with PITT-CHAR NX; however, increased care should be taken on the surface condition, thickness and curing conditions. An epoxy tie-coat should be used in conjunction with inorganic zinc silicate primers to prevent formation of zinc salts. Please consult PPG for further advice before the use of zinc silicate primers.

4.4 Primer Thickness

Prior to over-coating the applied primer with PITT-CHAR NX, the Dry Film Thickness (DFT) should be checked to ensure that the required thickness has been achieved and the maximum allowable DFT has not been exceeded. The maximum primer thickness is dependent on the specific primer system used and reference should be made to the PITT- CHAR NX PFP coating system primer list. The thicknesses in the PITT-CHAR NX primer list take precedence over the thickness on the primer PDS, and careful monitoring and measurement of primer thickness is required.

DFT measurement should be carried out in accordance with a recognized standard such as ISO 2808, SSPC PA2 or ASTM D1186. The method, frequency of measurement and number of measurements per spot should be agreed between applicator and client and confirmed prior to commencement of the contract. Optimal bonding is achieved when the primer's DFT is sufficient to just cover the peaks of the blast profile and maintain a rust-free condition prior to application the PITT-CHAR NX.

4.5 Reduction of Excessive Primer Thickness

Excessive primer thickness should be reduced to within that allowable DFT range in accordance with the PITT-CHAR NX primer list. The preferred method to be used is abrasive sweep blasting followed by thorough vacuuming to remove contaminants from the surface. Sanding with P80-P100 grade aluminum oxide abrasive paper or proprietary abrasive pads may be suitable for small areas. Care should be taken to prevent polishing of the surface which would lead to inadequate adhesion of the PITT-CHAR NX; frequent changes of the abrasive should be made.

After primer reduction, surfaces should be cleaned of dust and contaminants in accordance with SSPC- SP1 and should be washed with potable water and thoroughly dried, prior to the application of PITT-CHAR NX. Solvent should not be used for washing.

The primer manufacturer's application instructions should be followed where third part primers are used.

4.6 Thermally Sprayed Aluminum (TSA)

The use of thick film coatings such as epoxies has been shown to be problematic when applied over TSA and the PPG PITT-CHAR NX is not recommended for use over TSA. PPG should be contacted for technical advice with regards to the application of PITT-CHAR NX on TSA and all interfaces with TSA.

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5 MESH REINFORCEMENT

5.1 General description

Mesh reinforcement is used to help long term integrity, improve crack resistance and to strengthen the insulating char that is formed when the PITT-CHAR NX reacts in a fire.

The PITT-CHAR NX uses 2 different carbon fiber meshes depending on certification known as PPG PITT-CHAR® CF Mesh or PPG PITT-CHAR® CF-1 Mesh; only these meshes, as supplied by PPG, are approved for use with the PITT-CHAR NX. Both meshes are installed in the same way.

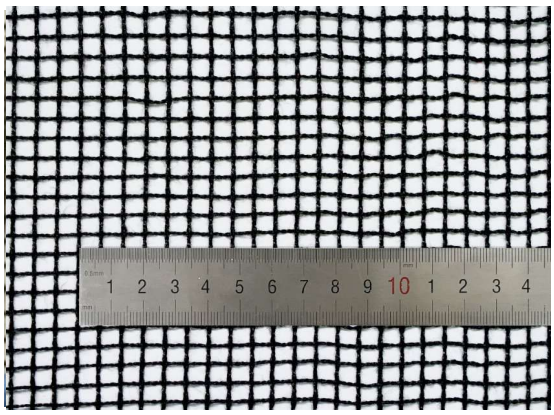

Figure 2: PPG PITT-CHAR CF mesh

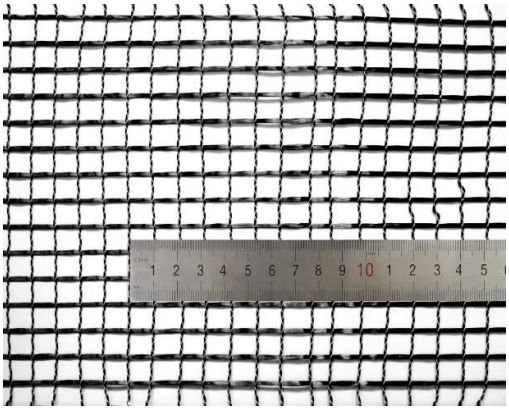

Figure 2a: PPG PITT-CHAR CF-1 mesh
Note white banding on CF-1 mesh only.

In all circumstances, the mesh should be encapsulated into the film. This is done by installing the mesh within approximately the middle 1/3rd depth of the final DFT of the PITT-CHAR NX as shown in Figure 3 below.

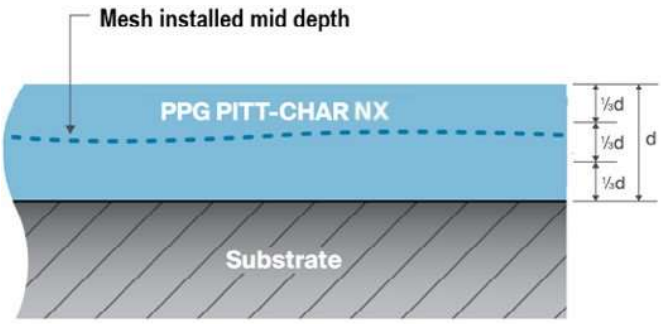

Figure 3: Mesh reinforcement location within PFP coating

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General rules for meshing:

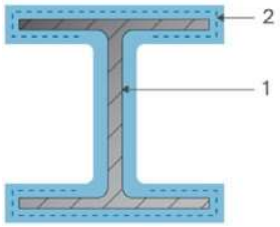
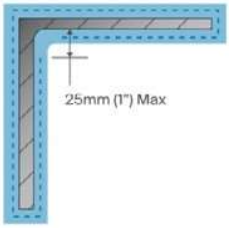
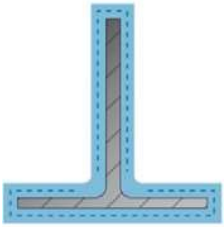
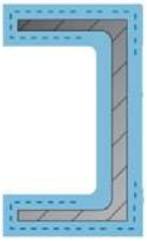
1. Prepare mesh by measuring and cutting to the required sizes before starting PITT-CHAR NX application.
2. Apply mesh on to wet PITT-CHAR NX at approximately half of the Wet Film Thickness (WFT). For low film thicknesses, more care needs to be taken to ensure the mesh is fully encapsulated i.e., towards the bottom of middle third. The surface of the PITT-CHAR NX prior to mesh installation can be troweled to ensure an even layer but should not be rolled – as this can affect adhesion of the mesh.
3. Embed the mesh thoroughly into the wet PITT-CHAR NX with trowels or short nap rollers (lightly dampened with the minimum solvent required).
4. Overlap adjacent pieces of mesh by a minimum of 50 mm (2”) for pool fire applications. For jet fire applications, overlap by a minimum of 150 mm (6”) and the mesh should cover all surfaces with 100% coverage.
5. After installing mesh, application of PITT-CHAR NX coatings can continue to be built up the final required WFT. Rolling the final coat should be done after the PITT-CHAR NX has started to gel. This is typically 20 minutes after application. Minimal solvent should be used.
6. At low PFP thicknesses the mesh profile may still be visible in the final coat; this is acceptable from a fire and film integrity performance perspective provided that mesh is fully encapsulated.
7. Field joints, connection joints or block-outs may not require mesh depending on certification.
8. At permanent terminations (i.e., not field joints, connection joints or block-outs where PFP will be added later) the mesh should be fully encapsulated within the PITT-CHAR NX. The mesh should be terminated as close as practical to the edge, typically around 10 mm (0.4”) and not exceeding 25 mm (1”) from the edge of the finished PITT-CHAR NX (See Section 6.11 Terminations). Flash-coats can be used for overlaps or where there will be extended overcoating between coats.

5.2 Mesh Reinforcement Arrangements

The reinforcing mesh arrangement and type depends on fire type and certification and project specific requirements. In general, the mesh reinforcements are as shown below, however project specific requirements or industry guidance such as NORSOK M501 may take precedence. The following figures show the normal mesh reinforcement arrangements for typical structural sections being protected with the PITT-CHAR NX and PPG Carbon Fiber Mesh. If in doubt, please contact PPG for specific mesh details.

Key: 1 = Substrate 2 = Carbon Fiber Mesh

5.2.1 Hydrocarbon Pool Fire Certification

Beams & Columns (I, H or W Sections)	Angles
	
T Section	**Channel Section**
	

Notes: For hydrocarbon pool fires, mesh overlaps should be a minimum of 50 mm (2”).
Field joints are treated differently

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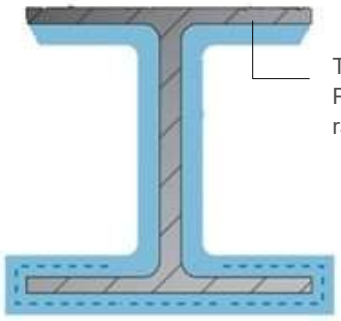
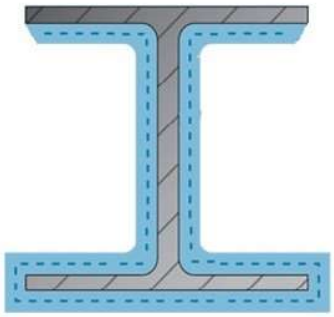
5.2.2 Mesh details where client specifies "3-Sided" application is to be used.
PPG will follow the recommendation in accordance with the owner/engineer's specification in all cases; however, where reference is made to "3-sided" protection of beams without consideration to failure modes, then PPG draws attention to the limited suitability of this approach and recommend 4-sided protection where appropriate. Further details on the limitations of "3-Sided" protection is provided in the publication by PFP Net, *"3-Sided PFP Protection of Structural Beams - Position Paper"*, Issue 1, October 2019 (www.PFPNet.com). The ultimate decision lies with the client, who is responsible for providing a design suitable to meet the safety case and regional legislation.

Meshing arrangements for 3 sided beams should follow the below recommendations:

Pool fire PFP only area:



Jet fire areas and CSP only areas or combined CSP+PFP areas:



Mesh type, location within the coating, overlaps and any requirements for mechanical retention at terminations to be in accordance with Certification Body requirements and project specification requirements.

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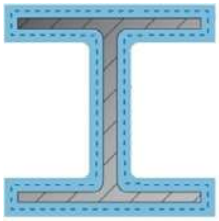
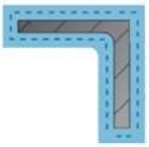
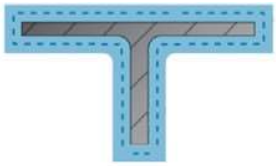
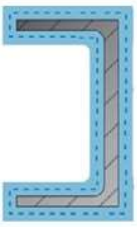
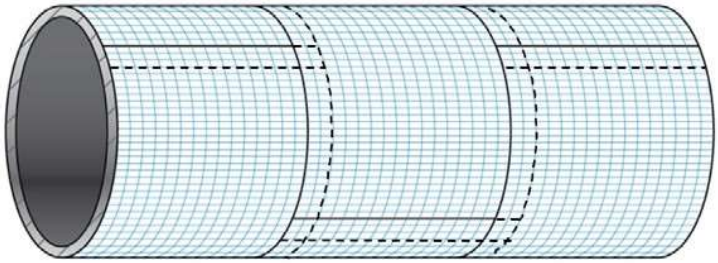
5.2.3 Jet Fire Certification:

Beams & Columns (I, H or W Sections)	Angles
	
T Section	**Channel Section**
	

Notes:
For jet fires mesh overlaps should be a minimum of 150 mm (6”)

5.2.4 Pipes & Circular Hollow Sections (CHS)



Solid lines indicate mesh overlaps (Note: the seams are staggered)

Notes:
For hydrocarbon pool fires, mesh overlaps should be a minimum of 50 mm (2”) For jet fires, mesh overlaps should be a minimum of 150 mm (6”)

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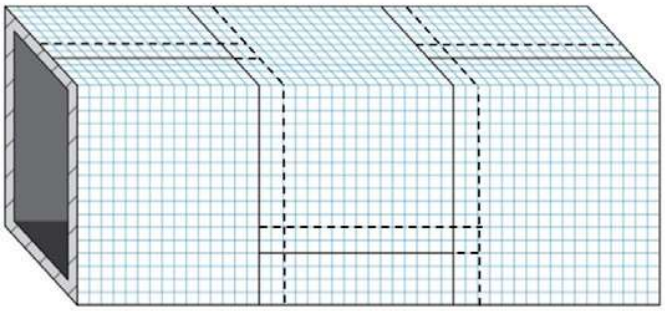
5.2.5 Square & Rectangular Hollow Sections (SHS/RHS)



Solid lines indicate mesh overlaps (Note: the seams are staggered)

Notes: For hydrocarbon pool fires, mesh overlaps should be a minimum of 50 mm (2”)
For jet fires, mesh overlaps should be a minimum of 150 mm (6”)

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6 PPG PITT CHAR NX APPLICATION

6.1 Application Methods

PITT-CHAR NX can be applied in a number of ways including:

- Heated plural feed airless spray (preferred)
- Single leg airless spray
- Hand application by trowel

Note: It is not possible to apply PITT-CHAR NX by brush or roller. This section of the guidelines

explains these three methods of application in detail.

6.2 Protection of Adjacent Surfaces

Adjacent surfaces that do not require PFP coating, and areas around field joint connections (block-outs) and other design details to be protected by hand application at a later date, should be completely masked off and covered using masking tape and/or paper or plastic sheeting in preparation for application. Once this has been complete application may begin.

6.3 Application Tools and Equipment

Hand application tools will be required regardless of whether the PITT-CHAR NX is applied by heated plural feed airless spray, single feed airless spray or by hand. See below for an example of the minimum application tool requirements to correctly apply PITT-CHAR NX, which should be regularly cleaned in order to avoid contamination or substandard quality application to the final surface finish of the coating.

Minimum Tools Required:

- Solvent resistant 4-inch short nap roller
- Solvent resistant 7–9-inch short nap roller
- Gauging trowel
- Floating trowel
- Industrial scissors
- 2–4-inch brush
- Industrial spray bottle
- Tape measure
- WFT Wet Film Thickness Gauge
- 2–4-inch scraper
- Masking tape
- Duct tape
- Plastic sheeting / brown paper
- Weighing Scales

6.4 Heated Plural Feed Airless Spray (preferred method)

6.4.1 Plural feed equipment

The PITT-CHAR NX is a two-component epoxy intumescent coating, therefore the most efficient application method of the coating is with heated plural airless spray equipment, which offers the advantage of not requiring any premixing of the two components, while eliminating any need for introducing solvents and negates pot-life issues.

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The equipment used should be purposely designed to spray thick film epoxy coatings such as PITT-CHAR NX and should be capable of delivering the required ratios, pressures, temperatures, and flow rates to correctly apply the product. The equipment should also have a reliable track record of operating in a wide range of environmental conditions often for long periods without any issues that cause interruptions. Equipment that meets this criterion is supplied by a number of manufacturers. They will provide their own instructions on machine operation, maintenance and set up required to achieve a high-quality application. The information contained within these application guidelines is given for advice only and the contractor is responsible for determining the suitability of specific pieces of equipment and maintenance of the equipment in good working order according to the manufacturer's recommendations. PPG's advice may be sought on suitable equipment and suppliers where necessary.

6.4.2 Preconditioning of Material

Prior to application of PITT-CHAR NX coatings using heated plural feed airless spray equipment it is strongly recommended that both base and hardener are stored in a heated storage unit at 25 to 35°C (77 to 95°F) for spray; 25 to 30°C (77 to 86°F) for trowel; for 24 hours prior to use. Storage at these temperatures will reduce the viscosity of the product, assisting machine filling and reducing start up time.

Base and hardener may be stored for up to 4 days in closed containers under these conditions. Prolonged storage of PITT-CHAR NX at these temperatures should be minimized as much as possible. The material should be used after this period and not be re-heated again.

6.4.3 Machine Operating Parameters

The operating parameters for PITT-CHAR NX depend on a number of factors including the equipment type and environmental conditions. The below general parameters are provided for guidance purposes and is designed to serve as a starting position, but each parameter may need to be taken outside the levels stated due to actual site conditions. Applicators should ensure the accuracy of parameters based on the factors influencing their application prior to use of PITT-CHAR NX.

Operating Parameter	Value
Storage Tank Temperatures	Base: 50 to 60 °C (122 to 140°F) Hardener: 55 to 60 °C (131 to 140°F)
In-line Heater Temperatures	Base: 50 to 55 °C (122 to 131°F) Hardener: 50 to 60 °C (122 to 140°F)
Hose Heater Temperatures	65 to 70°C (149 to 158°F)
Gun exit temperature	50 to 60°C (122 to 140°F)
Storage tank pressures	Base: 5 bar (70 psi) Hardener: 4 bar (60 psi)
Tank stirrer speed	Base: 15 rpm minimum Hardener: 15 rpm minimum
Displacement Pump Pressure	175 to 240 bar (2500 to 3500 psi)

Dispense components from the drums into the relevant holding tanks, ideally using ram-assisted shovel feed pumps.

The components should be circulated through the metering cylinders (and in-line heaters) until the base has reached a minimum temperature of 50°C (122°F) and hardener has reached a minimum temperature of 55°C (131°F).

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6.4.4 Spray tips and Operating Pressure

Typically spray tips of 0.84 to 1.09 mm (33 to 43 thou) internal diameter are recommended for application. Where a narrow spray fan pattern is required, such as smaller structural steel sections, a 20-to-30-degree angle tip can be used. If a wider spray fan pattern is required on larger structures and fire divisions, a 40-to-60-degree angle tip should be used. An operating pressure of 240 to 310 bar (3,500 to 4,500 p.s.i.) is typically recommended for application. The applicator should confirm the correct spray tips and operating pressure before applying PITT-CHAR NX

Nozzle or finger fan is an acceptable method of application under certain conditions.

6.4.5 Ratio Checks

Weight ratio checks should be carried out a minimum of twice a day regardless of machine type; once at the start of the shift and a second midway through shift; additional ratio checks may be required whenever there has been a significant break in spraying of more than 1 hour or parts need replacing.

The weight ratios should not deviate more than 10% from the target weight ratio of 3.24: 1.

Weight Ratio Range	Target Ratio	Allowed Range
PITT-CHAR NX	3.24 : 1	2.92 : 1 to 3.56 : 1

In addition to the weight ratio checks, the displacement pump pressure gauges should be checked constantly for pressure variations by the machine operator and the color of the mixed PITT-CHAR NX should be observed by the sprayer. Any color change would indicate the machine has gone off ratio and application should cease immediately, and a ratio check performed again.

Spray application should not be started until the correct weight ratio has been achieved. Results of all ratio checks should be recorded in a daily Quality Assurance / Quality Control (QA/QC) log.

For typical non-metered ratio spray pumps, use the following procedure for ratio checks by weight:

1. Weigh clean empty pails for Base and Hardener and record the respective tare weights of the pails.
2. Fix nozzles (35 thousandths of an inch orifice size) to the Base and Hardener dump valves on the mixing block. This is particularly important to maintain the pressure in the system and gain accurate ratio checks.
3. Place the weighed empty pails under the ratio check valves located on the mixing block and open both material valves at exactly the same time and open the flow valve on the pump (take out of circulation)
4. Close both material valves at the same time when the base material pail is at least half full and close the pump flow valve (put pump into circulation)
5. Weigh each pail including dispersed material and record the total weight.
6. Find the net weight of each material dispensed by subtracting the tare weight of the pail from the total weight.
7. Calculate the ratio of Base to Hardener

Example Calculation:

Component	Empty Container Weight (kg)	Filled Container Weight (kg)	Nett Weight (kg)	Calculation of ratio	Ratio
Base	1.800	8.928	7.128	7.128 ÷ 2.200	3.24
Hardener	1.200	3.400	2.200		

If the ratio is outside of tolerance, adjust the pressure settings and repeat the process.

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6.4.6 Spraying
It is possible to apply the PITT-CHAR NX with a coat thickness between 1 mm (40 mils) and typically up to a thickness of 6 mm (240 mils) depending on temperature, equipment and operator skill. It is recommended that typically 4-6 mm per coat is applied; once the material has gelled sufficiently, subsequent coats can be applied directly without waiting for PITT-CHAR NX to fully cure directly. Troweling can be used to regulate the thickness of the first coat before the mesh installation, however for areas that are not meshed then this should be done after 10 minutes.

The first coat should be applied to approximately ½ to ⅔ of the target DFT (where final DFT permits) and then the mesh is to be immediately installed. For example, where the target DFT is 8mm the initial coat should be 5mm. As the work progresses the first coat will become tacky as it cures and then when the first coat is sufficiently cured the second coat of PITT-CHAR NX material can be applied. A flash coat should be applied after mesh is installed if there is a risk of contamination and there is insufficient time to finish the final coat during the shift.

Once the first coat has become tacky the second coat of the PITT-CHAR NX can be sprayed to the final DFT (wet on tacky). In the above example this would be 3mm of PITT-CHAR NX to reach the target DFT of 8mm. The final coat can be rolled smooth with short nap rollers with minimal solvent. Rolling should be done once the material has had time to start curing to minimize the risk of sagging. This is typically after 20 minutes. Only THINNER 91-92 solvent should be used. See section 6.7.2 Final Surface Finish Appearance, for further information.

6.4.7 Flushing of Equipment
Hot water can be used very effectively for flushing out lines and equipment, but care should be taken, as water will not dissolve epoxy resin-based materials. If a true solvent is required for equipment maintenance, the use of THINNER 91-92 is recommended, but this should be done with care with hot equipment.

Particular attention should be paid to the mixing block and worm, as material and fibers will congest here. These areas should be thoroughly cleaned at least every 2 hours or when the sprayer starts to lose the fan and checked to avoid future blockages.

6.5 Hand Trowel Application

It is also possible to apply the PITT-CHAR NX by trowel, plaster trowel or other similar tools, and then smoothed off using a roller. Hand application is recommended for small areas such as block-outs.

6.5.1 Preconditioning of Material
It is recommended that both base and hardener are stored at between 25 to 35°C (77 to 95°F) for at least 24 hours prior to use to ease mixing and application. Storage above this temperature will reduce the pot life when mixed. Base and hardener may be stored at these temperatures for the duration of the shelf life quoted on the PDS.

6.5.2 Thinning
To assist the application at very low temperatures, and only when absolutely necessary, a small amount of thinners (up to 2%) may be added. However, this will reduce the Wet Film Thickness that can be achieved due to the lowering of the viscosity, and it will also extend the cure time. We recommend the use of PPG THINNER 91-92. Only thinners and solvents approved by PPG can be used.

2% equates to 20 ml (⅔ fl. oz.) of thinner per 1 kg (2.2 lbs) of PITT-CHAR NX

6.5.3 Mixing Ratio
The single feed kits of PITT-CHAR NX come in specific size containers to allow the mixing of a full kit within the base container. It is recommended that only full kits be mixed to ensure correct mixing ratio, however smaller portions of material can be mixed if care is taken that the correct ratio is achieved by accurate weighing of the base and hardener before mixing. The mixing ratio should be 3.24:1 by weight and should not deviate from this by more than 10% (see section 6.4.5). Hand mixing by volume should never be attempted.

6.5.4 Mixing
Due to the high viscosity of PITT-CHAR NX a high-powered mixer is required; standard paint mixers or drills are not suitable and should not be used as they may lead to improperly mixed material and excessive time taken to mix with resultant shortening of working pot-life.

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The mixer should preferably be a cart mixer specifically designed for mixing of thick film epoxy intumescent, as shown in Figure 4, to secure the pail and reduce the risk of accidents. Alternatively, a high torque, variable speed, paddle mixer of minimum 5 Horsepower air motor or 3725 W / 110 V electric motor equipped with 250 mm (10”) diameter paddle or twin paddles should be used (an example is shown in Figure 4). The mixing should begin slowly, and speed built up gradually.

As mentioned above, a small amount of PPG thinner may be added to reduce viscosity for mixing and application. The amount required varies with initial material temperature but up to a maximum of 2% may be added. The solvent, if used, may be added to the base and mixed in until it has reached a smooth consistency, the hardener is then poured into the base pail, scraping the sides of the hardener pail to empty it completely. Mix carefully until a smooth texture and uniform color is achieved, which should take less than 5 minutes. Consideration should always be given to the relevant pot life and kits should not be mixed until they are ready to be used. For trowel application it may be beneficial to spread the material out on a flat board to dissipate heat and extend the working pot-life.

Figure 4: Epoxy PFP Cart Mixer

Figure 5: High powered hand-held mixer

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6.6 Single Leg Airless Spray

For areas where application using plural-feed spray equipment is not possible or desirable, the PITT-CHAR NX may be spray applied using a single leg airless spray pump. It is recommended that a purpose designed epoxy PFP pump is used, this will normally have a minimum ratio of 70:1 and will be fitted with a ram feed plate and wiper to fit the size of pale.

After spraying, trowel and roller finishing should be carried out as would be normal practice with plural feed application of the PITT-CHAR NX. Mesh reinforcement should be incorporated as per the requirements in Section 5 of these application guidelines.

6.6.1 Preconditioning of Material

It is recommended that both base and hardener are stored at between 25 to 35°C (77 to 95°F) for at least 24 hours prior to use to ease mixing and application. Storage above this temperature will reduce the pot life when mixed. Base and hardener may be stored at these temperatures for the duration of the shelf life quoted on the PDS.

6.6.2 Thinning

Thinning may be required to achieve satisfactory single leg airless spraying. The amount of solvent added should be kept to a minimum which is normally in the range from 5% to 7%; the addition of thinner should not exceed 10% (1% = 7ml (1/4 fl. oz).

Note over-coating and cure times will differ when thinners are used. We recommend the use of THINNER 91-92. Only thinners and solvents approved by PPG can be used. Addition of solvent can affect the final DFT after evaporation.

6.6.3 Mixing Ratio

The single feed kits of PITT-CHAR NX come in specific size containers to allow the mixing of a full kit within the base container. Only full kits should be mixed, smaller portions of material should not be used in any circumstances for single leg spraying. This ensures the correct ratio of base and hardener is mixed together.

6.6.4 Spray tips & Operating Pressure

Nozzle size:	0.69 to 0.89 mm (27 to 35 thou)
Fan angle:	20 to 40 degrees.
Operating pressure:	350 bar (5,077 psi)

The above temperatures, pressures and sizes are given as a guide only and may be adjusted to provide optimum application characteristics. As for the guidance given in Section 6.4, the fan angle should be determined depending on the size of the structure being sprayed.

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6.7 Application Quality of PITT-CHAR NX

6.7.1 Methods of Measurement for Wet Film Thickness

Wet film thickness should be measured regularly during application using a pre-cut bridge gauge, typically made from a scraper, gauge widths of between 40 to 100mm (1.5 to 4.0 inches) have been found to be most appropriate. Each gauge is placed into the wet material pressing down to the steel substrate or previous cured layer of PFP and when a line is left in the surface of the wet material the required depth has been achieved. We do not recommend the use of notch or pin gauges as they limit the measurement to one point.

Figure 6: Pre-Cut Bridge Gauge

6.7.2 Final Surface Finish Appearance

Following spray application of the PITT-CHAR NX, a trowel should be used to eliminate any voids and then followed by a roller to attain a smooth, uniform finish. The optimum time will depend on the temperature, but for most projects it should be done within approximately 20 to 30 minutes after spraying; once the material has cured beyond the point it can no longer be worked, it is not possible to reverse this reaction and addition of solvent should not be used to try and achieve “re- activation”.

For rolling, a short nap, simulated sheepskin roller has been found to give good results, but other short or medium-naps solvent resistant, synthetic rollers may be suitable. It is recommended that the suitability of roller be established on a small area prior to use. Solvent should be used to lightly dampen the roller (it is recommended that a small spray mist bottle is used for this purpose) to prevent material pick-up on the roller as per normal site practice for application of epoxy PFP, but one should ensure that the roller is suitable for use with strong solvents. It is recommended that PPG THINNER 91-92 is used, and the quantity used should be kept to an absolute minimum.

Care should be taken to ensure that all residual solvent has evaporated from the film before applying a subsequent layer of the PITT-CHAR NX or a topcoat.

The quality and type of surface finish should be agreed by all parties at the beginning of the project by means of a reference area. It should be noted that PITT-CHAR NX is generally considered an “industrial finish” rather than an “aesthetic finish” and achieving a high degree of evenness is generally considered impractical, however poor workmanship, such as excessive runs and sags, should be avoided. Typical finishes are seen in Figure 6.

Figure 6: Example of high-quality finish appearance

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6.8 Final PFP thickness measurement

One of the most important aspects of quality control in the use of the PITT-CHAR NX is the attainment of the correct final DFT to meet the required fire resistance rating. It is imperative that the PITT-CHAR NX is applied to the DFT stated in the project specification documentation/drawings and in accordance with certification issued by the independent classification societies, such as DNV-GL, Lloyd's Register, UL, etc. for the design fire scenario identified.

The summary given below is believed by PPG to be accurate; however, it is qualified in its entirety by the certification criteria of the applicable independent classification societies. Additionally, project specific requirements might exceed these requirements and should be met.

6.8.1 Required DFT for a Given Fire Rating

The thickness PFP on fire certification is the **minimum average** thickness required to achieve the fire rating against which the product was tested. Each test standard differs in the method of testing and assessment and the limits on acceptable variance in thickness differ by standard as well. Application of PFP will always result in variation in thickness, typically with a normal distribution about an average thickness; it is essential that this variation is tightly controlled to ensure the fire performance. The concept of a minimum average thickness recognizes that variation exists and that local low thicknesses are acceptable as long as there are compensation areas of higher thickness. It should be noted that the thickness stated in fire certification is the thickness of the PFP coating excluding any primer or topcoat.

6.8.2 Limits on Deviation from Minimum Average

There are two principal methods used to control thickness during fire testing and these limits should be applied to site measurement appropriately:

1. Requirements for UL1709 certification

The requirements for testing to UL1709 is that the thickness should be within ±20% of the required minimum average thickness. The method requires any areas below 80% of the mean to be made-up with additional material until they comply. Where the thickness is more than 120% of the mean, these are acceptable on a project as long as the total thickness does not exceed the maximum allowable thickness: however, the thickness used to calculate the mean is the 120% figure (i.e., local high areas cannot be used to overcompensate for low areas). The maximum allowable thickness should ≤24 mm.

2. Requirements for ISO, EN, BS and other standards

For standards other than UL1709, PPG applies a statistical control. The thickness measurements should fall within the limits:

- 68% of readings are within 20% of the mean
- 95% of readings are within 30% of the mean
- 100% of readings are within 45% of the mean

This method aligns easily with modern electronic thickness measurement gauges. These gauges provide key statistical data on the mean thickness ($\bar{x}$), minimum measured thickness (t_{min}), maximum measured thickness (t_{max}) and the standard deviation (σ). The following requirements should be met:

- $\bar{x}$ should be ≥ specified thickness
- σ should be ≤ 15% of specified thickness
- t_{min} should be ≥ 45% of $\bar{x}$
- t_{max} should be ≤ 145% of $\bar{x}$ (higher thickness are acceptable on a project as long as the total thickness does not exceed the maximum allowable thickness, however this could indicate poor quality control and excessive material consumption). The maximum allowable thickness should ≤24 mm.

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6.8.3 Industry Guidance on Thickness Measurement

There are a number of industry specific guidance methods adopted on projects for the measurement of epoxy intumescent PFP in the hydrocarbon industry; however, many of these are guidance from the construction industry for thin-film intumescent coatings and may not be directly applicable. Commonly used guidance include:

- AWCI Technical Manual 12-B *Standard Practice for the testing and Inspection of Field Applied Thin Film Intumescent Fire Resistive Materials* (this method aligns to the UL1709 approach of thickness control).
- ASFP Technical Guidance Document – TGD 11 *Code of Practice for the specification & on-site installation of intumescent coatings for fire protection of structural steelwork*.
  AMPP SSPC-PA2 *Procedure for Determining Conformance to Dry Coating Thickness Requirements*.

6.8.4 Methods of Measurement for Dry Film Thickness

For high film thickness epoxy PFP, two types of method for DFT measurement are typically employed:

- Non-destructive – the electromagnetic gauge
- Destructive – the drill and pin depth gauge method

Preference should be given to non-destructive methods to minimize the risk of damage to the system.
The destructive method should only be used where non-destructive methods are not achievable or to verify the accuracy of non-destructive methods where doubt exist. The use of destructive methods should be kept to a minimum.

Figure 7: Electromagnetic depth gauge

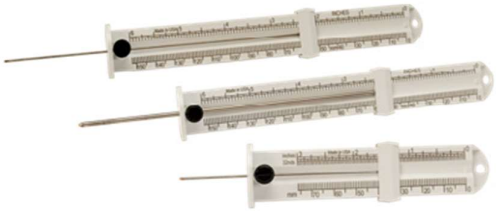

Figure 8: Pin depth gauge

6.8.5 Non-destructive Method

The use of magnetic induction or eddy current gauges for the measurement of the paint DFT has been common for many years. These gauges use interchangeable probes, which measure different ranges of thickness. Probes that will measure up to 50 mm (2 in) thickness of coating on ferrous or non-ferrous substrates are available.

Ensure the correct probe is used for the DFT range being applied so that an accurate measurement is achieved. In all cases, the manufacturer's instructions should be used to determine the correct method for use and calibration. Where electromagnetic gauges are concerned, particular note should be taken regarding their limited accuracy at edges and corners.

6.8.6 Destructive Method

Drilling of small diameter holes (typically less than 3mm (1/8")) and the use of a pin depth gauge to measure thickness at that point is acceptable. Care should be taken not to damage the substrate. All holes should be filled with the PITT-CHAR NX as soon as possible (preferably in same shift) after measurements have been taken.

6.8.7 Frequency of Measurements

The following information is given for guidance only and does not seek to override any project specific requirement for DFT measurement. Reference should always be made to the client's project specifications or recognized standards such as NACE, SSPC, BS, ISO, etc.

Open Sections (I Sections, Tees, Channels, etc.)

- Webs: Two readings per metre (3 ft) length on each face of web
- Flanges: Two readings per metre (3 ft) length on the outer face of each flange and one reading per metre length on the inner face of each flange.

Square and Rectangular Hollow Sections and Angles:

- Two readings per metre (3 ft) length on each face.

Pipes & Circular Hollow Sections:

- Eight readings per metre (3 ft) length evenly spread around the section.

Where members are less than 3 m (10 ft) in length, three sets of readings should be taken, one at each end and another at the center of the member. Each set should comprise of the number of readings on each face given above, as appropriate.

Flat Plate (e.g. decks bulkheads) and Large Vessels

On flat plate and large diameter vessels, two or three thickness readings should be taken every 1 m² (10 ft²). If deck and bulkheads are stiffened, readings should be taken at no more than 1 m (3 ft) intervals along the length of the flat area between the stiffeners. The stiffeners themselves should be measured as per the open sections or angles, as appropriate, as described above.

6.9 Heat Bridging & Coat-backs

Secondary and tertiary steelwork and steel plate (e.g., decks or walls), that do not require PFP but are attached to protected primary structural steel, are potential heat bridges that could conduct heat into the protected member causing premature failure and may need to be protected with PFP as a coat-back.

There is no agreed standard for the determination of coat-back lengths, however, commonly adopted industry guidance, detailed in FABIG Technical Note 13, is to coat-back for a distance of 450 mm (18 in) at the same coating thickness of the primary member being protected.

There are a number of published calculation methodologies available that can be used to support reduced coat-back distances, typically in the range of 150 mm (6") to 250 mm (10") but in certain instance no coat-back may be required; please contact PPG for further information. Note: Coat-back requirements should be agreed up front on a project-by-project basis.

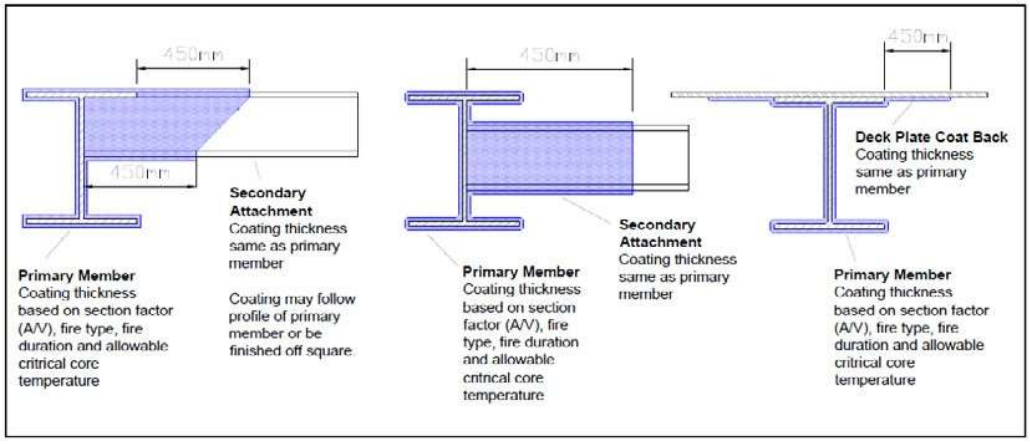

Figure 9: Typical Coat-back Details per FABIG TN13

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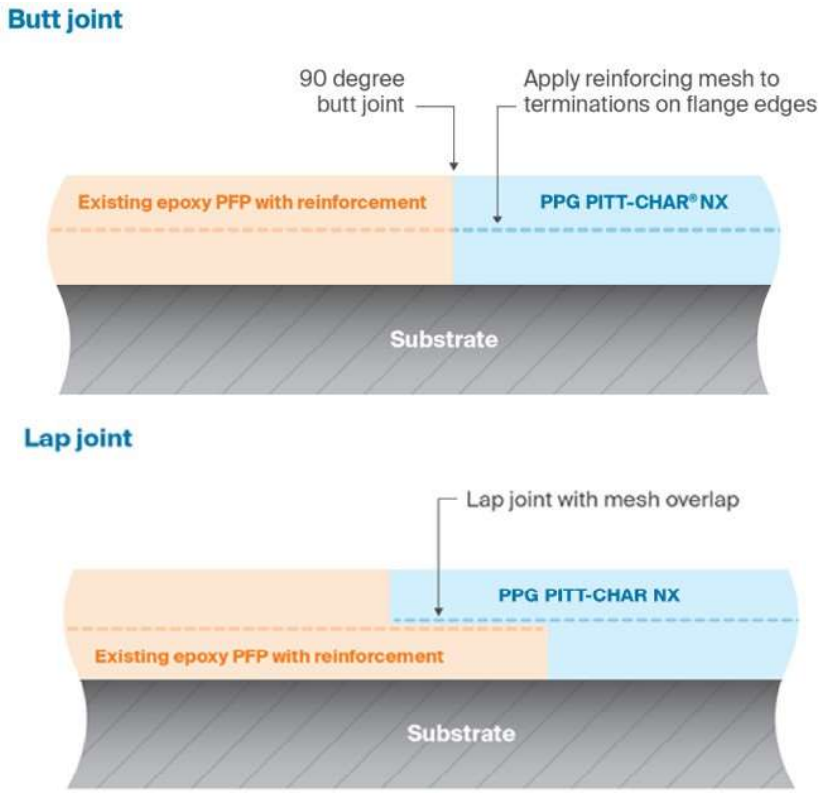
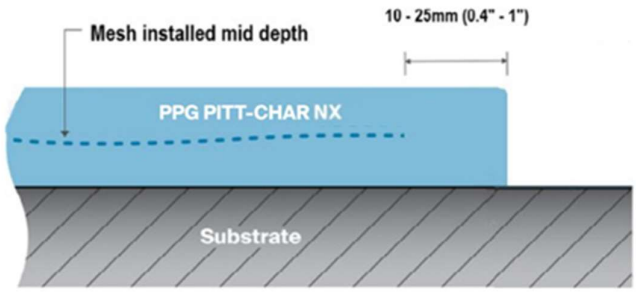
6.10 Field Joints

There are two types of field joint that should be used, the Butt Joint and the Lap Joint (also known as Step-Joint). Butt joints are used in pool fire designs (where no jet fire scenario is present), and a lap joint should be used where a jet fire scenario is called for and a 150mm (6" inch) overlap is required.



6.11 Terminations

At permanent terminations (i.e., not field joints, connection joints or block-outs where PFP will be added later) the mesh should be fully encapsulated within the PITT-CHAR NX. The mesh should be terminated as close as practical to the edge, typically around 10 mm (½") and not exceeding 25 mm (1") from the edge of the finished PITT-CHAR NX.



PPG PITT-CHAR® NX APPLICATION GUIDELINES

7 TOPCOATING

The PITT-CHAR NX has been extensively tested to industry recognized standards including NORSOK M501 and UL2431 to demonstrate its ability to withstand weather and environmental exposure without topcoats and as such, the use of a topcoat is generally considered optional and for aesthetic purposes only. However, when a topcoat is to be applied on the PITT-CHAR NX, only qualified topcoats should be used.

The PITT-CHAR NX can be topcoated when it is sufficiently cured (see PDS for overcoating intervals) ensuring the surfaces are clean and dry and free from surface contamination including dust, grease, amine bloom, etc.
Recommended minimum over coating intervals differs depending on topcoat therefore refer to PDS for relevant data.

Normally a polyurethane topcoat with a nominal DFT of 60 µm is recommended, although alternative topcoats such as isocyanate-free epoxy acrylics and polysiloxanes can also be used. Ideally, the PITT-CHAR NX should be used in conjunction with PPG topcoats as compatibility and performance are readily verified. Where non-PPG topcoats are used, the topcoat manufacture should ensure their product is compatible for use with the PITT-CHAR NX. Please contact PPG for details of PPG's qualified topcoats.