

Intumescent Coating Systems

Dulux[®] FIRETEX[®] FX6010 Intumescent Application Guide



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The purpose of this manual is to ensure correct application of Dulux® FIRETEX® FX6010.

For the safe handling and use of Dulux® FIRETEX® FX6010 reference must also be made to both the Technical and Safety Data Sheets.

Dulux® FIRETEX® FX6010 is fully tested and certified and this information is available to design architects and engineers on request.

The information contained in this application 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.

Only the electronic copy of this manual is a 'controlled document' and all paper versions are 'uncontrolled'. Thus, the user is advised to ensure they have the latest issue of the manual by contacting Dulux® Protective Coatings.

1.0 Introduction

Dulux® FIRETEX® FX6010 is a fast-drying and durable Intumescent coating. It has been designed for Cellulosic Fire protection to give minimized time from application of product to handling of coated steel, for fire resistance periods up to 120 minutes.

1.1 What is Dulux® FIRETEX® FX6010 and where is it used?

Dulux® FIRETEX® FX6010 is a two-component material based on patented technology.

- Part A, Base (Light Grey).
- Part B, Peroxide/Catalyst (White).

Part B (white component) is mixed into the Part A (light grey component), which once homogeneous can be applied through standard single leg spray equipment.

Main Advantages of Dulux® FIRETEX® FX6010

- Very fast drying e.g. 1.5mm DFT dry to handle in 4 hours at 23°C.
- Designed to be applied through standard single leg spray equipment.
- High film-build per coat.
- High volume solids at 92%.
- High quality aesthetic finish.
- Loadings generally lower than epoxies.
- FX6010 represents a significant advance in terms of speed of cure over epoxy and single component intumescent coatings.
- No requirement for mesh.

Dulux® FIRETEX® FX6010 is used to enhance the fire resistance of structural steel members by providing a layer of insulation, which is formed by a chemical reaction initiated by fire. This insulation reduces the rate of heat transfer and extends the time period for which the structural member can resist the weakening effects of the heat.

Dulux® FIRETEX® FX6010 has been designed for cellulosic fire resistance periods up to 120 minutes. It has been tested in accordance with a range of national and international fire testing standards, please consult the product data sheet or Dulux® Protective Coatings for details.

The aim of this manual is to provide relevant technical information to the applicator of Dulux® FIRETEX® FX6010 helping to ensure that the completed project 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 Dulux® Protective Coatings.

1.2 Product quality assurance

Dulux® FIRETEX® 6010 is manufactured to quality systems standard of ISO 9001:2015 by a BSI registered firm. All raw materials are subjected to quality testing before being released for manufacture. Representative batches of Dulux® FIRETEX® FX6010 are routinely selected from production and subjected to fire testing.

1.3 Technical support

To support our customers in the field we have experienced Technical Service teams working in conjunction with a dedicated Technical department.

Please Note: Dulux® FIRETEX® FX6010 is an approved applicator product which training can only be carried out by Dulux Protective Coatings Technical Service Department.

2.0 Surface Preparation and Priming

2.1 Surface Preparation

Surface preparation and painting should be carried out in line with best industry practice as indicated in many publications by organisations such as NACE, SSPC, AMPP, ICORR, ISO, ASTM, AS, 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.

All structural steel surfaces to be protected by Dulux® FIRETEX® FX6010 must be correctly prepared and primed. All steel surfaces must be clean, dry and free from all surface contamination, refer to AS 1627.1 (similar to SSPC – SP1), prior to abrasive blast cleaning per AS 1627.4 to a minimum standard of ISO 8501-1:2007 Sa 2½, (similar to NACE No.2/SSPC-SP10). When abrasive blasting has been completed, all dust arising must be removed from the cleaned surface by use of a vacuum cleaner, dry, oil, free compressed air or brush.

Dulux® FIRETEX® FX6010 can be applied directly to blast cleaned steel with a surface profile of 50 µm or above.

2.2 Priming

A primer is not necessary for environments up to and including C3 as per AS/NZS 2312.1:2014.

If a primer is used, it must have been satisfactorily tested and qualified by Dulux® Protective Coatings for use under Dulux® FIRETEX® FX6010. Contact Dulux® Protective Coatings for a list of approved primers.

All primers recommended by Dulux have been tested and approved by third party testing agencies at certain film thicknesses. Application of the recommended primers at film thicknesses above what has been certified and approved must be rectified before applying the next layer.

2.3 Coating over of approved primers with Dulux® FIRETEX® FX6010

Before application of Dulux® FIRETEX® FX6010, ensure the primer to be coated is inspected and any defects or break down is rectified. Also ensure the primer is dry and free from all traces of surface contaminants, especially grease and soluble salts.

Special care must be exercised in the removal of dry overspray dust prior to the application of Dulux® FIRETEX® FX6010.

Ensure that the over coating time/temperature intervals are in line with the primer manufacturer's data sheet and the Dulux® FIRETEX® FX6010 primer approval.

Contact Dulux® Protective Coatings for a list of approved primers.

3.0 Product Storage

Consult Product Health and Safety Data Sheet for information on safe storage, handling and application of this product.

3.1 Storage Precautions for Part B, (White, Peroxide/Catalyst)

- Observe the label precautions.
- Store separately from the Part A (base, light grey) component, and any other paints and chemicals.
- Store in closed original container at temperatures between 5°C and 25°C.
- Store in a cool and well-ventilated place.
- Keep away from sources of ignition, heat, sparks or open flame. No smoking.
- Containers which are open should be properly re-sealed and kept upright to prevent leakage.
- Store in flame proof/combustion proof equipment, away from other flammable materials.
- Avoid contact with reducing agents.
- Store in accordance with local regulations.

3.2 Storage Class

- Organic Peroxide storage – Class 5.2.
- Store in accordance with local regulations. See relevant Safety Data Sheet for details.

4.0 Application

The Dulux® FIRETEX® FX6010 technical data sheet also contains essential information regarding application parameters and must be read in conjunction with this manual. A copy of the data sheet can be obtained from Dulux® Protective Coatings.

Dulux® FIRETEX® FX6010 must be applied at a minimum dry film thickness of 400µm to ensure correct cure.

Where a low film thickness is required, it may be beneficial to use a smaller aperture spray tip to obtain finer atomisation and thereby greater control. At thin film thicknesses care must be taken to ensure a film is formed free of flaws and discontinuity.

In all circumstances it is the applicators sole responsibility to ensure that the Dulux® FIRETEX® FX6010 material is applied as a continuous film, at a dry film thickness equal to or greater than that indicated in the relevant certification or Client Schedule provided by Dulux® Protective Coatings.

All dry spray must be removed from the substrate/coating surface prior to and during application. Ineffective removal of dry spray will lead to disbondment of the coating system.

4.1 Recommended Equipment

Application Equipment

Airless spray unit Graco® K60FH2 (60:1) or equivalent.

- 3/8" (9.5mm) diameter material hose, max 15M in length. The addition of a 1/4" max of 2M whip line is allowed.
- The use of a non-restrictive SS swivel connection between the spray gun and the material line is recommended for ease of application.
- Use a Graco® XTR 7 spray gun w/ XHD RAC switch tip and guard or equivalent.
- Spray tips / nozzle sizes – 0.023" – 0.027" (584 to 686 microns).

NOTES:

- A direct feed configuration (straight pipe coming directly off the foot valve that can be immersed directly into the pail of coating material) to the lower is preferred over the use of a suction line.
- It is recommended that material lines dedicated to Dulux® FIRETEX® FX6010 only be used. The fibres in the material can drag dry material located on the interior walls of the lines to the spray tip causing clogging.

Mixing Equipment

Heavy duty paint mixer utilising a double helical mixing blade similar to an Intex MegaMixer® AMX 620 to thoroughly and uniformly mix the material, scraping the side of the pail, folding the material back into the body of the product while mixing.

4.2 Mixing Instructions

Prior to mixing the product, ensure the application equipment has been thoroughly flushed with Dulux® CR Reducer (965-63020).

For optimum cure rate and productivity, the paint should be stored at 15°C to 30°C for a period of 24 hours to stabilize prior to mixing.

Dulux® FIRETEX® FX6010 Part B (white component, peroxide/catalyst) should be incorporated into Dulux® FIRETEX® FX6010 Part A (light grey component, base). Mix thoroughly using a mechanical stirrer with a stainless-steel paddle until the products are fully homogenized.

Before Dulux® FIRETEX® FX6010 is pushed through the spray pump, purge the application unit to remove any solvent in the system. Any excessive residual solvent in the system will impede the curing time.

Notes: A minimum dry film thickness of 400 microns must be achieved. At film thicknesses below this figure, retarded curing will be evident.

Dulux® FIRETEX® FX6010 MUST NOT be thinned, as this will severely impair/extend the curing time of the material.

Equipment fluid lines must be flushed out with Dulux® CR Reducer (965-63020) prior to any break times.

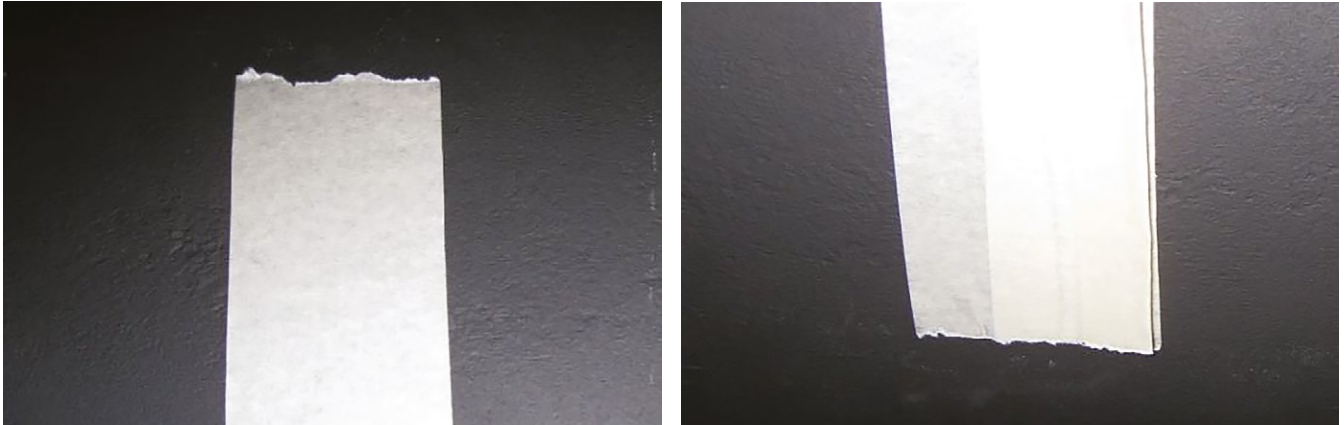
4.3 Application Conditions

In conditions of high relative humidity, i.e. 80–85% good ventilation conditions are essential. Substrate temperature should be at least 3°C above the dew point (and rising) and always above 5°C. Application at ambient air temperatures below 5°C is not recommended.

4.4 Masking

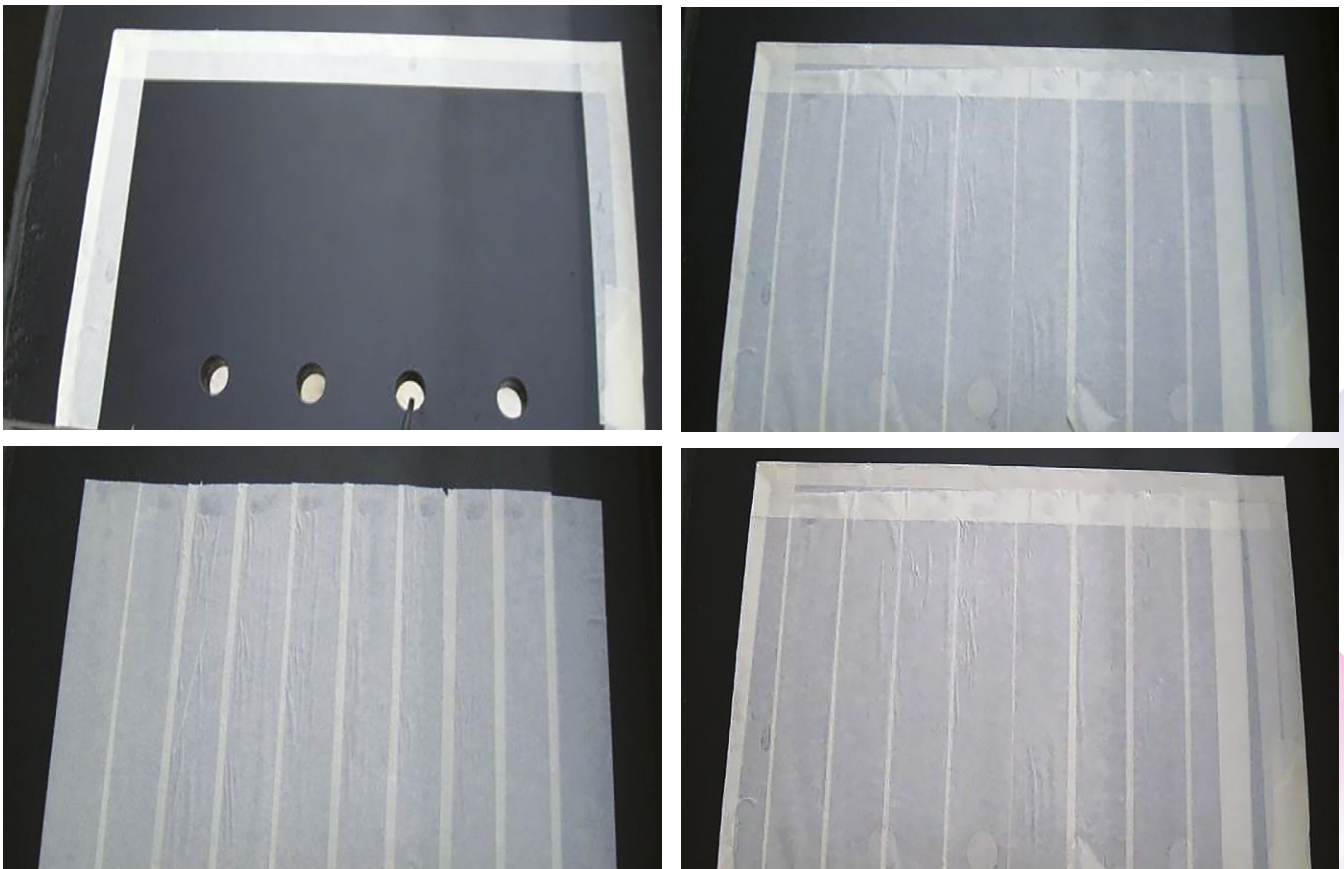
All connection points, unpainted areas, bolted connections (drill holes) may need to be masked off with masking tape prior to application of Dulux® FIRETEX® FX6010. See examples below:

Single Masking tape/Folded Masking tape



Folded masking tape on perimeter area/Folded masking tape area with normal masking infill. (Single coat application).

Single Masked area/Singled Masked area with folded masking around edge (Multiple coat application)



Removal of Single/Multiple coat Masking tape



NOTE: It is very difficult to remove the masking tape once the Dulux® FIRETEX® FX6010 has fully cured, it is therefore important to remove the masking tape whilst the Dulux® FIRETEX® FX6010 is only partially cured. Bolted connections (drill holes) can be cleaned with a pneumatic/battery drill or alternatively use bolt hole plugs.

4.5 Clean down/flush out scheduling regime

Dulux® FIRETEX® FX6010 is a rapidly curing material, which means that it is necessary to clean down the spray pump to prevent blockage or curing in the machine and lines. This should happen at regular intervals in the work pattern, or where interruptions in application will occur (breaks, etc).

It is recommended that spray equipment is periodically flushed using Dulux® CR Reducer (965-63020), after every 4 units are sprayed.

It is the operator/applicators responsibility to ensure that a clean down programme is followed to ensure effective maintenance of the spray equipment.

4.6 Recommended Topcoats/Sealer coats

In all instances where a topcoat is to be applied this must be an approved product for use with Dulux® FIRETEX® FX6010. Where re-decoration is required, the film formed by the topcoat layer must not exceed two coats of the topcoat at the specified DFT. If this is the case, the existing topcoat film must be reduced to allow for the new topcoat to fit within the above requirement.

In all circumstances it is the applicators sole responsibility to ensure that the specified topcoat is applied as a continuous film, free of any discontinuities in the film, and at a dry film thickness equal to what is indicated in the relevant certification or Client Schedule provided by Dulux® Protective Coatings. This includes subsequent re-decoration of fire protected steelwork.

For further details refer to the project specification or contact Dulux® Protective Coatings Technical Services.

5.0 Repair

The repair procedure must be carried out as soon as possible to prevent further damage and moisture ingress.

The surfaces to be coated shall be free of all contaminates. The preferred method of cleaning should be performed in accordance with AS 1627.1-2003, "Metal finishing – Preparation and pretreatment of surface, Part 1: Removal of oil, grease and related contamination". This shall be performed prior to any abrasion of the surface, as well as prior to the application of any coatings.

Repairs may be accomplished with the use of either abrasive blast equipment or power tools to remove marginally adhered coatings and to prepare any exposed steel. Please note: Ultimately, the efficacy by which the surface preparation is completed will depend on the contractor's choice of media, and the confidence in the capabilities of equipment, crew, and components.

Any exposed substrate must be re-prepared in accordance with the original specification. All edges of remaining sound, tightly adhering coating should be feathered back (beveled) to create a smooth transition from the substrate or lower layer of coating to the top surface of the coating system. A coating may be considered tightly adhering if an edge cannot be lifted with a dull putty knife. Thoroughly and uniformly abrade 50 to 100 mm outward from the remaining tightly adhered edge around the perimeter of the affected area.

To a clean, dry, contaminate free, and properly prepared surface, reinstate the specified coating system within the confines of the prepared area.

5.1 Dulux® FIRETEX® FX6010

Whilst Dulux® FIRETEX® FX6010 tends to resist damage during initial stages of handling, there may be some damage due to handling/transport process.

All surfaces to be coated shall be prepared in accordance with the guidance given in the product's data sheet or application manual.

Where the damage has exposed the substrate, the affected area should be prepared in accordance with the guidance given in Section 2 of this manual.

Providing the Dulux® FIRETEX® FX6010 can be applied before the prepared clean surface has degraded it is not necessary to apply a primer for internal dry and internal controlled environments for C1-C3 according to ISO 12944-2:2007.

The topcoat shall be removed in areas where new Dulux® FIRETEX® FX6010 will be applied over the existing (intact) Dulux® FIRETEX® FX6010 or FX6002.

Damage of materials back to substrate shall be prepared in accordance with the repair recommendations stated within this document.

Mix Dulux® FIRETEX® FX6010 Part A (light grey component) and Part B (white component) together until the material is fully homogeneous.

Apply Dulux® FIRETEX® FX6010 to the area of damage by use of appropriate tools such as brush, roller, scraper, or pallet knife. Care should be taken to ensure that the area of repair satisfies the specified DFT for the structural member under repair. In all instances it is essential that a minimum DFT of 400µm (450µm WFT) is achieved per coat.

Once the correct DFT has been installed, Dulux® FIRETEX® FX6010 can be sanded once cured to improve the aesthetic finish of the repair area. If specified, topcoat can then be applied to the finished Intumescent repair.

Mixed material is to be used immediately. Usability will vary depending on ambient conditions; however, as a guideline material should be used within the first 25 mins of post mixing.

Dulux® FIRETEX® FX6010 can be applied at up to 1470µm in one application. Approximate coverage 0.62m²/litre at 1470µm.

6.0 Quality of Finish

6.1 Definitions as set out in SCI P160 (Blue Book)

R470 The quality of finishes fall under the following categories

(1) Basic Finish

The coating system achieves the required fire performance and corrosion protection performance, but is not required to achieve any requirements for standard of finish.

(11) Decorative Finish

In addition to the requirements for (1) above, a good standard of cosmetic finish is generally required, when viewed from a distance of 5m. Minor orange peel or other texture resulting from application or localised repair is acceptable.

(111) Bespoke Finish:

In addition to the requirements for (1) above, the coating finish is required to have a standard of evenness, smoothness and gloss agreed between the Specifier and Contractor. When agreeing a bespoke standard of finish, the Specifier and Contractor should take account of the effects of steel size, section shape, design complexity and the required period of fire resistance.

The Contractor shall provide for a basic finish unless otherwise noted in the Contract.

6.2 Dry Film Thickness Measurement

Measurement Procedure / Guidance Notes

Calibration

In accordance with BS EN ISO 2808:2001, calibration of the DFT gauge should be carried out following the manufacturer's instructions using a smooth plate (similar in composition to the substrate being measured) at least 1.2mm thick. The calibration should be checked using shims above and below the expected DFT.

BS EN ISO 2808 refers to a figure of 25µm as a correction factor for blast profile. It is intended to use this correction factor for measurements of all coating thicknesses above 50µm nominal DFT.

Calibration checks should be performed prior to carrying out measurements, in the environment in which the measurements are to be taken. During a series of measurements, the calibration should be rechecked on a regular basis.

Measurement Procedure

Tests shall be carried out in accordance with the following:

- (i) I Sections, Tee Sections and Channels.

Webs: Two readings per metre length on each face of the web.

Flanges: Two readings per metre length on the outer face of each flange. One reading per metre length on the inner faces of each flange.

- (ii) Square and Rectangular Hollow Sections and Angles.

Two readings per metre length on each face.

- (iii) Circular Hollow Sections.

Eight readings per metre length evenly spread around the section.

- (iv) Where members are less than 2m in length, three sets of reading shall be taken, one near to each end and one at the centre of the member. Each set shall comprise the number of readings on each face given by (i), (ii), or (iii) above, as appropriate.

- (v) For flat plates take 5 readings per metre square

The proportion of items, or of the coated area, to be surveyed will need to be agreed between Dulux® Protective Coatings and the customer.

If defects are identified a more detailed survey may be appropriate.

6.3 Paint Film Thickness Acceptance Criteria

Intumescent Coating Schemes

These criteria are based on the required thickness as stated in the paint specification, advised by the applicator or from the FDE loading schedule:

- (i) The average dry film thickness applied to each element shall be greater than or equal to the specified nominal value.
- (ii) The average measured dry film thickness on any face of any member shall not be less than 80% of the specified nominal value.
- (iii) Dry film thickness values less than 80% of the specified nominal value are acceptable, provided that such values are isolated.

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 300 mm 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.

(iv) All dry film thicknesses shall be at least 50% of the nominal value.

When measuring intumescent fire protected steelwork, the mean must not exceed the maximum fire tested thickness for that type and orientation/use of section.

Where possible the primer thickness should be determined prior to the application of the Intumescent coating. This mean value and the blast profile correction should then be subtracted from the primer and Intumescent thickness, measured before the application of any topcoat.

If it has not been possible to measure the primer thickness and the primer and Intumescent thickness and hence determine the Intumescent thickness accurately then the specified nominal thickness for primer and topcoat may be used.

In either case the 50 and 80% values relate to the full primer (and topcoat) thickness plus 50 or 80% of the specified Intumescent thickness.

i.e. Specification:

Primer = 25µm, Intumescent = 1000µm, Top Coat = 50µm

50% value = Blast Profile + Primer + 50% Intumescent + Topcoat
600µm = 25 + 25 + 500 + 50

80% value = Blast Profile + Primer + 80% Intumescent + Top Coat
900µm = 25 + 25 + 800 + 50

Alternatively, SSPC PA 2-2022, "Procedure for Determining Conformance to Dry Coating Thickness Requirements", Appendix 11, "Method for Measuring the Thickness of Intumescent (Fireproofing) and Cryogenic Spill Protection Coatings Applied to Load-Bearing Structural Steel Members, Fire Divisions, Pipework, and Vessels/Tanks" can be followed for inspection compliance. Please consult Dulux Technical Services for which level (Level 1, 2, or 3) in Table A11.1, "Fireproofing Thickness Restriction Levels" would be enforced with your specific project.

7.0 Additional Notes

7.1 Trouble shooting

Challenge	Cause
Soft/Un-cured material	<ol style="list-style-type: none">1. Insufficient peroxide has been added to the base. Full bottles of peroxide need to be added.2. Insufficient material applied (less than 400 microns (DFT)).3. Insufficient or incomplete mixing.
Slow curing material	<ol style="list-style-type: none">1. FX6010 has been exposed to thinners.2. Insufficient or incomplete mixing.
Poor Adhesion/Detachment	<ol style="list-style-type: none">1. FX6010 has been applied over contaminated steelwork.2. FX6010 dry overspray has not been removed prior/during coating application.
Material curing on pump pick-up pipe	<ol style="list-style-type: none">1. Ensure the pickup pipe is wiped clean by brush to remove the older product, prior to putting a new unit of FX6010 under the pump.

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