Dulux PROTECTIVE COATINGS

FIRETEX®

Intumescent Coating Systems

Dulux® FIRETEX® FX6002 Intumescent Application Guide

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The purpose of this manual is to ensure correct application of Dulux® FIRETEX® FX6002.

For the safe handling and use of Dulux® FIRETEX® FX6002 reference must also be made to both the technical and safety data sheets.

Dulux® FIRETEX® FX6002 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® FX6002 is an ultra-fast drying and durable intumescent coating. It has been designed for cellulosic fire protection to give the shortest possible time from application to handling for fire resistance periods up to two hours.

1.1 What is Dulux® FIRETEX® FX6002 and where is it used?

Dulux® FIRETEX® FX6002 is a three-component material based on patented technology.

- Part A (white).
- Part B (grey).
- Part C (catalyst white).

Part C (catalyst) is mixed into Part B (grey component) then Part A and Part B (1:1 by vol ratio) are applied through plural component equipment.

Main advantages of Dulux® FIRETEX® FX6002

- Ultra-fast drying e.g. 1.84mm DFT (2mm WFT) dry to handle in 1 hour at 23°C.
- Solvent Free.
- 92% Solids volume, conventional intumescents are around 70%.
- Loadings generally lower than epoxies.
- Dulux® FIRETEX® FX6002 represents a significant advance in terms of speed of cure over epoxy and single component intumescent coatings.
- No scrim requirement.

Dulux® FIRETEX® FX6002 is used to enhance the fire resistance of structural steel members 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 member can resist the weakening effects of the heat.

Dulux® FIRETEX® FX6002 has been designed for cellulosic fire resistance periods up to two hours. 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® FX6002 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

All raw materials are subjected to ISO 9001:2015 registered quality testing systems before being released for manufacture. Representative batches of Dulux® FIRETEX® FX6002 are routinely selected from production and subjected to fire testing.

1.3 Technical support

Our specialist teams co-ordinate the front line technical and sales focus for Dulux® FIRETEX® FX6002. To support our customers in the field we have experienced technical service teams working in conjunction with a dedicated fire product estimators.

Please Note: Dulux® FIRETEX® FX6002 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® FX6002 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® FX6002 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 AS 4312:2019 C3. If a primer is used, it must have been satisfactorily tested and qualified for use under Dulux® FIRETEX® FX6002.

2.3 Coating Over of approved primers with Dulux® FIRETEX® FX6002

Before application of Dulux® FIRETEX® FX6002, ensure the primed surfaces to be coated over are 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® FX6002.

Ensure that the overcoating time/temperature intervals are in line with the primer manufacturer's data sheet and the Dulux® FIRETEX® FX6002 primer approval.

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

3.0 Product Storage

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

3.1 Storage Precautions for Part C (catalyst)

- Observe the label precautions.
- Store separately from the Part A (white) and Part B (grey) components, 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® FX6002 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® FX6002 must be applied at or above a minimum dry film thickness of 400 µm 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.

In all circumstances it is the applicators sole responsibility to ensure that the 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.

4.1 Recommended Equipment

The proportioning pump shall be capable of delivering 7,000 PSI (483 BAR) static material pressure. Preferred equipment starting base is a Graco® XP-70 plural component pump (Graco® Part No. 571102). Remove all filters on the high-pressure side of the pump and the spray gun. Add to the system as follows:

- TANKS: 2 × 26.5 litre hoppers as supplied with the above mentioned Graco® XP-70 kit.
- Pump Ratio: This is a 1:1 ratio product.
- Primary Heaters:
  - Not normally required in warmer environments.
  - In cooler conditions the use of two each (PART A, Part B) 240v, 4,000w in-line heaters (Graco® Part No. 245863) & heater adapter kit (Graco® Part No 262450) is recommended.
  - Consult Technical Services for any unique situation.

- **Solvent Flush Pump:**
  - Use a Graco® Merkur 45-1 or larger solvent pump kit (Graco® Part No. 262393).
  - See hose bundle info below – will need to connect a ¼ inch (6MM) fluid line (Graco® Part No. H72525 for 7.6M OR Graco® Part No. H72550 for 15.2M – max length 15.2M) from the solvent flush pump to the mix manifold.
- **Heated Hose Bundle:**
  - Use of heat to maintain material temperature is typically not needed in warmer environments. For scenarios where heat is not needed, the following is recommended to be included inside a scuff resistant protective jacket (Graco® Part No. 16T138 – cut scuff resistant jacket to size, 15.2M long):
    - » 2 each ½ inch (13MM) ID paint line (Graco® Part No. H75025 for 7.6M OR Graco® Part No. H75050 for 15.2M – max length 15.2M) for both Part A & Part B.
    - » 1 each ¼ inch (6MM) ID solvent flush line (Graco® Part No. for 7.6M is H72525 OR Graco® Part No. H72550 for 15.2M – max length 15.2M).
  - In cooler/cold environments the use of a heated hose bundle is recommended to help maintain the material temperature from the pump to the remote mix manifold. For scenarios where a heated hose bundle is needed to maintain material temperature, the following is recommended:
    - » Graco® Part No. HH75515, Electric heated hose bundle. Includes 2 each ½ inch (13MM) hoses for both Part A & Part B, 1 each ¼" line for the solvent flush pump, and scuff resistant jacket.
    - » Graco® Part No. 18C175, Stand-alone Controller, Electric Heated Hose (240V) Kit contains 240V controller, hose junction box and temperature sensor.
- **Mix Manifold:**
  - Should include valving for material flow, recirculation lines (if set up w/ recirculation lines), and solvent flush. Remove any restrictors or filters that may come with the mix manifold. Graco® breakdown is as follows –
  - If complete remote mix manifold is needed, the use of Graco® Part No 262807 is recommended.
  - If the XP unit comes with a mix manifold on the pump, it can be converted to a remote mix manifold by incorporating it into Graco® Part No 262522, 'Remote Manifold Carriage Kit'.
  - Connection fittings required:
    - » 2 each Graco® 159239, 'Pipe Nipple Fitting' – Connect material lines to mix manifold.
    - » 1 each Graco® 156971, 'Short Nipple Fitting' – Connect solvent flush line to mix manifold.
- Forward of the Mix Manifold: Forward of the remote mix manifold the static mixers and paint line should be configured in the following order (1 each):

Graco® Part No 511352 – 3/8" x 12 fold SS static mixer & housing.	3/8 inch ID (10MM) x 25 feet (7.62M) ID paint line (Graco® Part No. H73825) – up to 20 meters allowed. Insulate integration line if needed.	3/8" x 1/4" Graco® Part No 150287 hose adapter fitting & (1ea) Graco® Part No H72506, ¼" (6mm) x 6' (1.8M) whip line.	Graco® XTR7 or similar spray gun.

With these spray pumps and the above setup, some applicators have found two guns can be attached to double productivity.

For the best application properties, the material temperature exiting the spray tip should range between 20°C to 25°C.

In hot conditions store the material in such a way as to not exceed a material temperature of 30°C. Excessive heat will result in reduced usable time and the need to clean out the hoppers daily. Additionally, dry spray is more prone to occur under warmer conditions, resulting in the need to sand the applied coating once cured.

In cool conditions the material should be preconditioned to 15°C – 20°C prior to use.

Heated hose bundle heat should be set at 15°C – 20°C in cooler conditions to maintain material temperature.

Dynamic pressure range (the pressure while spraying) will range between 3,000 (207 BAR) to 4,000 (276 BAR) PSI. Spray tips – Graco® HD RAC spray tips at a range of 0.021 – 0.029 (0.53-0.73mm) without diffuser bar.

Static mixers, whip lines, spray gun and spray tip should be flushed with Dulux® CR Reducer (965-63020) as needed. Replace or disassemble and clean static mixers as needed.

It is strongly recommended for high production projects that a second set of all equipment forward of the mix manifold be acquired and be on standby for a quick swap out to keep the project running seamlessly. Swapping out the static mixer, lines, and spray gun forward of the mix manifold for regular maintenance reduces the potential for build up to occur inside the internals which can reducing flow and productivity.

Material must be flushed out with Dulux® CR Reducer (965-63020) within 2 minutes of releasing the trigger on the spray gun. Failure to flush within the set time will result in material setting up in the static mixers, paint line, spray gun, and spray tip.

To minimize dry spray, select the correct aperture/fan-angle spray tip and spray at lowest possible pressure to atomise the material. This will vary dependent on equipment. For further advice on application equipment seek advice from Dulux® Protective Coatings.

Note: All dry spray must be removed, by brush or airline, from the substrate/coating surface prior to and during application. Ineffective removal of dry spray may lead to some disbondment on curing of coating system.

Contact Dulux® Protective Coatings for equipment supply.

Note: Dulux® FIRETEX® FX6002 can NOT be applied through any standard single component application equipment. Reference should be made to the relevant application equipment user manual.

Operator should be trained and competent in the use of the application equipment.

4.2 Mixing Instructions

For a 36 litre unit.

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 or above for a period of 24 hours to stabilise prior to mixing.

Dulux® FIRETEX® FX6002 Part C (catalyst) should be incorporated into Dulux® FIRETEX® FX6002 Part B (grey).

- Mix thoroughly using a stainless steel mixing paddle such as a Jiffy Mixer PS-1 or equivalent.
- Pot life of Part B (grey) and Part C (catalyst) mixture = 48 hours at 23°C.
- Using a separate stainless steel mixing paddle, thoroughly stir Dulux® FIRETEX® FX6002 Part A (white) until homogeneous.

Keep all mixing equipment separate and DO NOT CROSS CONTAMINATE COMPONENTS.

Once both Part A and additive mixture (Part B and Part C) are homogeneous, transfer to the respective holding tanks on the application equipment or use transfer pumps and pump from the 20 litre pails. Purge the application unit to remove any solvent in the system. Any excessive residual solvent in the system will impede on the curing time.

Notes:

Beware of curing times during mixing and application. See below a guide to pot life for different stages of usage.

- Pot life of Part B (grey) and Part C (catalyst) mixture = 48 hours at 23°C
- Pot life of Part A and mixed Part B + Part C component mixture = 15 minutes at 23°C
- Pot life of mixed material within the pump fluid line = 5 minutes at 23°C

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

If the Part C (catalyst) is not mixed into the grey additive the Dulux® FIRETEX® FX6002 will not cure.

Dulux® FIRETEX® FX6002 MUST NOT be thinned, as this will severely impair/extend the curing time of the material.

Mix ratio checks

This is dependent on the application equipment.

Prior to commencing application, ratio checks must be carried out in line with the equipment user manual, to verify that a mix ratio of 1:1 is being achieved.

Daily ratio checks are recommended.

4.3 Application Conditions

Good ventilation conditions are essential.

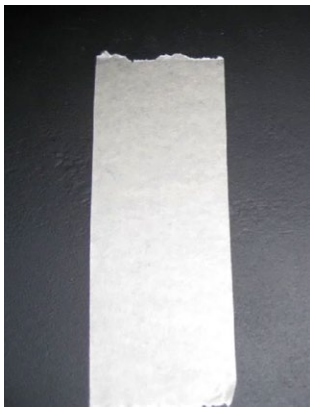
Do not apply at temperatures below 5°C.

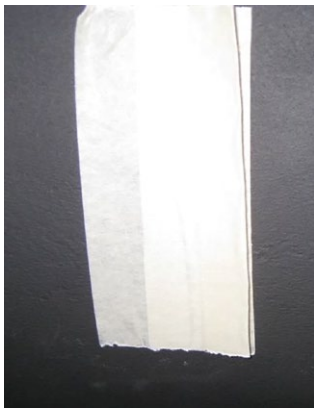
Do not apply at relative humidity above 85% or when the surface is less than 3°C above the dewpoint.

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® FX6002. 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® FX6002 has fully cured, it is therefore important to remove the masking tape whilst the Dulux® FIRETEX® FX6002 is only partially cured. Bolted connections (drill holes) can be cleaned with a pneumatic/battery drill or alternatively use bolt hole plugs.

4.5 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® FX6002, this includes subsequent re-decoration of fire protected steelwork.

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

4.6 External Exposure

The maximum overcoating time for Dulux® FIRETEX® FX6002 is 28 days. If Dulux® FIRETEX® FX6002 needs to be overcoated after this time, it is necessary to abrade and clean the FX6002 surface prior to applying the approved topcoat.

5.0 Repair

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

5.1 Dulux® FIRETEX® FX6010

Whilst Dulux® FIRETEX® FX6002 will give minimum 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 FIRETEX® FX6010 will be applied over the existing (intact) Dulux® FIRETEX® FX6002.

Damage of materials back to substrate shall be prepared as per the instructions in Section 2.0.

Damaged Dulux® FIRETEX® FX6002 shall be removed until a firm edge is achieved. Where the existing FX6002 will be over coated as part of the repair this should be abraded to ensure good adhesion of the subsequent coats.

Mix Dulux® FIRETEX® FX6010 Part A (grey, base) and Dulux® FIRETEX® FX6010 Part B (white, peroxide/catalyst) 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

(i) 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.

(ii) Decorative finish:

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

(iii) Bespoke finish:

In addition to the requirements for (i) 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 ISO 2808:2001 or SSPC PA 2, 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.

ISO 2808 refers to a figure of 25 µm as a correction factor for blast profile. It is intended to use this correction factor for measurements of all coating thicknesses above 50 µm nominal. When using SSPC PA 2, refer to Appendix 8 on guidance to adjust for surface profile.

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 five 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. No more than 10% of the DFT readings should be below 80% of the recommended DFT.

(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 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.

(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/geometry 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 = 25 µm, Intumescent = 1000 µm, Topcoat = 50 µm

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

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

7.0 Additional Notes

7.1 Trouble shooting

Challenge	Cause
Soft/un-cured material	1. Part C (catalyst, peroxide) not been added to Part B (grey, additive). 2. Application equipment off ratio. 3. Insufficient material (less than 300 µm (WFT) of material applied.
Slow curing material	1. Dulux® FIRETEX® FX6002 has been exposed to thinners
Poor adhesion/detachment	1. Dulux® FIRETEX® FX6002 has been applied over contaminated steelwork. 2. Dulux® FIRETEX® FX6002 dry overspray has not been removed prior/during coating application.

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