

APPLICATION INSTRUCTIONS

FIRESHIELD

ARCHITECTURAL WHITE

Steel Intumescent.



INTRODUCTION

FIRESHIELD ArchitecturalWhite is a white-pigmented, waterborne, expansive PVA coating which can be used indoors or outdoors protected under roofs or soffits in corrosion classes C1-C3 (see Recommended Paint Systems in table 1).

It foams into a thick layer when exposed to high temperatures derived from flames or intensive heat radiation from fire. The porous layer of foam effectively extinguishes the flow of heat to the treated structure.

ArchitecturalWhite is a waterborne expansive fire- protection coating,

FIRESHIELD Architectural should be sealed with an approved topcoat when used in areas with constant air humidity higher than 75%, or when washable surface is required.

Please note: these Application Instructions **must** be read in conjunction with our [Technical Data Sheet](#) and [Safety Data Sheets](#) for FIRESHIELD ArchitecturalWhite. These instructions are designed to explain and assist in the application of ArchitecturalWhite. No liability can be accepted for the information provided in this booklet, although it is published in good faith and believed to be correct.



GETTING STARTED

The foundation for correct fire protection is based on:

- The steel member size.
- The required fire rating of the steel member.
- The steel limiting temperature of the structural design.

This information is contained in the project documentation provided to do the coating take off and pricing, the project specific Loading Schedule is prepared by FIRESHIELD or the Applicator and must be read and checked prior to undertaking the work on site. The Applicator is responsible for the accuracy of this document and it must be cross checked against the project documents provided for pricing.

The Loading Schedule contains the required amount of coating to be applied to each structural steel member for compliance based on the Fire Design parameters set by the Fire and Structural Engineers involved in the project.

A successful application is subject to:

- The correct pre-treatment of the steel member.
- Ensure a **FIRESHIELD APPROVED PRIMER** is applied to the steel.
- The application of the coating is properly executed and documented on site.
- A **FIRESHIELD APPROVED TOPCOAT** is applied when required, i.e. areas with constant air humidity higher than 75%, when a washable surface is required or a coloured finish is required where the steel member is visible.
- This booklet provides advice and instructions to ensure the correct application of FIRESHIELD ArchitecturalWhite resulting in compliant fire protection.

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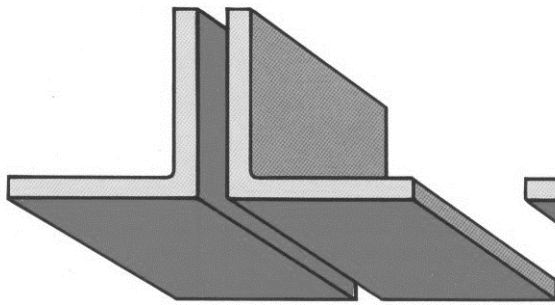
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MEMBERS TOO CLOSE



CORRECT SPACING TO COAT

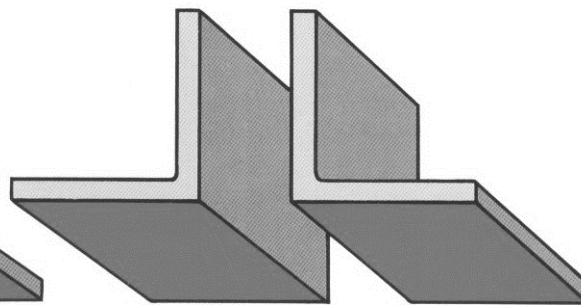
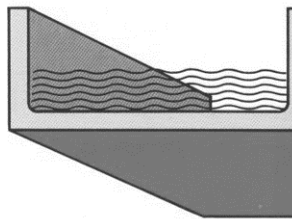
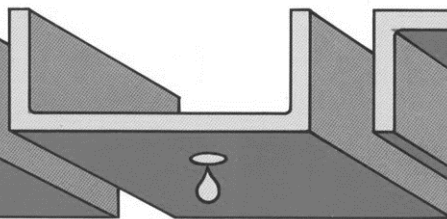


Fig. 1: Steel profiles that are too close to each other can make it impossible to apply the correct fire protection.

INCORRECT



BETTER



BEST

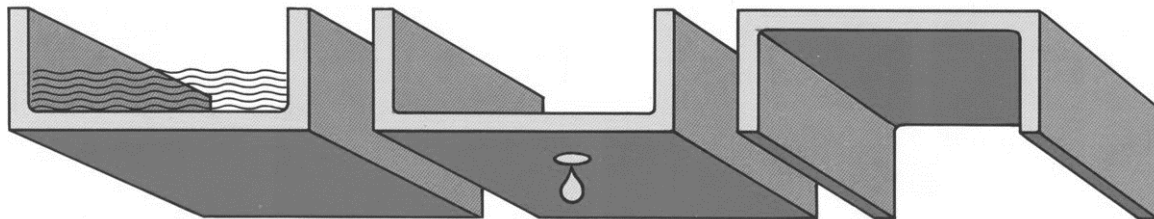


Fig. 2 Steel members facing downwards do not collect water and as a result these surfaces are at least likely to fail due to water/moisture build up and attack.

PRE-TREATMENT & PRIMING OF THE STEEL SUBSTRATE

Untreated/un-primed steel **cannot** be painted directly with FIRESHIELD ArchitecturalWhite.

Before applying ArchitecturalWhite ensure the steel is coated with a Fireshield approved primer and is free from:

- Grease
- Rust
- Flaking paint.
- Mill Scale

Ensure the Primer is the correct primer for the Corrosion Class and complies with Section 2- AS/NZ2312.1 and based on ISO9223 Corrosivity Categories. (A list of approved Primers is available from FIRESHIELD)

Any primer applied over mill scale will be ineffective and will fail, as the corrosion will take place below the paint surface, damaging the metal itself. It is imperative that mill scale is removed from structural steel before it is coated – e.g. by abrasive blasting.

The surface to be primed should be free of not only mill scale, but any dirt, grease or oil, and it should be perfectly dry. The aim is to remove anything that may hamper the adhesion of the coating to the metal and to create some roughness on the

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surface to improve adhesion. A protective primer coating only works as long as it sticks to the steel surface and its own surface remains unbroken.

Four grades of cleanliness are generally specified on steel prior to priming:

1. White metal blast-cleaned – No visible mill scale, rust or dirt.
2. Near white metal blast-cleaned – A small, set percentage of visible impurities allowed.
3. Commercial blast-cleaned – Nearly all mill scale, rust and dirt removed, but some variation in appearance allowed. This is usually good enough for most uses of structural steel.
4. Brush-off blast-cleaned – No loose mill scale, rust or dirt. This is still better than what usually achieved with power tools or hand sanding.

Other than simply looking at the metal surface, the easiest way to test how clean it is, is to wipe it with a clean, white cloth, pressing down firmly. Then check the material for residue, whether rust, mill scale or dirt. Once the surface is cleaned, it is recommended that you get it covered in a protective coating as soon as possible to prevent corrosion starting again.

Corrosive Class	Environment Classification	Table 1 : Examples of typical Environments to AS/NZS2312.1	
		Outdoor	Indoor
C1	Very low	In Australia and New Zealand some alpine regions.	Heated areas with dry air and insignificant amounts of impurities. e.g. offices, shops, schools, hotels.
C2	Low	Dry, rural areas and most regions remote from the coast or sources of pollution. Most areas within Aus and NZ 50km from the coast/sea are in this category	Non-heated spaces with varying temperature and humidity. Low frequency of moisture condensation and low content air pollution, e.g. sports halls, storage rooms.
C3	Moderate	Coastal areas with a certain amount of salt or moderate amounts of air pollutants. Urban areas and lightly industrialized regions. Extends from about 1km inland to between 10km and 50km inland.	Areas with moderate humidity and large amount of pollution from production processes e.g. Dairies.
C4	High	Atmospheres with moderate amount of salt or significant amounts of air pollution. Industry and coastal areas. Extends about 50m inland from the coast up to 300mtr depending on rough seas and winds/topography etc.	Areas with high humidity and large amount of air pollution from production processes, such as chemical industries, swimming pools, shipyards.
C5-I	Very high (Industrial)	Industrial areas with high humidity and aggressive atmosphere. Areas on the coastline and beyond with rough seas and topography/winds.	Areas with almost permanent moisture condensation and large amount of air pollutants.
C5-M	Very high (Marine)	Coastal and areas with large amount of salt.	Areas with almost permanent contamination and large amount of air pollutants.

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When using Architectural White, the steel **must always** be provided with a simple approved rust protection in the form of an approved Primer even in Class C1.

Not only is a thorough knowledge of priming paints necessary in order to be able to choose the appropriate corrosion protection system (Primer), but also the selected primer must be approved by FIRESHIELD to ensure a compliant SYSTEM has been installed.

Always consult FIRESHIELD or a reseller who can provide the approved list of Primers, and in particular for Environmental classes C3-C5 from the primer Manufacturer.

STEEL SURFACES WITH EXISTING PAINT

During a renovation or refurbishment, the building use can change and the building consent conditions can require an upgrade of the passive fire systems in the building.

Structural steel members with existing paint may need upgrading and fire rating with an application of ArchitecturalWhite.

When overcoating with ArchitecturalWhite, it is important that the following is performed and recorded in writing:

1. Determine the type of existing paint according to Table 2 above (if it is not known)
2. Measure the dry film thickness (DFT) of the existing paint.
3. Check the adhesion of the existing paint to the steel member.
4. Prepare the existing painted surface to improve adhesion of ArchitecturalWhite.



If the existing paint layer has good adhesion to the steel member, the surface may be overcoated with ArchitecturalWhite if the existing paint layer is:

- Epoxy
- Polyurethane
- Alkyd

Before coating with ArchitecturalWhite, the existing painted surface needs to be washed clean from grease and dirt with an appropriate detergent. The surface of the existing paint can be dulled to improve adhesion by thoroughly scrubbing with a Scotch-Bright pad or similar during cleaning.

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It may also be necessary to test the existing paint layer as per the following table to confirm what type existing paint has been used:

Select a clean surface (preferably horizontal) and apply a few drops of each solvent in three separate places. Wait a few minutes and observe the following reactions.

Type Of Existing Paint	Ethanol (T-Red)	Xylene	Methyl ethyl ketone
Alkyd – Oil based	No reaction	Softens/rises	Rise
Vinyl	No reaction	Dissolve	Dissolve
Chlorinated Rubber	No reaction	dissolves/Forms threads by touch	Dissolve
Epoxy – PU	No reaction	No reaction	Softens
Acrylic 1-Comp.	No reaction	Softens	Dissolve
Acrylic – Latex	Dissolve	No reaction	No reaction

Table 2 test methods for identifying the type of paint in previously painted surfaces

Perform an adhesion test with a sample area of ArchitecturalWhite over the existing paint before starting the entire coating process. For example a simple cross hatch adhesion test.



The existing paint system will need to be removed if:

- It has poor adhesion to the steel surface.
- Poor adhesion between the existing coating and ArchitecturalWhite.
- It shows signs of cracking
- It is a type latex- acrylate.

This can be achieved by blasting the existing paint layer off the steel member (hand held recycling blasters are now available minimising disturbance). If blasting is not an option, a chemical paint remover may be used to remove the existing paint, ensure all residue from the chemical stripper is completely removed and the steel member washed clean before priming and coating.

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The existing paint layer should not be thicker than:

- 100 µm (microns) for Alkyd paints.
- 200 µm for Epoxy or Polyurethane paints.

The thickness of the existing paint can be measured using an electromagnetic measuring instrument such as an Elcometer. If in doubt, please consult FIRESHIELD direct or a reseller.

APPLICATION OF FIRESHIELD ARCHITECTURALWHITE 4FR:

The following data should be recorded in writing on the Project Daily Record sheets provided by FIRESHIELD before the application of ArchitecturalWhite:

- The blasting degree of accuracy.
- Type and Brand (Manufacturer) of the Primer anti-corrosion coating.
- Primer coat DFT (Dry Film Thickness).
- The primer must be within its stated overcoating period.

Any damage to the primer coat caused during transport, installation or after welding must be repaired with the same Primer before installation of ArchitecturalWhite.

The actual application of ArchitecturalWhite can begin after the steel members surface has been confirmed as being correctly prepared and/or primed in the case of new structural steel.

If the client or main contractor wants to see what the coating will look like prior to full application, it is advisable to prepare a test area or sample for approval.

Any imperfections in the steel profile surface can be smoothed out with a fire-protective putty. Ensure once more the surface to be coated with ArchitecturalWhite are free from grease, dirt or dust after preparation.

Coating with ArchitecturalWhite should be avoided:

- When the ambient air temperature is lower than +10°C.
- The relative humidity is above 80%

Store at room temperature (above 5°C) and make sure it is well stirred before application so that a smooth finish is obtained, mechanical stirring is advised.

DAILY RECORD SHEET
Wet Film Thickness Record Sheet: FireShield Architectural White

fireshield
FIRE PROTECTION COATINGS

FRN: _____
 Project name: _____
 Product: _____
 Steel Section Location/Level: _____
 Steel Section ID: _____
 Required WFT (µm): _____ (Cross check with loading schedule provided)
 Application Method: _____ Tip Size if Sprayed: _____

PFC

Equal / Unequal Angle

Universal Beam / Column

Square/Rectangle Hollow Section

Circular Hollow Section

Steel Section Profile (circle one above)
 Orientation Beam/Column (delete one)

Face Coated	READING (µm) WET FILM THICKNESS (WFT)			
	COAT #1	COAT #2	COAT #3	COAT #4
A	Date: _____ Temp: _____ RH%: _____	Date: _____ Temp: _____ RH%: _____	Date: _____ Temp: _____ RH%: _____	Date: _____ Temp: _____ RH%: _____
B				
C				
D				
E				
F				
G				
H				
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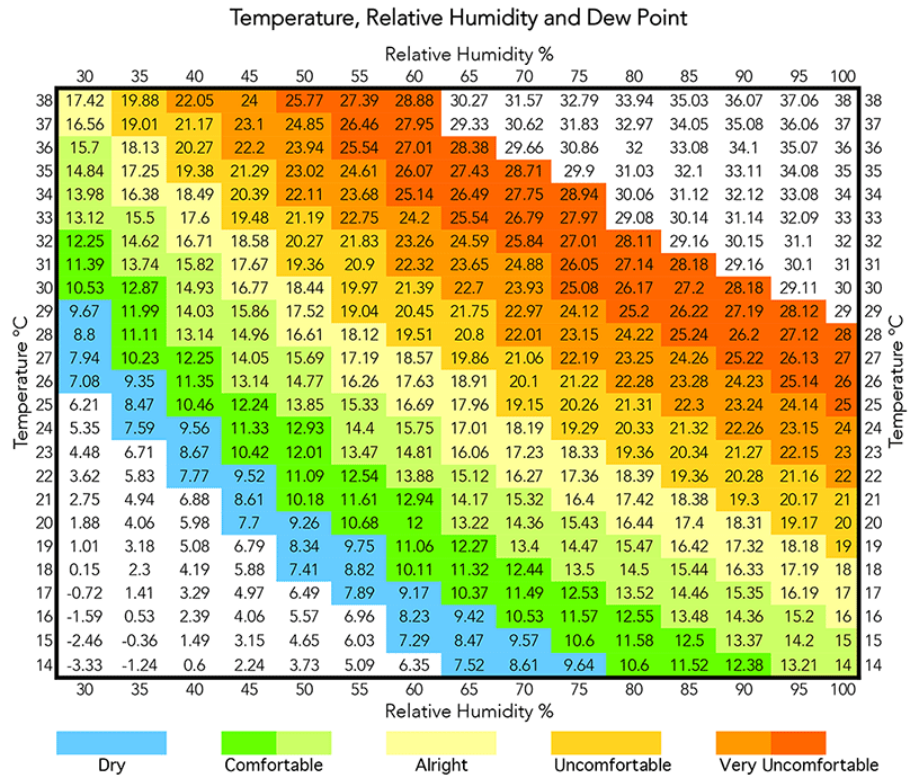
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ArchitecturalWhite should only be applied when the surface temperature of the steel member is 3°C above the current dew point, it is advisable that the air temperature should be increasing at the time of application.

A helpful tool to calculate the dew point is available as an app for your smartphone on Google Play Store or the Apple App Store, you can access a simple chart like the example below:



APPLICATION PROCEDURE:

1. Ensure the ArchitecturalWhite Loading Schedule which contains each steel members required coating thickness, is the latest revision and has been approved by the Main Contractor.
2. The Main Contractor, in conjunction with the Applicator, is responsible for ensuring the correct steel members receive the correct fire rating on site, cross check the latest Loading Schedule provided with the latest set of issued construction drawings as the drawings are subject to change without notice.
3. Obtain copies of the latest Technical Data Sheet and Safety Data Sheets (SDS) from the Fireshield web site, prior to collecting, receiving or opening Fireshield products and keep on site during coating.

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4. Confirm the compatibility of the primer coating to the steel member or contact Fireshield to check if the existing coating has been tested for compatibility and compliance with the Fireshield system. Record in writing.
5. A minimum 10°C and maximum 80% humidity must be maintained throughout the coating and curing process. Check dew points and steel surface temperature.
6. During, and at the conclusion of the application, Applicators must complete:
 - a PS3 / statement of construction
 - The Daily Application Records.

Copies must be forwarded to the main contractor or in absence of a main contractor, the property owner or his agent. The Applicator is advised to keep all records of application.
7. Install at least one small product label on or in close proximity to the coated surface and a large product description label in the switchboard cupboard serving the coated area. Fireshield can supply labels if required.

Depending on the level of finish required, ArchitecturalWhite can be applied using:

- Airless sprayer
- Brush
- Roller

Fireshield recommends using airless spray application as the method of choice for most projects as the level of finish and speed of application is far superior over brush and roller application.

Table 3 sets the target values for Application and Surface finishes with the different methods

Application Method	Paint Thickness per coat			Dry Time (Hours) (3)	Resulting Surface Finish
	grams/m ²	µm Wet	µm Dry		
Brush (1)	300-400	228-304	150-200	1-2	Residual brush stroke marks
Roller, 18-22 mm pile	400-500	304-380	200-300	1-2	Rough, high structure to surface
Airless 200/15 (2)	1000-2000(4)	760-1520	500-1000	8	Very smooth and smooth
Airless 200/17 (2)	1000-2000(4)	760-1520	500-1000	8	Smooth
Airless 200/21 (2)	1000-2000(4)	760-1520	500-1000	8	Low, soft surface.

Table 3 guideline values for different methods.

1. Type of brush
2. High-pressure pump with 200 bar pressure and a nozzle of a diameter of 0.015" (approx. 0.4 mm) spray angle 25-40° depending on the surface of the object.
3. Can be painted with topcoat after 48 hours.
4. The specified wet volume assumes a larger spray unit and application at room temperature.

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To obtain a smoother and less textured surface finish when applying with brush or roller, the paint can be thinned with clean water (max 2%).

Note! Consult Fireshield before thinning on site, thinning of ArchitecturalWhite will:

- reduce the specified DFT of each layer.
- Increase drying time
- changes the ratio of weight (g/m^2) to wet film (WFT) (μm) to dry film (DFT) (μm).

A superior, smoother surface is obtained by airless spraying and if a smaller nozzle (tip size) is used but the amount product dispersed decreases and the time needed to achieve the required coating thickness increases.

A Roller with shorter pile gives less texture to the finish but also less coating amount than a roller with longer pile. Rough texture from a roller can be lessened with a lacquer brush to the surface when wet.

NOTE: Never use the same tools for solvent-based paints as for aqueous paints. These items must be cleaned thoroughly and used only for the fire-retardant paint. Any filter in the spray gun must be removed and the line filter in the high-pressure pump must be set to 60 meshes or omitted entirely.

ON SITE MEASURE:

The thickness of the wet film must be checked at regular intervals during each coat when applying FIRESHIELD paint. A measuring cam or wet film comb is used to measure the wet film.

Before applying the last coat of fire-retardant paint, it is a good idea to measure the dry film to establish how much paint will be needed for the final application in order to achieve the requisite dry film (DFT).

It is also important to carry out a final inspection of the paint before applying the topcoat. The table below shows the paint volume ratio, wet film to dry film, of FIRESHIELD paint for of ArchitecturalWhite in accordance with our Technical Data Sheet to comply with the necessary fire rating

Wet paint quantity (g/m^2)	Wet film (μm)	Dry film (μm)
2040	1470	1000



When measuring DFT avoid damage to the coating layer



WFT measurements to be recorded regularly.

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Measurements for compliance:

- Circular areas of a diameter of 30 mm are used as test areas.
- Five measurements must be carried out within each test area
- The average WFT will constitute the measurement for the test area.

The approved WFT for the coating is achieved when the test area does not fall below the prescribed coat thickness and the results from the individual test areas do not fall below 85% of the prescribed coat thickness.

If the WFT measurements show that the required film thickness hasn't been achieved in the test area, the number of measurements should be increased for this part.

There must be a sufficient number of test areas as per Table 5 below, these must be distributed evenly over the steel member. It is generally true that the larger or more complicated the structure is, the more test areas that are required.

The number of test areas for objects of different sizes is shown in Table 5 below.

Steel Member face size. m ² (required by legislation)	The minimum number of test areas per face
0-1	3
1-3	9
3-10	15
10-30	21
30-100	27
100 +	27 for the first 100 m ² + 9 for each additional subsurface up to 100 m ²

Table 5 The number of test areas for objects of different sizes

TOPCOAT INFORMATION:

To protect ArchitecturalWhite against moisture or environmental impact, an approved topcoat can be used.

It is important that this topcoat is tested and approved by FIRESHIELD. If a non-approved topcoat is used it may inhibit the foaming effect of the intumescent coating which in turn affects the fire protection of the steel member.

Restricting the foaming effect of ArchitecturalWhite causes the emergence of large cracks in the protection foam layer that causes the steel to be exposed to the fire.

Consult FIRESHIELD or the reseller for a list of approved top coats.

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COMPLIANCE AND QUALITY ASSURANCE:

Detailed inspection, measurement and quality control must be carried out on site by the Approved Applicator to verify that the required fire rating has been achieved and each steel member has the correct fire rated coating as set out in the Construction Documentation and Loading Schedule.

The building inspection will be carried out by the contractor and include a calculation of the necessary amount of paint and the approved ArchitecturalWhite system selected including:

- The approved primer coat.
- The ArchitecturalWhite coat.
- The approved top coat.

The Applicator will then issue documentation to the Main Contractor for compliance sign off by the Council or Independent Inspector, these include but not limited to:

- The signed, project specific PS3 (New Zealand)
- Daily Record Sheets with beam specific WFT and DFT measurements.
- Loading Schedule
- Datasheet.

TRANSPORTATION OF PRE-COATED STEEL MEMBERS

On and off-site application are both possible with ArchitecturalWhite. For offsite application, care should be taken to protect surfaces from damage, a protective approved topcoat before transportation can help with this.

Steel members coated with ArchitecturalWhite should not be stacked at all for at least 1 week after coating. If possible transporting to site in a sling system can minimize damage to coated surfaces.

The product fully cures after 3 weeks.

REPAIRS TO COATING:

Damages to the ArchitecturalWhite coating during transport or on site must be repaired using the same coating products as those included in the approved system already applied to the steel member.

Sand the damaged surfaces and remove the topcoat to at least 5 cm away from the damaged area. Clean the sanded surface to remove grease and dust.

Check that the primer coating is still intact, if not repair and re-prime as necessary then apply the necessary amount of ArchitecturalWhite. Fire-retardant filler can be used for minor damage or for smoothing out the area between damaged and undamaged surfaces.

Let the fire protection paint dry for at least 3 days at room temperature and feather evenly to smooth to a level surface. Finish the repair with the previously used approved topcoat.

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BWOF COMPLIANCE INSPECTIONS

In accordance with the Building Warrant of Fitness (Compliance Schedule), Coatings shall be inspected annually as part of the annual inspection. This is to be carried out by a Fireshield approved applicator or a suitably qualified IQP and experienced practitioner with a full understanding of the Fireshield coating systems and New Zealand surface finish requirements.

Acceptable surface conditions for compliance inspections includes:

- Soft scuff or polish marks to surface coating (caused by clothing or hand bags rubbing etc)

Non-acceptable surface conditions for compliance inspections include but limited to:

- Dents, scratched, gouges, chips or holes in the coating.
- Delamination of coatings
- Flaking, peeling or blistered coatings.

All non-acceptable surface conditions require immediate remedial work to be carried out by an approved FIRESHIELD applicator, in accordance with all FIRESHIELD literature including the repairs and Maintenance clause below.

MAINTENANCE

There is no maintenance period required for FIRESHIELD products. If the coating is attached to the surface, it will remain compliant indefinitely. Scuff marks, general wear and tear to the TOPCOAT maybe very lightly sanded and overcoated with an additional coat of the same topcoat.

Scuff marks, general wear and tear to non-top coated ArchitecturalWhite will require repair as per the Repairs section above.

CONTACT:



Fire Protection Coatings Ltd

Head Office:

NZ 0800 FIRESHIELD

AUS 1800 092 097

Email info@fireshieldcoatings.com

Web www.fireshieldcoatings.com

Post PO Box 1016,
Christchurch 8013
New Zealand