TECHNICAL GUIDE

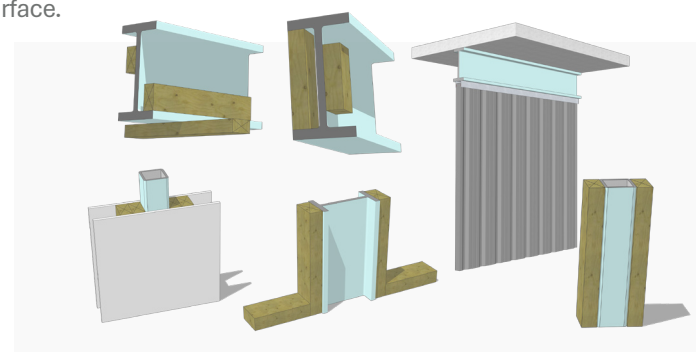
Fireshield® FIRE PROTECTION COATINGS

STEELCOATINGS

APPROVED ATTACHMENTS GUIDE

Solutions for attachments to Fireshield® coated structural steel surface.

The Fireshield® Attachments Guide is designed to assist Architects and Contractors when reducing expansion gaps or fixing attachments to fire rated steel members coated with Fireshield® intumescent systems.



1.0 INTRODUCTION

Fire-rated intumescent coatings are reactive systems designed to protect structural steel during a fire. When the steel temperature reaches approximately 200°C, the coating forms an expanding char layer that insulates the steel surface beneath.

This char layer does not generate significant force during expansion and can be easily restricted by surrounding construction materials or attachments. By expanding and insulating, the coating reduces the steel temperature for the required fire resistance period—typically between 30 and 120 minutes—helping to prevent structural failure.

In commercial steel-framed construction, timber, insulation, and plasterboard are often fixed to or positioned close to the coated surface, reducing the available expansion gap. Additionally, metal attachments and service clips fixed directly to Fireshield®-coated surfaces must be installed in a way that does not impede the char layer's expansion.

1.1 EXPANSION GAPS + METAL ATTACHMENTS

To simplify the calculation of the required expansion zone, international guidelines produced by FPANZ and the ASFP provide generic guidance.

A gap of 50 times the DFT (dry film thickness) of the intumescent coating will generally need to be provided (for thin film intumescent coatings) to allow for full expansion of the intumescent coating char layer during a fire event.

Below is an example of the calculation to determine the required gap for char expansion:

Fireshield® Steel 1001 scheduled at 400 microns (0.4mm) DFT

The requried expansion zone is:

50 X 0.4mm = 20mm expansion zone.

Gap sizes may be reduced only where the intumescent coating Manufacturer has specific test evidence to justify a reduction for the specified period of fire resistance. This applies to the gap between the cladding/framing and the flat surfaces of the protected steel section, as well as to flange tips.

This method can be challenging in real-world commercial construction. To address this, Fireshield® has carried out fire tests on different systems to provide technical evidence that allows reducing the char zone from 50 times the dry film thickness (DFT) to direct fixing:

- Timber
- Insulation
- Plasterboard
- Metal attachments and clips

1.2 FIRESHIELD® SOLUTIONS

The Fireshield® Attachments Guide offers practical solutions for using Fireshield® coating systems. It includes analysis and test data that support reducing gap sizes and using different types of fixings on coated surfaces.

The following approved attachment methods are detailed in this guide:

A. Direct fix timber framing and blocking.
Timber stud framing and blocking can be mechanically fixed directly to Fireshield®-coated structural steel sections.

B Direct fix plasterboard linings.
Plasterboard linings up to 13 mm thick can be fixed directly to Fireshield®-coated structural steel sections.

C. Steel stud light gauge framing solutions.
Guidance and solutions for fixing light-gauge steel stud to Fireshield®-coated structural steel sections.

D. Fireshield® + Korok two way fire walls up to 120mins FRR.
Korok wall panels can be fixed directly to Fireshield®-coated steel columns or beams to create two-way fire walls with up to 120 minutes fire resistance. Specific design is required.

E. Metal service brackets and attachments + web penetration solutions.
Solutions for fixing metal brackets for services (up to 3000 mm^2) directly to coated steel columns or beams without applying intumescent coating to the bracket.

F. Insulation material to coated steel surface.
Solutions for installing mineral and wool insulation batts in and around Fireshield®-coated steel columns and beams.

The details of each system are contained on the following pages, a summary of each is found in Section 2 Attachment and Expansion Summary. The following documentation is available from Fireshield®:

- Full project documentation review of all construction details.
- Project specific Consultant Advice Notice detailing the use of the Fireshield® Attachments + Expansion Guide.
- PS1/PS4, PN22 and SFA if required.
- Full consent package including loading schedule, specification and structural 3D mark up.

APPROVEDATTACHMENTS
TIMBER FRAMING + BLOCKING

Attaching timber framing ≥ 45mm to Fireshield® coated steel surface.

1.0 SYSTEM INFORMATION

Timber stud framing and timber blocking used to support cladding, linings and any other system can be mechanically fixed directly to Fireshield®-coated structural steel sections for up to 120 minutes FRR coating systems. See below for the correct Fireshield® product to use for the requried fire rating period and installation zone.

Fireshield® Product	Fire resistance period	TDS Reference	Fire Test Code
Fireshield® Steel 1001	30-60 mins FRR - Interior C1 - C2 only zones.	TD-FS1001AUNZ	ST-2019-01-01 + ST-2021-01-04/03
Fireshield® 471KS	30-120 mins FRR - Interior C1 - C2 only zones.	TD-FS1002NZ	ST-2021-01-04/01 + ST-2021-01
Fireshield® SQ476	30-120 mins FRR - Interior C1 - C3 zones.	TD-FSSQAUNZ	KCC-A22-01
Fireshield® 920KS	30-120 mins FRR - Interior + Exterior C1-C5 zones.	TD-FS920KS-NZ	H-22.02.2023 / Issue 1

1.1 INSTALLATION

1. Coat the structural steel member with the specified Fireshield® intumescent system at the required dry film thickness (DFT) from the Fireshield® loading schedule.
2. Apply required top coat if specified.
3. Complete DFT survey and QA before fixing to the coated surface.
4. Attach and mechanically fix the timber stud to the coated steel member.

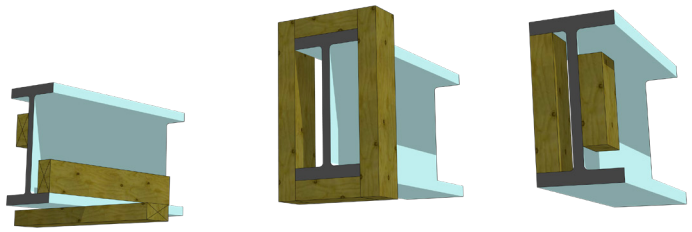


Image 4: Examples timber framing to open section steel beams.

1.2 SYSTEM REQUIREMENTS

Steel Sections	Hollow and open columns and beams.
Timber depth	≥ 45mm, see Fireshield® for ≤45mm
Timber width	Any
Fixings	Mechanical

Image 5: Examples timber framing to hollow section steel columns.

1.3 COMPLIANCE INFORMATION

- Fireshield® carried out fire testing in accordance with FPANZ COP-03 v2 on both open and closed steel sections.
- Temperature and time readings were taken at the timber-to-steel interface and compared with reference data.
- These tests provided the guidance on reducing the required expansion zones to zero when using Fireshield® intumescent coatings and demonstrate the impact of attaching timber framing directly to coated steel members.
- The results showed that the timber blocking charred and eventually burnt away, the Fireshield® intumescent coating expanded as expected when activated and met the compliance requirements under NZBC B1/VM1 and C2/AS1–C6/AS1 Section C5.1.1, as well as NCC Volume 2, Schedule 5.

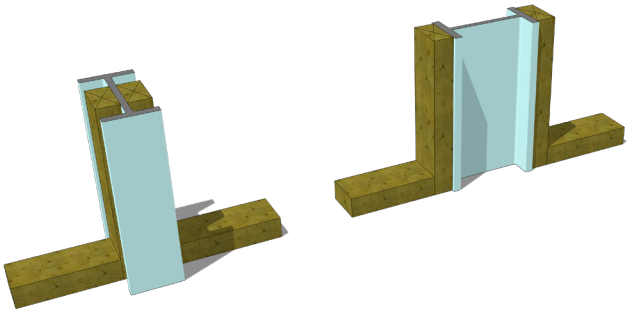


Image 6: Examples timber framing to open section steel columns.

RECOMMENDATIONS

This fire test evidence can be used to engineer a solution that allows a structural steel section to be coated with the listed Fireshield® intumescent and timber stud with or without plasterboard linings attached. This is a summarised version of the fire test report, for a copy of the original detailed report, email technical@fireshieldcoatings.com.

APPROVEDATTACHMENTS
PLASTERBOARD

Attaching ≥ 13mm Plasterboard to Fireshield® coated steel surface.

1.0 SYSTEM INFORMATION

Plasterboard linings can be fixed directly to Fireshield®-coated structural steel sections for up to 120 minutes FRR coating systems. See below for the correct Fireshield® product to use for the requried fire rating period and installation zone.

Fireshield® Product	Fire resistance period	TDS Reference	Fire Test Code
Fireshield® Steel 1001	30-60 mins FRR - Interior C1 - C2 only zones.	TD-FS1001AUNZ	ST-2019-01-01 + ST-2021-01-04/03
Fireshield® 471KS	30-120 mins FRR - Interior C1 - C2 only zones.	TD-FS1002NZ	ST-2021-01-04/01 + ST-2021-01
Fireshield® SQ476	30-120 mins FRR - Interior C1 - C3 zones.	TD-FSSQAUNZ	KCC-A22-01
Fireshield® 920KS	30-120 mins FRR - Interior + Exterior C1-C5 zones.	TD-FS920KS-NZ	H-22.02.2023 / Issue 1

1.1 INSTALLATION

1. Coat the structural steel member with the specified Fireshield® intumescent system at the required dry film thickness (DFT) from the Fireshield® loading schedule.
2. Apply required top coat if specified.
3. Complete DFT survey and QA before fixing to the coated surface.
4. Attach plasterboard hard against the coated surface as per the board manufacturers instructions, do not use adhesive on the coated steel surface.

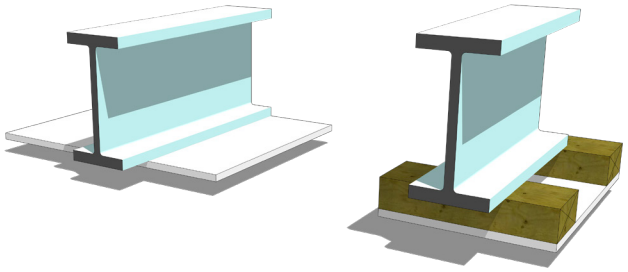


Image 7: Examples timber framing to open section steel beams.

1.2 SYSTEM REQUIREMENTS

Steel Sections	Hollow and open columns and beams.
Plasterboard thickness	≥ 13mm, see Fireshield® for over 13mm.
Plasterboard Type	Any
Fixings	Mechanical

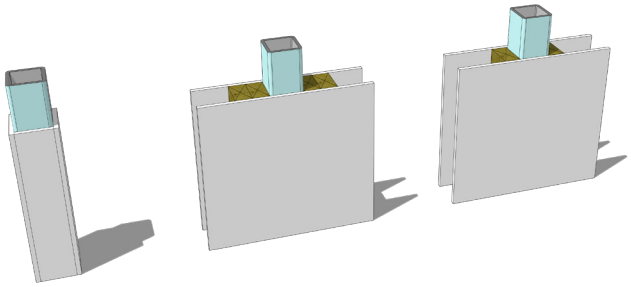


Image 8: Examples timber framing to hollow section steel columns.

1.3 COMPLIANCE INFORMATION

- Fireshield® carried out fire testing in accordance with FPANZ COP-03 v2 on both open and closed steel sections.
- Temperature and time readings were taken at the timber-to-steel interface and compared with reference data.
- These tests provided the guidance on reducing the required expansion zones to zero when using Fireshield® intumescent coatings and demonstrate the impact of attaching plasterboard directly to coated steel members.
- The results showed that the plasterboard failed and burnt away, the Fireshield® intumescent coating expanded as expected when activated and met the compliance requirements under NZBC B1/VM1 and C2/AS1–C6/AS1 Section C5.1.1, as well as NCC Volume 2, Schedule 5.

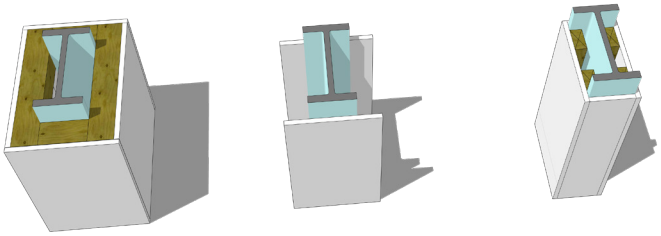


Image 9: Examples timber framing to open section steel columns.

RECOMMENDATIONS

This fire test evidence can be used to engineer a solution that allows a structural steel section to be coated with the listed Fireshield® intumescent and timber stud with or without plasterboard linings attached. This is a summarised version of the fire test report, for a copy of the original detailed report, email technical@fireshieldcoatings.com.

APPROVEDATTACHMENTS

STEELSTUD LIGHT GAUGE FRAMING

Attaching light gauge steel channel framing to Fireshield® coated steel surface.

1.0 SYSTEM INFORMATION

Light gauge steel stud framing cannot be directly attached the coated surface of a structural steel beam or column, however Fireshield® recommend utilising one of the two solutions below for all Fireshield® intumescent systems up to 120mins FRR. See below for the correct Fireshield® product to use for the requried fire rating period and installation zone.

Fireshield® Product	Fire resistance period	TDS Reference	Fire Test Code
Fireshield® Steel 1001	30-60 mins FRR - Interior C1 - C2 only zones.	TD-FS1001AUNZ	TK-220701-01
Fireshield® 471KS	30-120 mins FRR - Interior C1 - C2 only zones.	TD-FS1002NZ	TK-220701-01
Fireshield® SQ476	30-120 mins FRR - Interior C1 - C3 zones.	TD-FSSQAUNZ	TK-220701-01
Fireshield® 920KS	30-120 mins FRR - Interior + Exterior C1-C5 zones.	TD-FS920KS-NZ	TK-220701-01

1.1 INSTALLATION

1. Coat the structural steel member with the specified Fireshield® intumescent system at the required dry film thickness (DFT) from the Fireshield® loading schedule.
2. Apply required top coat if specified.
3. Complete DFT survey and QA before fixing to the coated surface.
4. Attach and mechanically fix the steel stud channel as per Manufacturers instructions to the coated member.
5. Coat the attached steel channel with the same dry film thickness as the main structural member it is attached to.
6. Alternative Solution: Attach 45mm timber packer between the coated steel section and steel stud framing, see images.

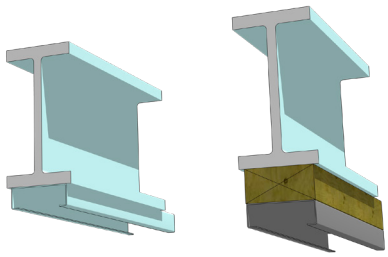


Image 10: Examples timber framing to open section steel beams.

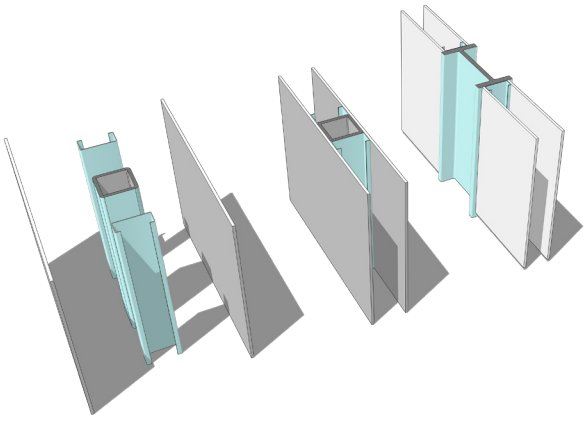


Image 11: Examples timber framing to hollow section steel columns.

1.2 SYSTEM REQUIREMENTS

Steel Sections	Hollow and open columns and beams.
Steel stud	Galvanised cold rolled steel stud.
Steel stud size	>0.55mm BMT and any dimension.
Fixings	Mechanical

1.3 COMPLIANCE INFORMATION

- Fireshield® carried out fire testing in accordance with FPANZ and ASFP guidelines on both open and closed steel sections.
- Temperature and time readings were taken at the coated steel stud -to-steel interface and compared with reference data.
- These tests provided guidance on the required solution which is to intumescent coatback onto the steel stud at the same DFT as the primary member to prevent heat sync as per ASFP TGD 11.
- As a result this solutions meets the compliance requirements under NZBC B1/VM1 and C2/AS1–C6/AS1 Section C5.1.1, as well as NCC Volume 2, Schedule 5.

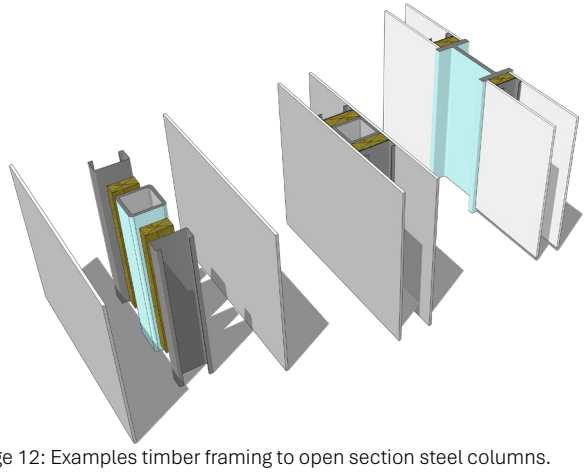


Image 12: Examples timber framing to open section steel columns.

RECOMMENDATIONS

This fire test evidence can be used to engineer a solution that allows a structural steel section to be coated with the listed Fireshield® intumescent and timber stud with or without plasterboard linings attached. This is a summarised version of the fire test report, for a copy of the original detailed report, email technical@fireshieldcoatings.com.

TECHNICAL GUIDE

APPROVEDATTACHMENTS
FIRESHIELD® + KOROK® WALL

Attaching Korok wall panels to Fireshield® coated structural steel members to form 2-way fire walls without boarding.

1.0 SYSTEM INFORMATION

Fireshield® coated structural steel beams and columns can be directly attached to Korok wall panels to form a two way firewall without the need to box out the steel members with fire rated plasterboard. This is a specific design system contact Fireshield® for design advice. See below for the correct Fireshield® product to use for the requried fire rating period and installation zone.

Fireshield® Product	Fire resistance period	TDS Reference	Fire Test Code
Fireshield® Steel 1001	30-60 mins FRR - Interior C1 - C2 only zones.	TD-FS1001AUNZ	FR16707
Fireshield® 471KS	30-120 mins FRR - Interior C1 - C2 only zones.	TD-FS1002NZ	FR16707
Fireshield® SQ476	30-120 mins FRR - Interior C1 - C3 zones.	TD-FSSQAUNZ	FR16707
Fireshield® 920KS	30-120 mins FRR - Interior + Exterior C1-C5 zones.	TD-FS920KS-NZ	FR16707

1.1 INSTALLATION

1. Coat the structural steel member with the specified Fireshield® intumescent system at the required dry film thickness (DFT) from the Fireshield® loading schedule.
2. Apply required top coat if specified.
3. Complete DFT survey and QA before fixing to the coated surface.
4. Attach and mechanically fix the Korok wall panel to the underside of beam or to the side of the column as per the Korok Wall installation guide using deflection head and fire rated mastic.
5. All gaps at junctions must be filled using the Ryan Fire 502 batt system.

1.2 SYSTEM REQUIREMENTS

Steel Sections	Hollow and open columns and beams.
Korok Wall	≥78mm
Deflection Head	Korok C Track 60X80X60X1.15 BMT galv.
Fixings	Mechanical
Fire Rated Mastic	Hilti CP606 fire rated sealant

1.3 COMPLIANCE INFORMATION

- Fireshield® undertook fire tests in conjunction with Korok at BRANZ to evaluate the effects of the Korok wall system attached directly to a Fireshield® coated beam and column sections up to 120 mins FRR.
- The fire test was to evaluate if the entire wall system could be used as a 2-way fire wall providing structural, insulation and integrity values.
- The Korok wall system should be installed as per the Korok fire systems installation manual.
- The fire test results concluded that the Korok + Fireshield® tested system can provide a 2 way fire wall up to 120mins FRR in sprinklered buildings and in non sprinklered with a 50mm standoff distance (less than 25W/m^2) . The system complies with the NZBC B1/VM1 and C2/AS1-C6/AS1 Section C5.1.1 and the NCC Volume 2, Schedule 5.

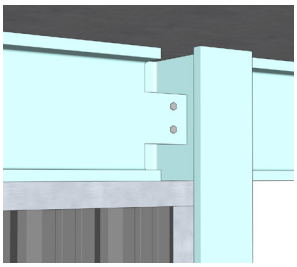


Image 13: Unprotected junction beam to column.

Image 14: Ryanfire 502 batt to fill void both sides.

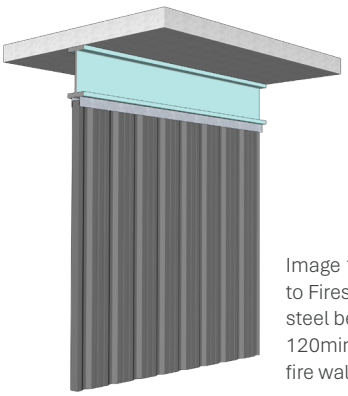


Image 16: Korok wall to Fireshield® coated steel beam - up to 120mins FRR 2 way fire wall.

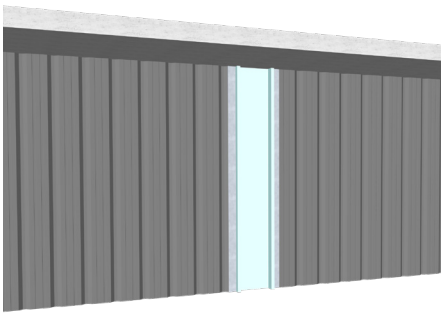


Image 15: Korok wall to Fireshield® coated steel column - up to 120mins FRR 2 way fire wall.

RECOMMENDATIONS

This is a summarised version of the fire test report, for a copy of the original detailed report, email technical@fireshieldcoatings.com.

APPROVEDATTACHMENTS

METAL BRACKETS + SERVICES PENETRATIONS

Attaching metal brackets + services clearances to Fireshield® coated structural steel.

1.0 SYSTEM INFORMATION

Metal clips and attachments to support piping and cables can be directly fixed to Fireshield® coated steel beams and columns without the need to coat them, see below. Services passing through apertures in beam webs can be completed using the guidelines below. See below for the correct Fireshield® product to use for the requried fire rating period and installation zone.

Fireshield® Product	Fire resistance period	TDS Reference	Fire Test Code
Fireshield® Steel 1001	30-60 mins FRR - Interior C1 - C2 only zones.	TD-FS1001AUNZ	FABIG Technical Note 13 Section 6.5
Fireshield® 471KS	30-120 mins FRR - Interior C1 - C2 only zones.	TD-FS1002NZ	FABIG Technical Note 13 Section 6.5
Fireshield® SQ476	30-120 mins FRR - Interior C1 - C3 zones.	TD-FSSQAUNZ	FABIG Technical Note 13 Section 6.5
Fireshield® 920KS	30-120 mins FRR - Interior + Exterior C1-C5 zones.	TD-FS920KS-NZ	FABIG Technical Note 13 Section 6.5

1.1 INSTALLATION METAL BRACKETS

1. Coat the structural steel member with the Fireshield® system at the required dry film thickness (DFT) from the Fireshield® loading schedule.
2. Complete DFT survey and QA before fixing to the coated surface.
3. Attach the required service clips, attachments and brackets to the coated surface, they must be under 3000mm^2 in size.
4. There can be no more than one fixing per lineal metre **or** square metre.
5. If fixings are larger than 3000mm^2 in size or if there are more than one per lineal metre or square metre, coat all fixings with intumescent at the same DFT as the primary fire rated member they are attached to.
6. Services penetrations through web apertures such as metal pipes and data cables must have a >25mm clearance from the aperture coated edge, see Image 17. This is to allow intumescent expansion and avoid coating damage.
7. Cellular beams and services that combust <200°C and burn away do not require a clearance distance from the aperture edge.

1.2 SYSTEM REQUIREMENTS

Steel Sections	Hollow and open columns and beams.
Attachments	Service clips and brackets
Attachment Type	Steel, Aluminium, Light Gauge Steel.
Minimum Spacing.	1 per lineal metre or per m^2
Attachment Size	Up to 3000mm^2

Image 17: Compliant <3000mm^2 service clips to bottom of beam, note compliant pipe penetration.

Image 18: Non-compliant bracket attachment @7500mm^2, solution: coat the bracket with the same DFT as the primary member.

1.3 COMPLIANCE INFORMATION

- The Fire and Blast Information Group (FABIG) Technical Note 13 Section 6.5 states that for small attachments such as brackets for cable trays, instrument piping and handrails, the cross sectional area will be small and the resultant heat transfer is not significant to the primary fire rated member.
- Therefore, assuming these do not cumulatively exceed 3000 mm^2 cross sectional area per metre length of primary steel section or per square metre of surface area, then they generally do not need to be coated.
- The intumescent coating will continue to perform as per the compliance testing and continue to provide compliance with the NZBC B1/VM1 and C2/AS1-C6/AS1 Section C5.1.1 and the NCC

RECOMMENDATIONS

This is a summarised version of the fire test report, for a copy of the original detailed report, email technical@fireshieldcoatings.com.

APPROVEDATTACHMENTS

INSULATION ATTACHMENTS

Insulation material in close proximity to Fireshield® coated structural steel members.

1.0 SYSTEM INFORMATION

Fireshield® coated structural steel beams and columns can have insulation or acoustic batts or rolls as detailed below placed within the voids or in and around the steel section in close proximity to the coated surface. See below for the correct Fireshield® product to use for the requried fire rating period and installation zone.

Fireshield® Product	Fire resistance period	TDS Reference	Fire Test Code
Fireshield® Steel 1001	30-60 mins FRR - Interior C1 - C2 only zones.	TD-FS1001AUNZ	UC-240111-INS-01/02
Fireshield® 471KS	30-120 mins FRR - Interior C1 - C2 only zones.	TD-FS1002NZ	UC-240111-INS-01/02
Fireshield® SQ476	30-120 mins FRR - Interior C1 - C3 zones.	TD-FSSQAUNZ	UC-240111-INS-01/02
Fireshield® 920KS	30-120 mins FRR - Interior + Exterior C1-C5 zones.	TD-FS920KS-NZ	UC-240111-INS-01/02

1.1 INSTALLATION

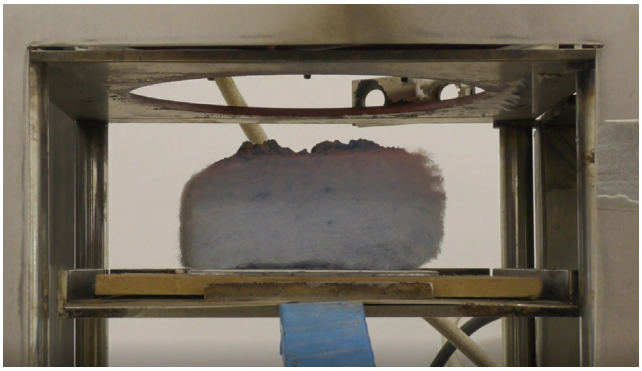
1. Coat the structural steel member with the Fireshield® system at the required dry film thickness (DFT) from the Fireshield® loading schedule.
2. Complete DFT survey and QA before fixing to the coated surface.
3. Insert the acoustic or insulation material into the steel section or wall/floor void.
4. The insulation material can be hard against the Fireshield® coated surface.
5. Only use the insulation materials listed: Polyester or mineral wool glass or stone.
6. Contact Fireshield® for XPS and PIR board insulation use.

1.2 SYSTEM REQUIREMENTS

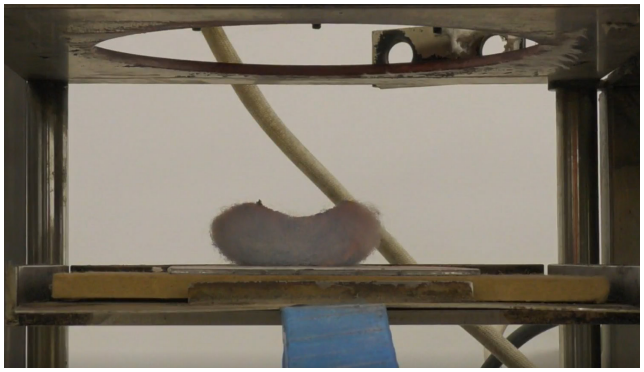
Steel Sections	Hollow and open columns and beams.
Attachments	Insulation/acoustic batts and rolls
Batt Type	Mineral wool and polyester.
Insulation Thickness	≥100mm
Attachment Size	Any size

1.3 COMPLIANCE INFORMATION

- Fireshield® carried out fire testing in accordance with AS NZS 3837 on intumescent coated steel plates.
- Insulation materials tested:
  - Polyester insulation blanket
  - Mineral glass wool insulation batt.
- Time readings were taken and compared with reference data.
- These tests provided the guidance on reducing the required expansion zones to zero when using Fireshield® intumescent coatings and demonstrate the impact of attaching insulation directly to coated steel members.
- The results showed that the polyester insulation material rapidly contracted when exposed to heat and burnt away, the Fireshield® intumescent coating expanded as expected when activated.
- The mineral glass wool insulation batt did not combust and burn away, it insulated the coated steel plate below meaning the intumescent not expand because the temperature at the surface was <200°C.
- Both met the compliance requirements under NZBC B1/VM1 and C2/AS1–C6/AS1 Section C5.1.1, as well as NCC Volume 2, Schedule 5.



Polyester 100mm thick insulation material: start of test.



Polyester 100mm thick insulation material shrinkage after 8 seconds.

RECOMMENDATIONS

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