FIRETEX® Technical Bulletin

FTB 002: Issue 1: 28/10/2022

Attachments to FIRETEX® Protected Steelwork

Attaching an item to a FIRETEX protected structural element has a potential to detrimentally affect the elements behaviour in a fire. Without the availability of an expansion gap the intumescent coating may not provide the intended protection.

Contractors installing attachments to FIRETEX protected steelwork should consider the potential effects on the fire protection performance, using this document for reference, and take any necessary actions to maintain the specified fire protection. It is not the responsibility of Sherwin-Williams or applicators of the FIRETEX products to determine what measures are appropriate however this document provides Sherwin-Williams' opinions in this matter.

In Sherwin-Williams' view it is reasonable to ignore attachments which would be expected to burn away or fall away quickly in a fire providing this can be expected to happen within the first 10 minutes, i.e. before the intumescent coating begins to react. Guidance on the expected behaviour of an attachment should be sought from the manufacturer or supplier of the attachment.

Small Attachments

The Fire and Blast Information Group (FABIG Technical Note 13) recommends that no fire protection is needed for a secondary attachment with a contact area of no greater than 3000mm² per linear metre or per square metre of surface area. Similar guidance is given by UL in their Best Practice Guide for Passive Fire Protection for Structural Steelwork - FIRE RESISTANCE AND EXTERNAL EXPOSURE CHARACTERISTICS.

Larger Attachments

Sherwin-Williams has commissioned an investigation into the appropriate protection necessary for secondary steelwork attached to fire protected primary elements. In this context a secondary component is one which does not itself require fire protection.

The investigation was carried out by a Chartered Engineer and Fellow of the Institution of Fire Engineers, whose report can be made available to project engineers, if required, by contacting Sherwin-Williams.

The following simplified table supersedes Sherwin-Williams previous views on the subject of coatback distance:

Fire Resistance Period	Minimum Coatback Length
Up to 30 minutes	0mm
31-120 minutes	260mm

The above table uses a maximum local temperature increase at the connection of 10%, a primary to secondary section factor ratio of 1:1 and a primary member limiting temperature of 550°C, information relating to other local temperature variances is available to project engineers on request. Examples of other coatback scenarios are shown below:

The following coatback lengths assume a protected primary limiting temperature of 550°C and a primary to secondary section factor ratio of 1:8. The investigation showed that increasing the secondary component's section factor compared to the primary reduces the coatback requirement.

Coatback length (mm) for predicted % temperature increase										
Fire resistance period (mins)	End Plate Connections					Fin Plate Connections				
	0%	2%	5%	10%	20%	0%	2%	5%	10%	20%
30	214	29	0	0	0	210	43	0	0	0
60	291	89	65	26	0	379	97	79	48	0
90	461	96	81	55	4	476	128	92	70	25
120	485	100	87	67	26	490	145	100	79	39

With a 1:1 ratio of primary to secondary section factor and a local temperature increase of 10% the report suggests the following coatback distances at primary member limiting temperature of 550°C.

Fire resistance period (mins)	End plate connections Coatback length (mm)	Fin plate connections Coatback length (mm)
30	0	0
60	71	111
90	125	197
120	188	257

The following images illustrate the required coatback for up to 30 minutes (Figure 1) and for 31-120 minutes (Figure 2).

Figure 1 – Up to 30 minutes protection

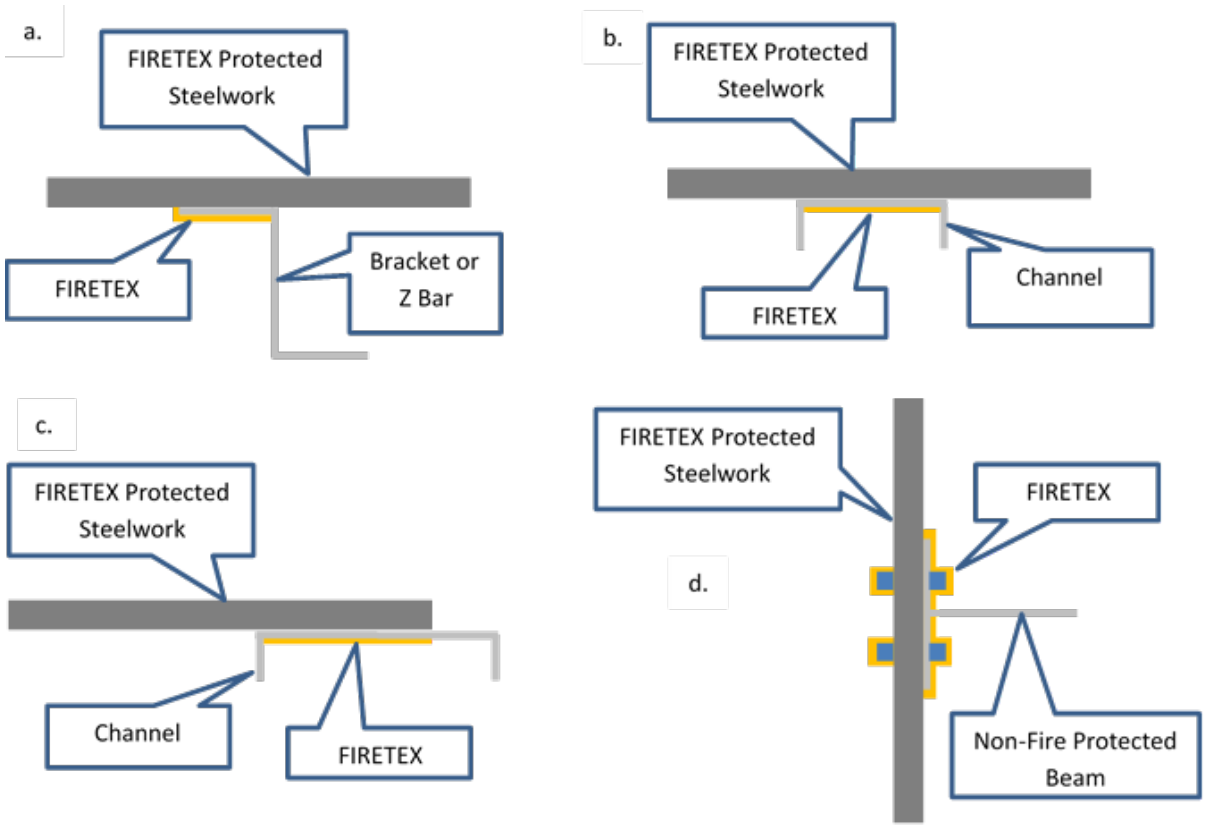
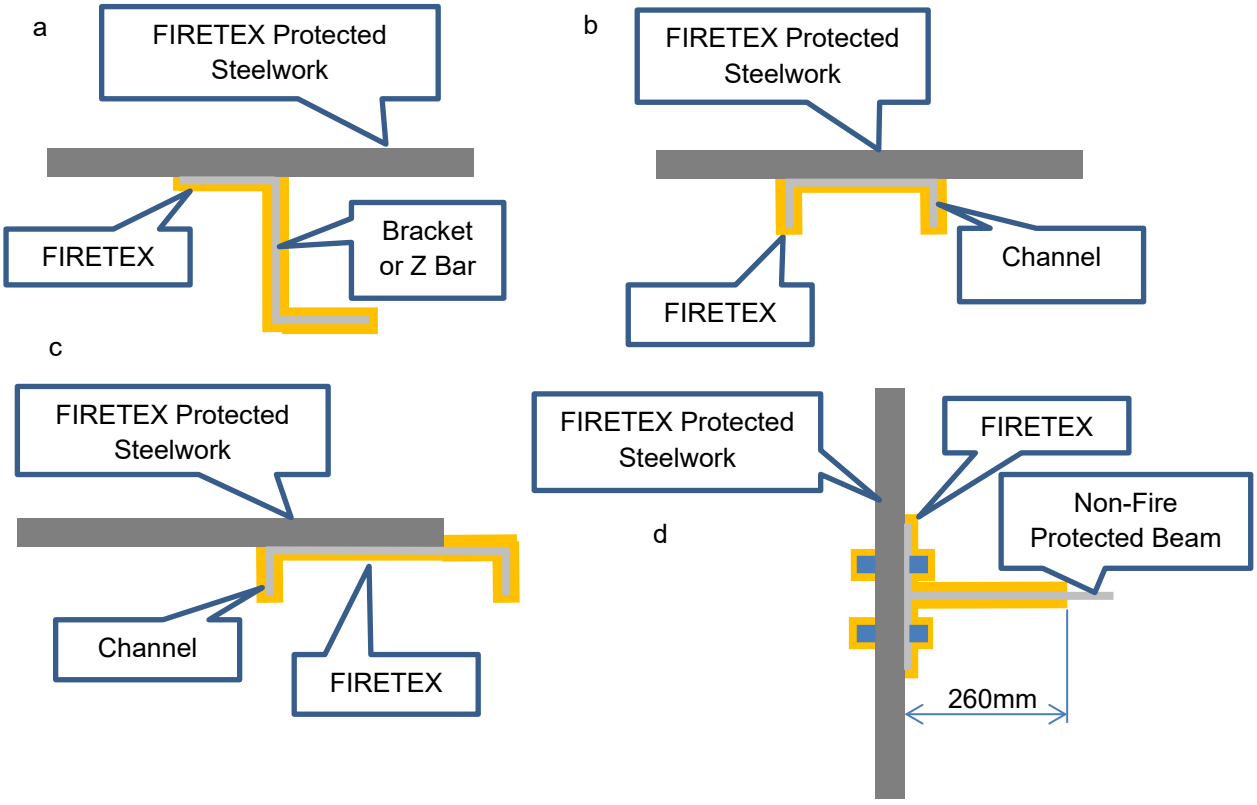


Figure 2 – 31-120 minutes protection



Note: Where the secondary component is <260mm in length, the full exposed surface should be protected.

Hollow section secondary components

Hollow section secondary components should be protected with a minimum of 500mm of coatback, in line with the guidance provided by the Association for Specialist Fire Protection (ASFP) in their Technical Guidance Document TGD 8.

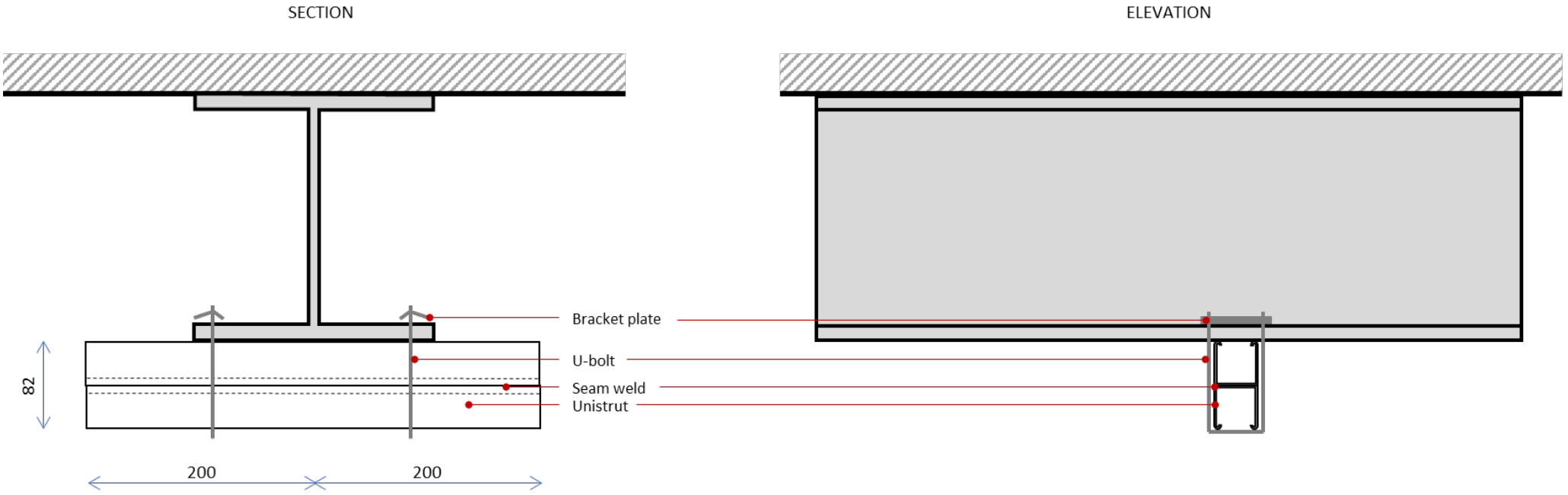
Fin and/or Toe Plates

In the light of the study carried out and to allow simple guidance to be offered, Sherwin-Williams no longer consider fin and toe plates differently to other attachment types.

Unistrut Attachments

To enhance the available guidance Sherwin-Williams commissioned further work to investigate some common restrictions to intumescent expansion space. The attachment of Unistrut to beams was tested alongside a control specimen in a fire test conducted by an independent, ISO17025 accredited laboratory. The results obtained were evaluated by a Chartered Engineer and Fellow of the Institution of Fire Engineers, whose report can be made available to project engineers, if required, by contacting Sherwin-Williams.

Unistrut Attachment to I or H Shaped Beams



Sherwin-Williams UK Limited, Protective & Marine Division
Tower Works, Kestor Street, Bolton, BL2 2AL, United Kingdom
T: +44 (0)1204 521771 F: +44 (0)1204 382115 W: protectiveemea.sherwin-williams.com
Registered in England Reg. No. 2968830 Reg. Office: Station Lane, Witney, Oxfordshire, United Kingdom, OX28 4XR

This document and the supporting report detailing the Unistrut test provide insight for designers and specifiers into the performance of FIRETEX intumescent coatings when encasement and associated fixings details attached to protected structural steelwork give the potential for inhibiting or reducing the expansion of the intumescent or creating localised hotspots.

The result showed that the time to reach the average critical temperature of the specimen was at least 85%* of that of the relevant control specimen. As such, it may be considered that the attached Unistrut would not lead to a significant detrimental performance in the fire resistance of the member to which they are attached.

*The 85% value was selected as this is a common approach in the passive fire protection industry, being used in British Coatings Federation documents, EAD350402-00-1106, EN16623 and UL's fire protection durability test standard UL2431.

The results of the fire test should provide a degree of comfort to design teams, approving authorities or other project stakeholders, that the use of such designs does not lead to a detrimental performance of the fire resistance of the protected member.

The fire test investigation was based on a common industry constructional detail; however it is recognised that an almost infinite number of permutations of encasement and attachment design detail may occur in practice. Where the tested details are used on projects, they may provide a direct correlation to expected performance. Where alternative constructional details are proposed on a project, then the outcome of this report may be used by design teams to make an informed decision on the anticipated performance and therefore suitability of the design detail itself. This type of engineering judgement may be made by an appropriately qualified person which may be part of the project's design team or an appointed third-party.

Note: **Fire Engineering**

The use of a fire engineered approach to designing the fire protection for a structural steel frame is increasing in frequency. It should be noted that the act of fire engineering the structure could offer a reduction in the quantity of fire protection materials required to protect the steel elements.

This process removes some of the conservatism inherent in the use of default limiting temperatures and those responsible for the fire safety of the building must satisfy themselves that the guidance provided by Sherwin-Williams in FIRETEX Technical Bulletins or otherwise remains applicable when a project has been fire engineered.

The information herein is subject to revision as a result of additional information or test evidence becoming available, please consult Sherwin-Williams to ensure you have the latest version.

Nothing in this document is intended to amount to professional engineering or architectural advice on which any reader of this document or recipient of such statements should rely and Sherwin-Williams does not accept a duty of care to any reader of this document for such statements. TO THE EXTENT PERMITTED BY LAW, SHERWIN-WILLIAMS EXCLUDES ALL CONDITIONS, WARRANTIES, REPRESENTATIONS, OR OTHER TERMS THAT MAY APPLY TO THIS DOCUMENT WHETHER EXPRESS OR IMPLIED. SHERWIN-WILLIAMS WILL NOT BE LIABLE FOR ANY LOSS OR DAMAGE, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), BREACH OF STATUTORY DUTY, MISREPRESENTATION, MISSTATEMENT, OR OTHERWISE, EVEN IF FORESEEABLE, ARISING UNDER OR IN CONNECTION WITH THIS DOCUMENT. Nothing in this disclaimer excludes or limits Sherwin-Williams' liability for any liability that cannot be excluded or limited by law.