

FIRE ASSESSMENT REPORT

FC18036-01-3

FIRE RESISTANCE OF HB FULLER FIRESOUND SEALANT AS CONTROL JOINTS IN FIRE RATED WALLS IN ACCORDANCE WITH AS 1530.4-2005/2014

CLIENT

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ASSESSMENT OBJECTIVE

To assess the fire resistance of HB Fuller Firesound Sealant fire rated control joints in accordance with AS 1530.4-2005/2014 and with reference to AS 4072.1-2005 (including Amendment No. 1) with reference to Section 4, when installed in fire rated plasterboard, concrete or masonry walls.

CONCLUSION

It is considered that the HB Fuller Firesound Sealant fire rated control joints would be expected to achieve the stated FRL if tested in accordance with AS 1530.4-2005/2014 with reference to AS 4072.1-2005 (including Amendment No. 1) with reference to Section 4, as stated in the following table.

Summary of HB Fuller Firesound Sealant Control Joints in Fire Rated Walls

Control Joint Configuration (Sealant Backing)	Minimum Wall Thickness	Maximum Joint Width (mm)	Minimum Sealant Depth (mm)	FRL
Vertical Plasterboard Control Joints (with backing rod)				
1 x 13 mm/ 1 x 13 mm	90 mm	20	13	-/60/60
1 x 13 mm/ 1 x 13 mm +stopping angle (13 mm x 28 mm x 0.4 mm)	90 mm	20	13	-/60/60
1 x 13 mm/ 1 x 13 mm +P35	90 mm	20	22	-/60/60
1 x 16 mm/ 1 x 16 mm	96 mm	20	22	-/90/90
1 x 16 mm/ 1 x 16 mm +stopping angle (16 mm x 28 mm x 0.4 mm)	96 mm	20	22	-/90/90
1 x 16 mm/ 1 x 16 mm +P35	96 mm	20	22	-/90/90
2 x 13 mm/ 2 x 13 mm	116 mm	20	20	-/120/120
2 x 13 mm/ 2 x 13 mm +stopping angle (13 mm x 28 mm x 0.4 mm)	116 mm	20	20	-/120/120
2 x 13 mm/ 2 x 13 mm + P35	116 mm	20	26	-/120/120
2 x 16 mm/ 2 x 16 mm	128 mm	20	32	-/180/180
2 x 16 mm/ 2 x 16 mm +stopping angle (16 mm x 28 mm x 0.4 mm)	128 mm	20	32	-/180/180
2 x 16 mm/ 2 x 16 mm + P35	128 mm	20	26	-/180/180
3 x 13 mm/ 3 x 13 mm	142 mm	20	26	-/180/180
3 x 13 mm/ 3 x 13 mm +stopping angle (13 mm x 28 mm x 0.4 mm)	142 mm	20	26	-/180/180
3 x 13 mm/ 3 x 13 mm +P35	142 mm	20	26	-/180/180

Client supplied drawings of the plasterboard/plasterboard control joint configurations are shown in Figure 1 to Figure 5.

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Summary of HB Fuller Firesound Sealant Control Joint Junctions in Fire Rated Walls

Control Joint Configuration (Sealant backing)	Minimum Wall Thickness	Maximum Joint Width (mm)	Minimum Sealant Depth (mm)	FRL
Vertical (perimeter) or Horizontal (top or bottom) Plasterboard to Concrete/Masonry				
1 x 13 mm/ Concrete/Masonry (framing)	90 mm	20	13	-/60/60
1 x 16 mm/ Concrete/Masonry (framing)	96 mm	20	16	-/90/90
2 x 13 mm/ Concrete/Masonry (framing)	116 mm	20	26	-/120/120
2 x 13 mm/ Concrete/Masonry (framing+ backing rod)	116 mm	20	20	-/120/120
2 x 16 mm/ Concrete/Masonry (framing)	128 mm	20	32	-/180/180
2 x 16 mm/ Concrete/Masonry (framing+ backing rod)	128 mm	20	20	-/180/180
3 x 13 mm/ Concrete/Masonry (framing+ backing rod)	142 mm	20	26	-/180/180

Client supplied drawings of the plasterboard/perimeter control joint configurations are shown in Figure 6 to Figure 7.

It is considered the control joints may be installed with the following variations:

- The fire rated wall steel framing may be increased in depth.
- The fire rated wall framing may be constructed using timber according to the lining manufacturer's specification with the same plasterboard lining configurations as tested.
- The fire rated plasterboard facings may be increased in thickness.
- Equivalent alternative fire rated plasterboard walls (including, but not limited to Knauf Gypsum, CSR, Siniat or BGC) which have an established fire resistance rating by test or assessment in accordance with AS 1530.4-2005/2014.
- In concrete or masonry walls of the same minimum wall thickness as stated above. The walls shall be built to comply with the concrete or masonry standard as appropriate.
- Firesound sealant may be used as an alternative to stopping compound for recess and butt joints All joints must be backed with either framing sections or plasterboard, see Figure 8.

LIMITATION

This report is subject to the accuracy and completeness of the information supplied.

BRANZ reserves the right to amend or withdraw this assessment if information becomes available which indicates the stated fire performance may not be achieved.

This assessment report may only be quoted or reproduced in full.

TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in BRANZ Services Agreement for this work.

The results reported here relate only to the item/s described in this report.

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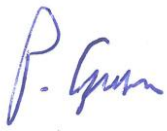

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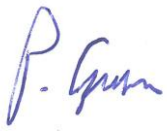

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DOCUMENT REVISION STATUS

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3	29 May 2025	29 May 2035	Including additional test data and client supplied drawings

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1. INTRODUCTION

This report gives BRANZ's assessment on the fire resistance of HB Fuller Firesound Sealant control joints in fire rated plasterboard walls if tested in accordance with AS 1530.4-2005/2014 with reference to AS 4072.1-2005 (including Amendment No. 1) with reference to Section 4.

2. BACKGROUND

In Warringtonfire Australia Pty Ltd fire resistance test FRT210007 a number of control joints were tested in a nominal 64 mm deep steel stud framed plasterboard wall in accordance with AS 1530.4:2014. The wall was divided in half vertically and lined with two different thicknesses of fire rated plasterboard. Specimen A to D were tested with 16 mm fire rated plasterboard, Specimen E to H with 13 mm fire rated plasterboard. Specimens A, D, E and H were horizontal control joints at the perimeter of the specimen. Specimens B and G were vertical control joints at the perimeter of the specimen. Specimens C and F were vertical control joints in the body of the specimen. HB Fuller Firesound Sealant was applied to each face of the wall and either backed by the perimeter steel framing or an open cell backing rod. See Table 1 for a summary of the tested control joints and results.

Table 1: Summary of Fire Resistance Test FRT210007

Specimen	Control Joint Configuration	Sealant Backing	Joint Width (mm)	Sealant Depth (mm)	FRL
A	1 x 16 mm/Perimeter blockwork	Framing	20	16	-/120/90
B	1 x 16 mm/Perimeter blockwork	Framing	16	16	-/120/90
C	1 x 16 mm/1 x 16 mm	Backing rod	15	16	-/120/60
D	1 x 16 mm/Perimeter blockwork	Framing	10	16	-/120/90
E	1 x 13 mm/Perimeter blockwork	Framing	20	13	-/120/60*
F	1 x 13 mm/1 x 13 mm	Backing rod	15	13	-/120/60
G	1 x 13 mm/Perimeter blockwork	Framing	13	13	-/120/60
H	1 x 13 mm/Perimeter blockwork	Framing	10	13	-/120/90*

* Specimen E and H were 584 mm long which does not comply with the minimum length required in AS 1530.4-2005/2014.

In Warringtonfire Australia Pty Ltd fire resistance test FRT210008 a number of control joints were tested in a nominal 64 mm deep steel stud framed plasterboard wall in accordance with AS 1530.4:2014. The wall was divided in half vertically and lined with two different thicknesses of fire rated plasterboard. Specimen A to D were tested with two layers of 16 mm fire rated plasterboard, Specimen E to H with two layers of 13 mm fire rated plasterboard. Specimen A, D, E and H were horizontal control joints at the perimeter of the specimen. Specimens B and G were vertical control joints at the perimeter of the specimen. Specimens C and F were vertical control joints in the body of the specimen. HB Fuller Firesound Sealant was applied to each face of the wall and either backed by the perimeter steel framing or an open cell backing rod. See Table 2 for a summary of the tested control joints and results.

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Table 2: Summary of Fire Resistance Test FRT210008

Specimen	Control Joint Configuration	Sealant Backing	Joint Width (mm)	Sealant Depth (mm)	FRL
A	2 x 16 mm/Perimeter blockwork	Framing	20	32	-/180/180
B	2 x 16 mm/Perimeter blockwork	Framing	16	32	-/180/180
C	2 x 16 mm/2 x 16 mm	Backing rod	15	20	-/180/180
D	2 x 16 mm/Perimeter blockwork	Framing	10	32	-/180/180
E	2 x 13 mm/Perimeter blockwork	Framing	20	26	-/180/180*
F	2 x 13 mm/2 x 13 mm	Backing rod	15	20	-/180/120
G	2 x 13 mm/Perimeter blockwork	Framing	13	26	-/180/180
H	2 x 13 mm/Perimeter blockwork	Framing	10	26	-/180/180*

* Specimen E and H were 584 mm long which does not comply with the minimum length required in AS 1530.4-2005/2014.

In Warringtonfire Australia Pty Ltd fire resistance test FRT220129 two control joints were tested in a nominal 64 mm deep steel stud framed plasterboard wall in accordance with AS 1530.4:2014. The wall was divided in half vertically and lined with two different thicknesses of fire rated plasterboard. Specimen A was tested with 13 mm fire rated plasterboard, Specimen B with 16 mm fire rated plasterboard. HB Fuller Firesound Sealant was applied to each face of the wall and backed by an open cell backing rod. See Table 3 for a summary of the tested control joints and results.

Table 3: Summary of Fire Resistance Test FRT220129

Specimen	Control Joint Configuration	Sealant Backing	Joint Width (mm)	Sealant Depth (mm)	FRL
A	1 x 13 mm/1 x 13 mm Plaster stopping angles (13 mm x 28 mm x 0.4 mm)	Backing rod	20	13	-/120/60
B	1 x 16 mm/1 x 16 mm Plaster stopping angles (16 mm x 28 mm x 0.4 mm)	Backing rod	20	20	-/120/60

In Warringtonfire Australia Pty Ltd fire resistance test FRT220130 a number of control joints were tested in a nominal 64 mm deep steel stud framed plasterboard wall in accordance with AS 1530.4:2014. The wall was divided in half vertically and lined with two different thicknesses of fire rated plasterboard and insulated with fibre glass insulation. Specimen A, C, E and G were tested with two layers of 13 mm fire rated plasterboard, Specimen B, C, F and H with three layers of 13 mm fire rated plasterboard. Specimen E, F, G and H were horizontal control joints at the perimeter of the specimen. Specimens C and D were vertical control joints at the perimeter of the specimen. Specimens A and B were vertical control joints in the body of the specimen.

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HB Fuller Firesound Sealant was applied to each face of the wall and either backed by the perimeter steel framing, an open cell backing rod or both. All the plasterboard edges included a steel plaster stopping angle nominally 13 mm x 28 mm x 0.4 mm along the length of the control joints. See Table 4 for a summary of the tested control joints and results.

Table 4: Summary of Fire Resistance Test FRT220130

Specimen	Control Joint Configuration (with plaster stopping angles)	Sealant Backing	Joint Width (mm)	Sealant Depth (mm)	FRL
A	2 x 13 mm/2 x 13 mm	Backing rod	20	26	-/180/120
B	3 x 13 mm/3 x 13 mm	Backing rod	20	26	-/180/180
C	2 x 13 mm/Perimeter blockwork	Framing	20	20	-/180/120
D	3 x 13 mm/Perimeter blockwork	Backing rod and Framing	20	26	-/180/180
E	2 x 13 mm/Perimeter blockwork	Backing rod and Framing	20	20	-/180/180*
F	3 x 13 mm/Perimeter blockwork	Backing rod and Framing	20	26	-/180/180
G	2 x 13 mm/Perimeter blockwork	Backing rod and Framing	20	20	-/180/180*
H	3 x 13 mm/Perimeter blockwork	Backing rod and Framing	20	26	-/180/180

* Specimen E and G were 552 mm long which does not comply with the minimum length required in AS 1530.4-2005/2014.

In BRANZ fire resistance FP18716-01, three control joints were tested in a nominal 64 mm deep steel stud framed plasterboard wall in accordance with AS 1530.4:2014. The framing was lined around two of the control joints with a single layer of 16 mm Firestop plasterboard to each face, the framing around the remaining control joint was lined with a single layer of 13 mm Firestop plasterboard to each face. See Table 5 for a summary of the tested control joints and results.

Table 5: Summary of Fire Resistance Test FP18716-01

Specimen	Control Joint Configuration	Sealant Backing	Joint Width (mm)	Sealant Depth (mm)	FRL
A	1 x 16 mm/1 x 16 mm	Backing rod	20	22	-/90/90
B	1 x 16 mm/1 x 16 mm +P35	Backing rod	20	22	-/90/90
C	1 x 13 mm/ 1 x 13 mm +P35	Backing rod	20	22	-/60/60

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In Warringtonfire Australia Pty Ltd fire resistance test No. 56967300.1 a number of control joints were tested in a nominal 64 mm deep steel stud framed plasterboard wall in accordance with AS 1530.4:2014. The wall was lined with two layers of 13 mm Firestop plasterboard to each face and included a control joint 19 mm wide with 20 mm deep Fulaflex FR sealant overlaid with a Rondo P35 stopping bead. The control joint was reported to have failed the Integrity criteria after 171 minutes and Insulation criteria after 133 minutes. The wall the control joint was tested in had an established FRL of -/120/120.

In Warringtonfire Australia Pty Ltd fire resistance test No. 56967400.1 a number of control joints were tested in a nominal 64 mm deep steel stud framed plasterboard wall in accordance with AS 1530.4:2014. The wall was lined with two layers of 13 mm Firestop plasterboard to each face and included a control joint 22 mm wide with 25 mm deep Fulaflex FR sealant. The control joint was reported to have failed the Integrity criteria after 176 minutes and Insulation criteria after 161 minutes. The wall the control joint was tested in had an established FRL of -/120/120.

3. DISCUSSION

3.1 AS 1530.4:2014 vs AS 1530.4-2005

At the time of writing this report the New Zealand building code approved documents references AS 1530.4-2005. A review of the two versions of the test standard (2005 and 2014) with respect to control joints has been undertaken and it is considered that the supporting evidence would achieve the same fire resistance to either the 2005 or 2014 versions of AS 1530.4.

3.2 Compliance with NCC 2022

This report has been prepared to meet the NCC 2022 deemed-to-satisfy (DTS) provision Specification 1 which states:

***"S1C2 Rating** [2019: Sch. 5: 2]*

A building element meets the requirements of this Specification if—

(b) it is identical with a prototype that has been submitted to the Standard Fire Test, or an equivalent or more severe test, and the FRL achieved by the prototype without the assistance of an active fire suppression system is confirmed in a report from an Accredited Testing Laboratory which—

(i) describes the method and conditions of the test and the form of construction of the tested prototype in full; and

(ii) certifies that the application of restraint to the prototype complied with the Standard Fire Test; or

(c) it differs in only a minor degree from a prototype tested under (b) and the FRL attributed to the building element is confirmed in a report from an Accredited Testing Laboratory which—

(i) certifies that the building element is capable of achieving the FRL despite the minor departures from the tested prototype; and

(ii) describes the materials, construction and conditions of restraint which are necessary to achieve the FRL; "

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For the purposes of assessing the proposed systems in this report they are confirmed as meeting NCC 2022 S1C2 (b) and/or NCC 2022 SC1C2 (c) as appropriate.

This assessment report may be used to demonstrate compliance with the requirements for evidence of suitability under NCC A5G3 (1) d.

3.3 HB Fuller Firesound Sealant Control Joints

3.3.1 General

HB Fuller have commissioned a number of fire resistance tests on control joints in fire rated plasterboard walls. The configurations tested and considered in this report are as follows:

- Within the body of a plasterboard wall where each vertical edge is framed and lined with fire rated plasterboard.
- Along the vertical edge of a plasterboard wall where the perimeter frame butts up against a concrete/masonry column/fire rated wall.
- Along the top of the plasterboard wall where the head track is secured to the underside of a concrete slab.
- Along the bottom of the plasterboard wall where the bottom track is secured to a concrete floor slab.

Each configuration will be discussed in the following sections.

3.3.2 Plasterboard/Plasterboard Control Joints

The plasterboard to plasterboard control joint consists of a slot between framing which is lined with one or more layers of fire rated plasterboard. An open cell backing rod is inserted at the required depth and the joint sealed with HB Fuller Firesound Sealant. Table 6 is a summary of the tested control joints.

Table 6: Summary of Plasterboard/Plasterboard Control Joints

Plasterboard lining	Sealant Backing	Joint Width (mm)	Sealant Depth (mm)	FRL*
1 x 13 mm	Backing rod	15	13	-/60/60
1 x 13 mm + stopping angle	Backing rod	20	13	-/60/60
1 x 16 mm	Backing rod	20	22	-/90/90
1 x 16 mm + stopping angle	Backing rod	20	20	-/90/60
2 x 13 mm	Backing rod	15	20	-/120/120
2 x 13 mm + stopping angle	Backing rod	20	26	-/120/120
2 x 16 mm	Backing rod	15	20	-/180/180
3 x 13 mm + stopping angle	Backing rod	20	26	-/180/180

* FRL limited to that of the fire rated plasterboard wall or as tested. The lower performance applies to the control joint.

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In fire resistance test FRT220130, a 20 mm wide x 26 mm deep control joint with stopping angles, tested in a 2 x 13 mm thick plasterboard lined wall-maintained Integrity for the 181-minute test duration and achieved 176 minute Insulation. In fire resistance test FRT210008, a 15 mm wide x 20 mm deep control joint, tested in a 2 x 13 mm thick plasterboard lined wall-maintained Integrity for the 195-minute test duration and achieved 177 minute Insulation.

Based on the results of these two specimens, it is considered that a 20 mm wide x 20 mm deep control joint, in a 2 x 13 mm thick plasterboard wall would provide an FRL of -/120/120.

The positioning of the backing rod (inside of the framing) allowed for the sealant depth to be full depth of the lining thickness. For 20 mm wide joints in 2 x 16 mm thick plasterboard walls, assuming the backing rod position is as tested, the total sealant depth would be 32 mm on both faces compared to 26 mm of the tested specimen. It can be reasonably considered that the increase of sealant combined with the additional lining thickness of the wall would be sufficient to provide an FRL of -/180/180 for a 20 mm wide x 32 mm deep joint in 2 x 16 mm thick plasterboard lined walls.

3.3.3 Stopping Angles

3.3.3.1 General

Previous testing has shown that the inclusion of stopping angles to plasterboard to plasterboard control joints is not detrimental to the Integrity performance of the control joint but is however, slightly more onerous to the Insulation performance of the control joint, when compared to similar control joints tested without stopping angles.

3.3.3.2 2 x 13 mm Plasterboard Walls

In fire resistance test FRT210008, a 15 mm wide x 20 mm deep control joint tested without stopping angles, achieved a 177 minute Insulation result whereas in fire resistance test FRT220130, a 20 mm wide x 26 mm deep control joint fitted with stopping angles, achieved a 176 minute Insulation result.

Based on the results of these two specimens, both exceeding 120 minutes by a significant margin, it is considered that a 20 mm wide x 20 mm deep control joint would provide an FRL of -/120/120.

3.3.3.3 1 x 16 mm Plasterboard Walls

In fire resistance test No. FRT210007 a 15 mm wide x 16 mm deep control joint tested without stopping angles, achieved an 87 minute Insulation result whereas in fire resistance test FRT220129, a 20 mm wide 20 mm deep control joint fitted with stopping angles, achieved an 81 minute Insulation result.

In fire resistance test No. FP18716-01, a 20 mm wide x 22 mm deep control joint fitted without stopping angles, achieved a 115 minute Insulation result. With a margin of 25 minutes in excess of 90 minutes, tested without stopping angles, it is considered that with the inclusion of stopping angles, the control joint would still achieve an FRL of -/90/90.

3.3.3.4 2 x 16 mm Plasterboard Walls

As previously, a 20 mm wide x 26 mm deep control joint including stopping angles tested in fire resistance test FRT220130 demonstrated an 181 minute Integrity result and an Insulation result of 176 minutes when tested in a 2 x 13 mm thick plasterboard lined wall. It can therefore be considered that a 20 mm wide x 32 mm deep joint with stopping angles in a 2 x 16 mm thick plasterboard lined wall would achieve an FRL of -/180/180.

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3.3.4 Plasterboard/Plasterboard Joint Configurations

In reviewing the available test data, it is considered the following configurations would be expected to maintain the fire resistance of the plasterboard wall as stated:

- Wall lined with one layer of 13 mm fire rated plasterboard can be up to 20 mm wide x nominally 13 mm deep. With or without stopping angles. FRL -/60/60.
- Wall lined with one layer of 16 mm fire rated plasterboard can be up to 20 mm wide x nominally 22 mm deep. With or without stopping angles. FRL -/90/90.
- Wall lined with two layers of 13 mm fire rated plasterboard can be up to 20 mm wide x nominally 20 mm deep. With or without stopping angles. FRL. -/120/120.
- Wall lined with two layers of 16 mm fire rated plasterboard can be up to 20 mm wide x nominally 32 mm deep. With or without stopping angles. FRL -/180/180.
- Wall lined with three layers of 13 mm fire rated plasterboard can be up to 20 mm wide x nominally 26 mm deep. With or without stopping angles. FRL -/180/180.

3.3.5 Concrete/Masonry to Plasterboard Control Joints

The Concrete/Masonry to plasterboard control joint consists of the plasterboard perimeter framing being secured to the concrete/masonry element which might be a fire rated wall/column. When the plasterboard is installed, a gap is provided between the edge of the board and concrete/masonry element. The gap is either filled to the full depth of the plasterboard thickness when backed by framing, or an open cell backing rod inserted and filled to the required depth with HB Fuller Firesound Sealant. Table 7 is a summary of the tested control joints.

In the fire resistance tests summarised in Table 7 the control joints were installed against the perimeter block of the specimen frame. It is considered that this is sufficiently similar to the expected performance of a concrete element or masonry that the results can be applied to either concrete or masonry. It is expected that the concrete/masonry wall will be built in accordance with the appropriate standard which defines the FRL of the wall.

Table 7: Summary of Vertical Concrete or Masonry/Plasterboard Control Joints

Plasterboard lining	Sealant Backing	Joint Width (mm)	Sealant Depth (mm)	FRL*
1 x 13 mm	Framing	13	13	-/60/60
1 x 16 mm	Framing	16	16	-/90/90
2 x 13 mm	Framing	13	26	-/120/120
2 x 13 mm + stopping angle	Backing rod + Framing	20	20	-/120/120
3 x 13 mm + stopping angle	Backing rod + Framing	20	26	-/180/180
2 x 16 mm	Framing	16	32	-/180/180

* FRL limited to that of the fire rated plasterboard wall or as tested. The lower performance applies to the control joint.

Horizontal control joints may also be installed to the top of the plasterboard wall to the underside of a concrete slab or the bottom of the wall and floor slab. Table 8 is a summary of the tested horizontal control joints.

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Table 8: Summary of Horizontal Concrete/Plasterboard Control Joints

Plasterboard lining	Top/Bottom	Sealant Backing	Joint Height (mm)	Sealant Depth (mm)	FRL*
1 x 13 mm	Top	Framing	20	13	-/60/60#
1 x 13 mm	Bottom	Framing	10	13	-/60/60#
1 x 16 mm	Top	Framing	20	16	-/90/90
1 x 16 mm	Bottom	Framing	10	16	-/90/90
2 x 13 mm	Top	Framing	20	26	-/120/120#
2 x 13 mm	Bottom	Framing	10	26	-/120/120#
2 x 16 mm	Top	Framing	20	32	-/180/180
2 x 16 mm	Bottom	Framing	10	32	-/180/180
2 x 13 mm + stopping angle	Top	Framing	20	20	-/120/120#
2 x 13 mm + stopping angle	Bottom	Framing	20	20	-/120/120#
3 x 13 mm + stopping angle	Top	Framing	20	26	-/180/180
3 x 13 mm + stopping angle	Bottom	Framing	20	26	-/180/180

* FRL limited to that of the fire rated plasterboard wall or as tested. The lower performance applies to the control joint.

The length of the control joint was less than that specified by the test standard.

Some of the tested control joints listed in Table 7 and Table 8 did not comply with the minimum length defined in AS 1530.4 and as such were not assigned an FRL in the test reports referenced in Section 2. In reviewing the test data and performance of the seals in the tests the fire performance is consistent with those that did comply with the length requirements. It is therefore considered that had the above seals been tested at 1,000 mm lengths the same performance would be expected and an FRL can be assigned as give in Table 7 and Table 8 above.

In reviewing the available test data, it is considered the following configurations would be expected to maintain the fire resistance of the concrete or masonry/plasterboard wall as stated:

- Wall lined with one layer of 13 mm fire rated plasterboard can be up to 20 mm wide x nominally 13 mm deep. With or without stopping angles. FRL -/60/60.
- Wall lined with one layer of 16 mm fire rated plasterboard can be up to 20 mm wide x nominally 16 mm deep. With or without stopping angles. FRL -/90/90.
- Wall lined with two layers of 13 mm or 16 mm fire rated plasterboard can be up to 20 mm wide x nominally 20 mm deep. With or without stopping angles. FRL -/120/120.
- Wall lined with three layers of 13 mm fire rated plasterboard can be up to 20 mm wide x nominally 26 mm deep. With or without stopping angles. FRL -/180/180.

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3.3.6 Control Joints with P35 Stopping Bead

The Rondo P35 stopping bead consists of 0.4 mm BMT mild steel angles with a PVC connector which can be positioned over a control joint.

In fire resistance test No. FP18716-01, P35 stopping beads tested in single 13 mm and 16 mm Plasterboard lined walls achieved 132 NF for Integrity and 94 minutes Insulation in the 13 mm wall which has an established FRL of 60/60/60 and 115 minutes in the 16 mm lined wall which has an established FRL of 90/90/90.

In fire resistance test No. 56967300.1 a control joint with a P35 stopping bead was tested in a steel framed wall lined with two layers of 13 mm Firestop plasterboard. The control joint was 19 mm wide with 20 mm depth of Fulaflex FR sealant. In fire resistance test No. 56967400.1 a similar wall was tested with a control joint 22 mm wide with 25 mm deep Fulaflex FR sealant. The control joint with the P35 stopping bead was reported to exceed the insulation performance earlier than the control joint without the stopping bead. In reviewing the test data it is considered the initial insulation failure may be attributed to the thermocouple being placed in close proximity to a screw fixing. Reviewing the temperature data between the two seals suggest the performance is otherwise similar with the P35 stopping bead joint as tested achieving a slightly lower performance.

In fire resistance test No. FRT210008 a similar control joint was tested but with Firesound Sealant. The performance between the Firesound Sealant and Fulaflex FR control joints were compared and the performance between sealants in the same wall type are considered to be sufficiently similar that the comparative performance of the P35 stopping bead can be applied to Firesound Sealant control joints in the same wall type. In addition to the comparison between sealant performance the above tests were undertaken in a fire rated wall with an FRL of -/120/120 however the control joints achieved a considerable margin beyond the FRL of the wall.

Based on the above analysis it is considered that the Firesound Sealant control joint with a Rondo P35 stopping bead would not prejudice the FRL of single or multiple layer fire rated plasterboard walls as given in Table 9 below.

Table 9: Summary of Plasterboard/Plasterboard Control Joints with P35

Plasterboard lining	Sealant Backing	Joint Width (mm)	Sealant Depth (mm)	FRL*
1 x 13 mm + P35	Backing rod	20	22	-/60/60
1 x 16 mm + P35	Backing rod	20	22	-/90/90
2 x 13 mm + P35	Backing rod	20	26	-/120/120
2 x 16 mm + P35	Backing rod	20	26	-/180/180
3 x 13 mm + P35	Backing rod	20	26	-/180/180

* FRL limited to that of the fire rated plasterboard wall or as tested. The lower performance applies to the control joint.

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3.4 Wall Construction Variations

3.4.1 Concrete or Masonry wall Control Joints

The control joints referenced in Section 2 were tested in a plasterboard wall or the junction between plasterboard/block. In AS 1530.4:2014 section 10.12 permissible variations, 10.12.2 Separating elements it states the following:

(c) Results obtained from framed wall systems may be applied to the performance of a system in concrete, masonry or solid gypsum blocks of greater or equal thickness to that of the tested prototype.

Therefore the control joints discussed in this report may be installed in concrete or masonry walls of the same thickness as tested and be expected to achieve the same FRL in accordance with AS 1530.4:2014. Based on the tested walls the minimum concrete/masonry wall thickness is:

- 60 minute walls not less than 90 mm
- 90 minute walls not less than 96 mm
- 120 minute walls not less than 116 mm
- 180 minute walls not less than 128 mm

It is expected that the concrete/masonry walls will comply with the appropriate standard which defines the FRL of the wall and may have additional requirements and increased wall thickness to that given above.

3.4.2 Plasterboard Framed Wall Variations

Section 10.12.2 of AS 1530.4-2005/2014 states the following permissible variations for penetrations tested in framed walls.

(d) Results obtained from framed wall systems may be applied to similar walls having studs of the same material with sizes greater than the tested prototype.

(e) Results obtained from a prototype test may be applied to framed wall systems of similar construction but having thicker facings of the same material applied to the studs.

In summary the control joints discussed in this report may be installed into steel framed plasterboard walls with deeper studs and/or thicker fire rated plasterboard facings and be expected to achieve the same FRL in accordance with AS 1530.4-2005/2014.

The fire testing referenced in Section 2 was undertaken with Knauf Gypsum fire rated plasterboard and system specifications. It is considered the HB Fuller control joints discussed in this report would be expected to achieve the same FRL if installed in other brands (for example, but not limited to CSR, Siniat, or BGC) of fire rated plasterboard walls with the following conditions:

- The fire rated plasterboard lining must be the same thickness or thicker than tested.
- The minimum steel framing shall not be less than nominally 64 mm deep and the overall wall thickness not less than that described in this report.
- The fire rated plasterboard wall shall have an established fire resistance rating by test or assessment in accordance with AS 1530.4-2005/2014.

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3.4.3 Timber Framing

The fire testing referenced in Section 2 was undertaken on specimens constructed using steel studs and track members. It is acknowledged that during fire exposure, steel framing tends to have greater deflection compared to timber framing due to the movement induced by thermal expansion; whereas deflection of timber framing would be greatly reduced as timber generally behaves in a more stable and predictable manner during fire exposure.

Furthermore, timber framing will not conduct or radiate heat as significantly as steel framing, therefore it can be reasonably considered that the control joint specimens tested in tests referenced in Section 2 would achieve at least the same test results if the construction they were installed in was timber framed.

Therefore, the control joints discussed in this report may be installed in timber framed walls of the same thickness as tested and be expected to achieve the same FRL in accordance with AS 1530.4-2005/2014.

3.4.4 Recess and Butt Joints

It has been proposed that for recess and butt joints in the plasterboard linings, Firesound sealant may be used as an alternative stopping material to standard stopping compounds and jointing tape. The tests referenced in Section 2 have demonstrated the ability of Firesound sealant to maintain its adhesion and its low risk of ignition for up to 180 minutes during fire exposure. In contrast, a two coat, standard tape and stop application would likely be burnt away after 30 to 45 minutes fire exposure.

With regards to the maximum permitted width of the joint, in the absence of guidance from the plasterboard manufacturer on maximum joint width, the maximum permitted joint width that could be sealed with Firesound sealant is 10 mm which is the narrowest joint tested in the tests referenced in Section 2. All joints must be backed with either framing sections or plasterboard and the depth of sealant must be equal to the thickness of the plasterboard edges, additional build up required for recessed joints.

Based on the discussion above, it is reasonable to expect that Firesound sealant would provide at least the same level of protection for recess joints and butt joints as a standard stopping compound with jointing tape and would not be detrimental to the established FRL of a plasterboard lined fire resistant wall.

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4. CONCLUSION

It is considered that the HB Fuller Firesound Sealant fire rated control joints would be expected to achieve the stated FRL if tested in accordance with AS 1530.4-2005/2014 with reference to AS 4072.1-2005 (including Amendment No. 1) with reference to Section 4, as stated in Table 10 below.

Table 10: Summary of Firesound Sealant Control Joints

Control Joint Configuration (Sealant Backing)	Minimum Wall Thickness	Maximum Joint Width (mm)	Minimum Sealant Depth (mm)	FRL
Vertical Plasterboard Control Joints (with backing rod)				
1 x 13 mm/ 1 x 13 mm	90 mm	20	13	-/60/60
1 x 13 mm/ 1 x 13 mm +stopping angle (13 mm x 28 mm x 0.4 mm)	90 mm	20	13	-/60/60
1 x 13 mm/ 1 x 13 mm +P35	90 mm	20	22	-/60/60
1 x 16 mm/ 1 x 16 mm	96 mm	20	22	-/90/90
1 x 16 mm/ 1 x 16 mm +stopping angle (16 mm x 28 mm x 0.4 mm)	96 mm	20	22	-/90/90
1 x 16 mm/ 1 x 16 mm +P35	96 mm	20	22	-/90/90
2 x 13 mm/ 2 x 13 mm	116 mm	20	20	-/120/120
2 x 13 mm/ 2 x 13 mm +stopping angle (13 mm x 28 mm x 0.4 mm)	116 mm	20	20	-/120/120
2 x 13 mm/ 2 x 13 mm + P35	116 mm	20	26	-/120/120
2 x 16 mm/ 2 x 16 mm	128 mm	20	32	-/180/180
2 x 16 mm/ 2 x 16 mm +stopping angle (16 mm x 28 mm x 0.4 mm)	128 mm	20	32	-/180/180
2 x 16 mm/ 2 x 16 mm + P35	128 mm	20	26	-/180/180
3 x 13 mm/ 3 x 13 mm	142 mm	20	26	-/180/180
3 x 13 mm/ 3 x 13 mm +stopping angle (13 mm x 28 mm x 0.4 mm)	142 mm	20	26	-/180/180
3 x 13 mm/ 3 x 13 mm +P35	142 mm	20	26	-/180/180
Vertical (perimeter) or Horizontal (top or bottom) Plasterboard to Concrete/Masonry				
1 x 13 mm/ Concrete/Masonry (framing)	90 mm	20	13	-/60/60
1 x 16 mm/ Concrete/Masonry (framing)	96 mm	20	16	-/90/90
2 x 13 mm/ Concrete/Masonry (framing)	116 mm	20	26	-/120/120
2 x 13 mm/ Concrete/Masonry (framing+ backing rod)	116 mm	20	20	-/120/120
2 x 16 mm/ Concrete/Masonry (framing)	128 mm	20	32	-/180/180
2 x 16 mm/ Concrete/Masonry (framing+ backing rod)	128 mm	20	20	-/180/180
3 x 13 mm/ Concrete/Masonry (framing+ backing rod)	142 mm	20	26	-/180/180

Client supplied drawings of the plasterboard/plasterboard control joint configurations are shown in Figure 1 to Figure 5.

Client supplied drawings of the plasterboard/perimeter control joint configurations are shown in Figure 6 to Figure 7.

It is considered the control joints may be installed with the following variations:

- The fire rated wall steel framing may be increased in depth.
- The fire rated wall framing may be constructed using timber according to the lining manufacturer's specification with the same plasterboard lining configurations as tested.
- The fire rated plasterboard facings may be increased in thickness.
- Equivalent alternative fire rated plasterboard walls (including, but not limited to Knauf Gypsum, CSR, Siniat or BGC) which have an established fire resistance rating by test or assessment in accordance with AS 1530.4-2005/2014.
- In concrete or masonry walls of the same minimum wall thickness as stated above. The walls shall be built to comply with the concrete or masonry standard as appropriate.
- Firesound sealant may be used as an alternative to stopping compound for recess and butt joints. All joints must be backed with either framing sections or plasterboard see Figure 8.

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Figure 1: Plasterboard/Plasterboard - 1 x 13 mm

1 x 13mm Plasterboard – Control Joints (Flush Finish/Stopping Bead/P35 Rondo)

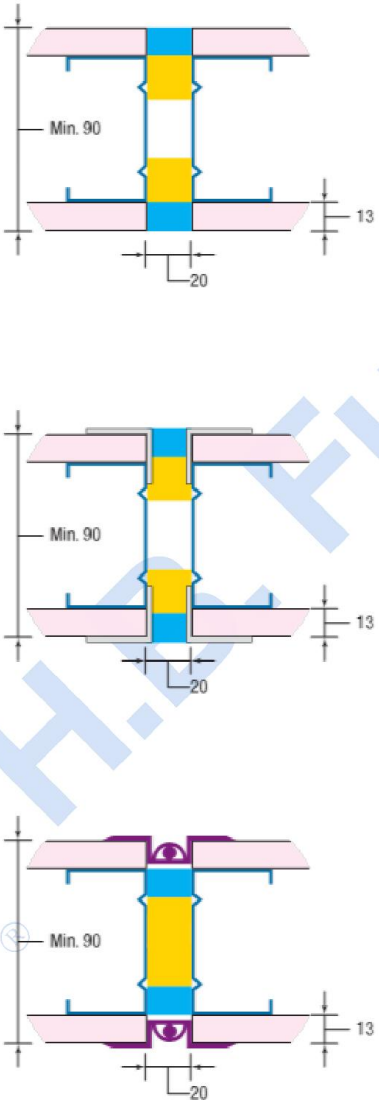

Figure 2: Plasterboard/Plasterboard - 1 x 16 mm

1 x 16mm Plasterboard – Control Joints (Flush Finish/Stopping Bead/P35 Rondo)

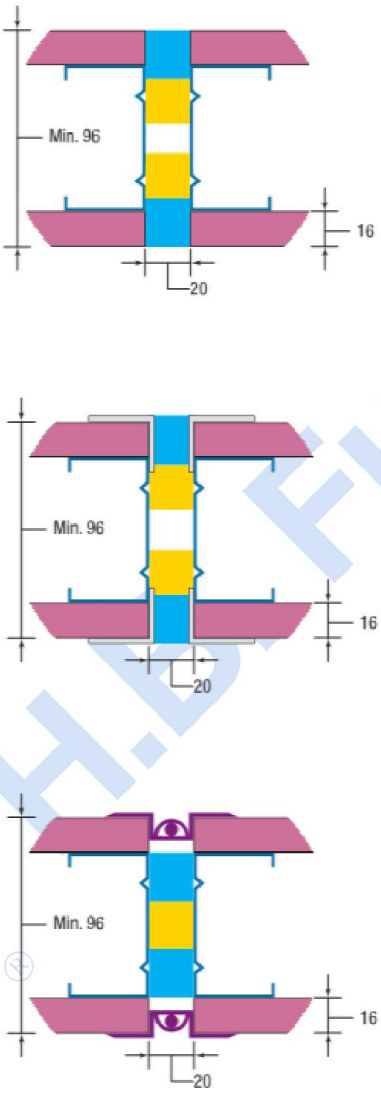

Figure 3: Plasterboard/Plasterboard - 2 x 13 mm

2 x 13mm Plasterboard – Control Joints (Flush Finish/Stopping Bead/P35 Rondo)

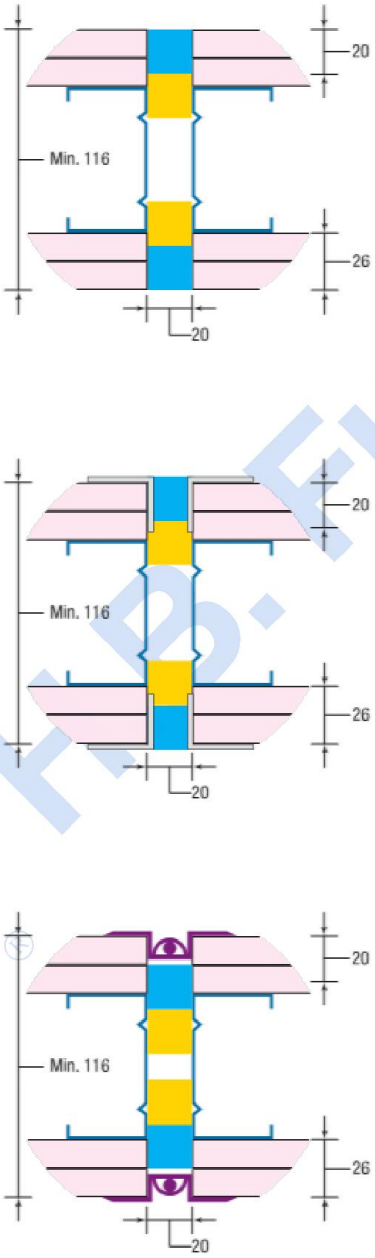

Figure 4: Plasterboard/Plasterboard - 2 x 16 mm

2 x 16mm Plasterboard – Control Joints (Flush Finish/Stopping Bead/P35 Rondo)

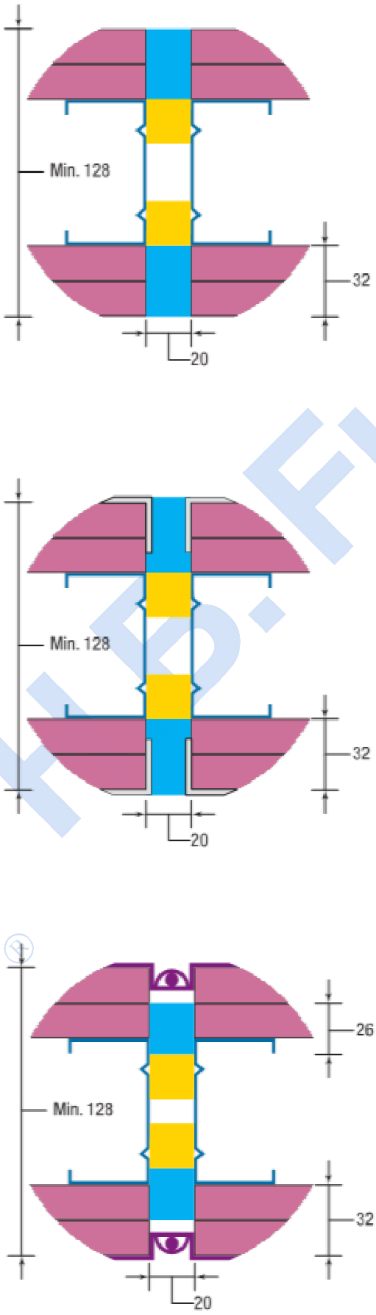

Figure 5: Plasterboard/Plasterboard - 3 x 13 mm

3 x 13mm Plasterboard – Control Joints (Flush Finish/Stopping Bead/P35 Rondo)

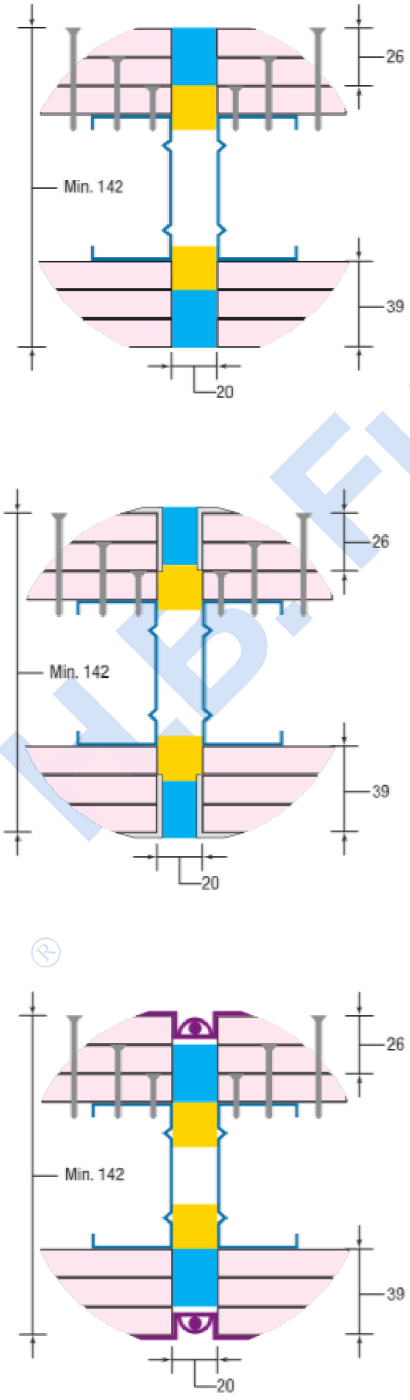

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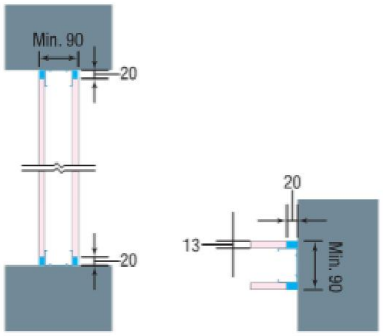
Figure 6: Plasterboard/Perimeter - 1 x 13 mm & 1 x 16 mm

1 x 13mm Plasterboard Perimeter Joints (Horizontal + Vertical)



1 x 16mm Plasterboard Perimeter Joints (Horizontal + Vertical)

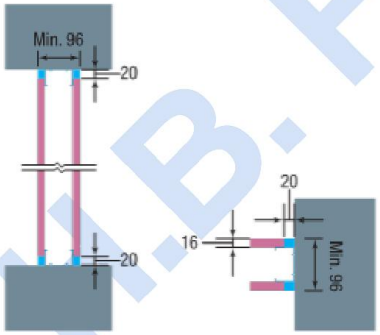


Figure 7: Plasterboard/Perimeter - 2 x 13 mm, 2 x 16 mm & 3 x 13 mm

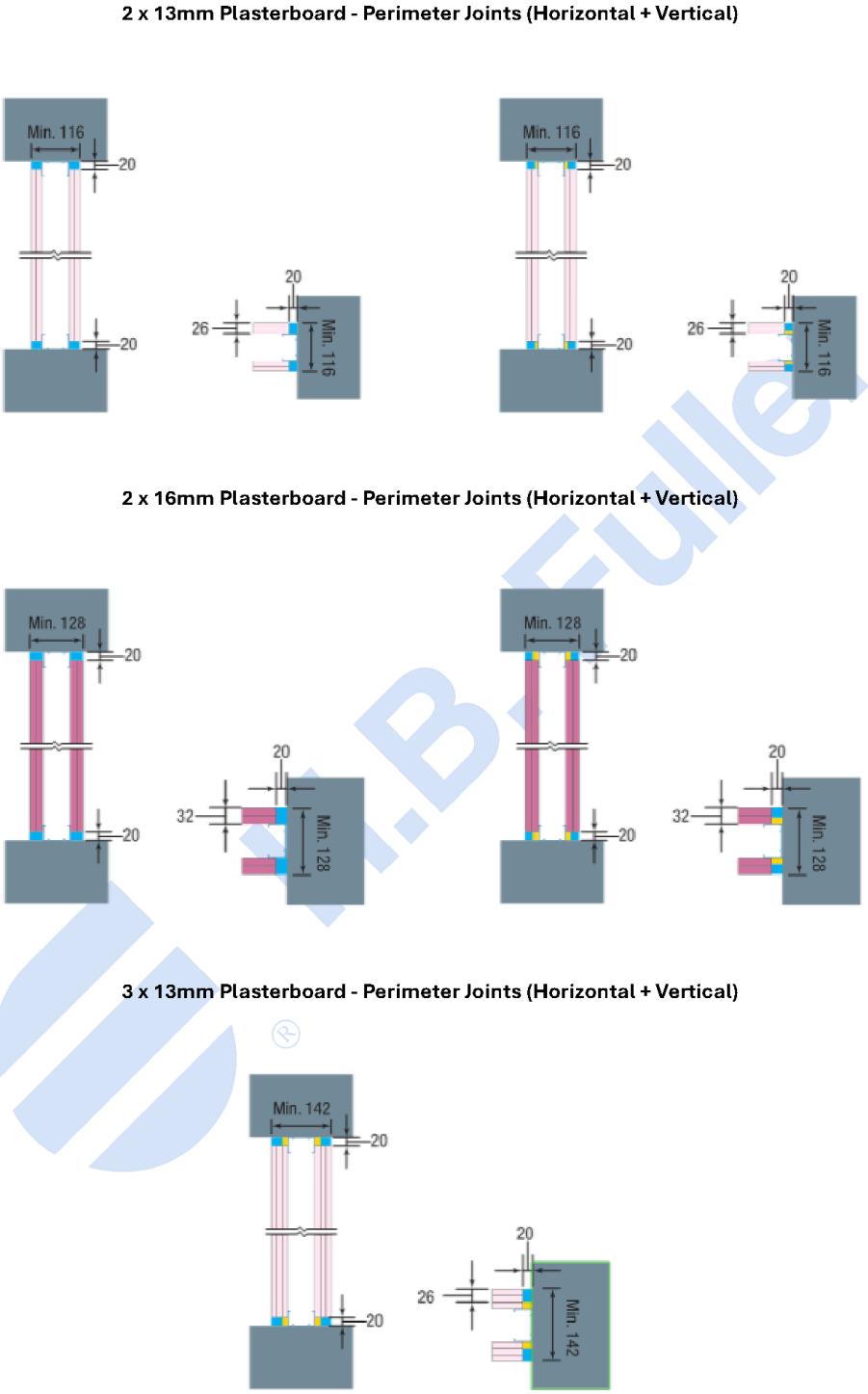
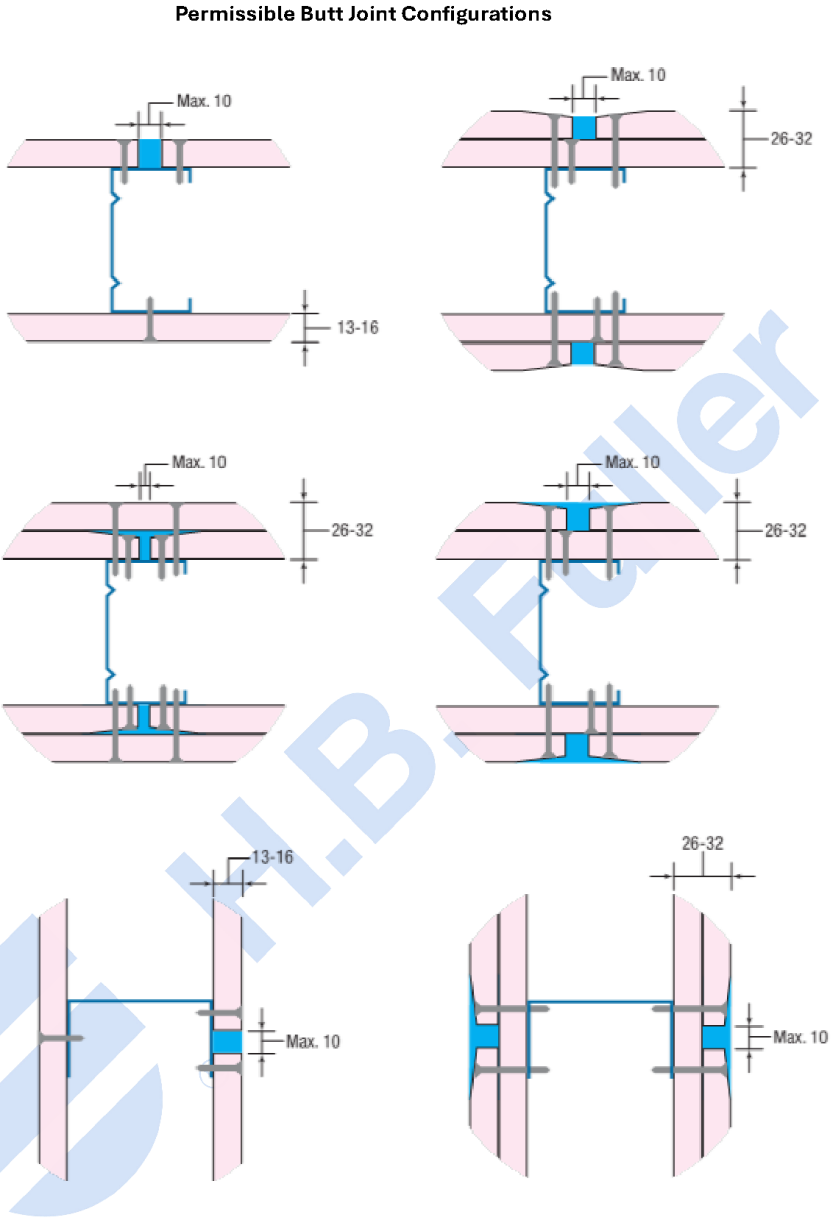


Figure 8: Recess and Butt Joints



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