

FIRE ASSESSMENT REPORT

FC20151-01-1

FIRE RESISTANCE OF H.B. FULLER FULAFLEX™ FR SEALANT CONTROL JOINTS IN CONCRETE FLOOR SLABS IN ACCORDANCE WITH AS1530.4-2005/2014

CLIENT

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ASSESSMENT OBJECTIVE

To assess the fire resistance of H.B. Fuller FulaFlex™ FR sealant 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 a 240 mm thick concrete floor slab.

CONCLUSION

It is considered that the H.B. Fuller FulaFlex™ FR sealant, 40 mm wide x 25 mm deep (with foam backing rod) control joint, as tested in FP18279-02 would be expected to achieve an FRL of -/120/120 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.

It is considered that an alternative foil faced mineral fibre material with at least the same maximum service temperature and nominal density would be expected to achieve and FRL of -/240/240 if tested as part of a H.B. Fuller FulaFlex™ FR sealant control joint, as tested in FP18279-02 in accordance with AS 1530.4-2005/2014 with reference to AS 4072/1-2005 (including Amendment No. 1) with reference to Section 4.

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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1. INTRODUCTION

This report gives BRANZ's assessment on the fire resistance of HB Fuller FulaFlex™ FR sealant control joints in a 240 mm thick concrete floor 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

2.1 BRANZ Fire Resistance Test FP18279-02

In BRANZ fire resistance test FP18279-02, a number of control joints were tested in a nominal 240 mm thick concrete floor slab in accordance with EN 1366-4:2006+A1:2010. The concrete floor slab was formed from seven, 240 mm thick segmented normal weight concrete blocks which were arranged above a horizontal furnace to provide six 1.000 mm long apertures of varying widths.

The apertures for specimens A, C and F were packed from the unexposed face with a layer of nominally 75 mm thick, foil faced mineral fibre identified as PAROC Pro Mat 80 AluCoat, the aperture for specimen E was packed with a foam backing rod. The mineral fibre or foam backing rod was inserted into the aperture to a depth corresponding to the desired sealant depth. FulaFlex™ FR sealant was applied into the aperture from the unexposed face and finished flush to the upper face of the concrete floor slab.

To comply with the requirements of EN 1366-4:2006+A1:2010, the furnace temperature was controlled using plate thermometers.

The specimens were instrumented on the unexposed face in accordance with both EN 1366-4:2006+A1:2010 and AS 1530.4:2014.

A summary of the control joint configuration and test performance of the control joints relevant to this assessment is shown in Table 1.

Table 1: FP18279-02 Specimen Details

Specimen Ref	Control Joint Details Width x Depth	Integrity (min)		Insulation (min)
		Sustained Flaming	Cotton Pad	
A	100 mm x 50 mm FulaFlex™ FR PAROC Pro Mat 80 AluCoat	264 NF	264 NF	264 NF
C	60 mm x 40 mm FulaFlex™ FR PAROC Pro Mat 80 AluCoat	264 NF	264 NF	264 NF
E	40 mm x 25 mm FulaFlex™ FR Backing Rod	264 NF	264 NF	119
F	80 mm x 40 mm FulaFlex™ FR PAROC Pro Mat 80 AluCoat	264 NF	264 NF	264 NF

NF = No Failure.

The test was terminated after 264 minutes.

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 EN 1366-4:2006+A1:2010 vs AS 1530.4:2014

The test report referenced in Section 2 described a fire resistance test conducted in accordance with EN 1366-4:2006+A1:2010. A review has been undertaken between the two standards with respect to control joint testing.

Both the BS EN and AS test standards use the same ISO time/temperature curve which starts at nominally 20 °C. For horizontal control joints, both standards require a similar furnace pressure of 20 Pa, measured 100 mm below the soffit.

For furnace control, The EN test standard specifies plate thermometers and the AS test standard specifies either 3 mm MIMS or plate thermometers. Therefore, the furnace conditions meet the requirements of AS 1530.4:2014.

Both standards determine Integrity failure by the application of a cotton pad or sustained flaming. There are slight differences with unexposed face thermocouple positioning however the test specimens included additional thermocouples to comply with both standards. The 180 K maximum temperature rise criteria is the same between standards. Therefore, the failure criteria meet the requirements of AS 1530.4:2014.

3.3 Compliance with NCC

It is considered that EN 1366-4:2006+A1:2010 test standard is equivalent to AS 1530.4:2014 with respect to control joint testing and that the control joints tested in the test detailed in Section 2 would achieve no less fire resistance if tested in accordance with AS 1530.4:2014.

3.4 40 mm x 25 mm FulaFlex™ FR Control Joint for FRL -/120/120

Specimen E exceeded the maximum temperature rise criteria (180 K) after a test duration of 119 minutes. As noted above, the furnace temperature was controlled using plate thermometers as to comply with EN 1366-4:2006+A1:2010.

It is accepted that for the initial 10 minute period of a fire resistance test, the plate thermometers will provide more onerous furnace conditions compared to 3 mm MIMS thermocouples which are specified in AS 1530.4 tests. Research has indicated that use of plate thermometers could lead to a 15 - 20% reduction in fire resistance performance of an insulated specimen compared to 3 mm MIMS thermocouples for short duration tests fire resistance periods (up to 60 minutes). Beyond this time the effects of the plater thermometer reduce relative to 3 mm MIMS however the overall exposure over the test duration remains higher.

Therefore, it can be reasonably considered that if the furnace temperature had been controlled using 3 mm MIMS thermocouples as specified in AS 1530.4, the expected Insulation performance of specimen E would at least exceed 120 minutes before a rise of 180 K occurred.

3.5 Alternative Mineral Fibre

The mineral fibre used for specimens A, C and F was identified as PAROC Pro Mat 80 AluCoat. The technical data sheet for this products states that it has a maximum service temperature of 550 ^oC and a nominal density of 80 kg/m^3.

During the 264 minute test duration, there were no instances of Integrity failure observed and the maximum temperature rise recorded was 45 ^oC on specimen A and 62 ^oC on both specimen C and specimen F.

It is therefore considered that the substitution of the mineral fibre material for an alternative with at least the same maximum service temperature and nominal density, subject to no difference in installation method, would not be detrimental to the fire resistance of the control joint for up to and including FRL -/240/240.

4. CONCLUSION

It is considered that the H.B. Fuller FulaFlex™ FR sealant, 40 mm wide x 25 mm deep (with foam backing rod) control joint, as tested in FP18279-02 would be expected to achieve an FRL of -/120/120 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.

It is considered that an alternative foil faced mineral fibre material with at least the same maximum service temperature and nominal density would be expected to achieve and FRL of -/240/240 if tested as part of a H.B. Fuller FulaFlex™ FR sealant control joint, as tested in FP18279-02 in accordance with AS 1530.4-2005/2014 with reference to AS 4072/1-2005 (including Amendment No. 1) with reference to Section 4.

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