



## **ASSESSMENT REPORT**

The likely fire resistance performance of HB Fullers FireSound Acrylic sealant protecting control joints in a hollow core concrete block wall, if tested in accordance with AS1530.4-2014 and assessed in accordance with AS4072.1-2005

### **EWFA Report No:**

28122-03

### **Report Sponsor:**

H.B Fuller Australia Company Pty Ltd  
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## DOCUMENT REVISION STATUS

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## 1 INTRODUCTION

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This report presents an assessment of the fire resistance performance of HB Fullers FireSound Acrylic sealant protecting control joints in a hollow core concrete block wall, if tested in accordance with AS1530.4-2014 and assessed in accordance with AS4072.1-2005.

The tested systems are described in Section 2 and are subject to the proposed variations described in Section 3 if tested in accordance with the referenced test method described in Section 4. The conclusions of the report are summarised in Section 5.

The validity of this assessment is conditional on compliance with Sections 7, 8 and 9 of this report.

Summaries of the test data on which this assessment is based are provided in the Appendices together with a summary of the critical issues leading to the assessment conclusions including the main points of argument.

## 2 TESTED PROTOTYPES

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This assessment is based on a fire resistance tests WFRA 41003.1

The test specimen reported in WFRA 41003.1 comprised a 140mm thick hollow core concrete block wall incorporating various control joints protected with HB Fuller FireSound Acrylic sealant and tested in accordance with AS1530.4-1997 Sections 2, 4 and 10 and AS4072.1-1992 as appropriate.

## 3 VARIATION TO TESTED PROTOTYPES

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The proposed construction shall be as Specimen H and G tested in WFRA 41003.1 subject to the following variations;

- Consideration given to the likely performance if tested in accordance with AS1530.4-2014 for walls with one side exposure and for joints on the non-fire side.
- The 10mm wide control joint shall be 10mm depth in lieu of 5mm tested.

## 4 REFERENCED TEST PROCEDURES

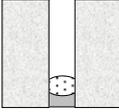
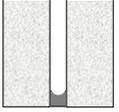
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This report is prepared with reference to the requirements of AS1530.4-2014 and AS4072.1-2005 as appropriate to control joints.

## 5 FORMAL ASSESSMENT SUMMARY

Based on the discussion presented in this report, it is the opinion of this testing authority that if the tested prototype described in Section 2 had been modified within the scope of Section 3, it will achieve the fire resistance as stated below if tested in accordance with the test method referenced in Section 4 and subject to the requirements of Section 7.

### Assessed Performance

Wall	Joint Width (mm)	Joint Depth (mm)	Backing Rod Depth (mm)	Seal Position	FRL From One side only
Minimum 140mm thick hollow core concrete wall	30	15	20	Fire Side 	-/180/60
	10	10	-	Fire Side 	-/180/120

## 6 DIRECT FIELD OF APPLICATION

The application of the results of this assessment is for control joints in walls exposed from one side only.

## 7 REQUIREMENTS

This report details the methods of construction, test conditions and assessed results that would have been expected had the specific elements of construction described herein been tested in accordance with AS1530.4.

Any further variations with respect to size, constructional details, loads, stresses, edge or end conditions, other than those identified in this report, may invalidate the conclusions drawn in this report.

## 8 VALIDITY

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This assessment report does not provide an endorsement by Exova Warringtonfire Aus Pty Ltd of the actual products supplied.

The conclusions of this assessment may be used to directly assess fire hazard, but it should be recognised that a single test method will not provide a full assessment of fire hazard under all conditions.

Because of the nature of fire testing, and the consequent difficulty in quantifying the uncertainty of measurement, it is not possible to provide a stated degree of accuracy. The inherent variability in test procedures, materials and methods of construction, and installation may lead to variations in performance between elements of similar construction.

The assessment can therefore only relate to the actual prototype test specimens, testing conditions, and methodology described in the supporting data, and does not imply any performance abilities of constructions of subsequent manufacture.

This assessment is based on information and experience available at the time of preparation. The published procedures for the conduct of tests and the assessment of test results are the subject of constant review and improvement and it is recommended that this report be reviewed on or, before, the stated expiry date.

The information contained in this report shall not be used for the assessment of variations other than those stated in the conclusions above. The assessment is valid provided no modifications are made to the systems detailed in this report. All details of construction should be consistent with the requirements stated in the relevant test reports and all referenced documents.

## 9 AUTHORITY

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### 9.1 APPLICANT UNDERTAKINGS AND CONDITIONS OF USE

By using this report as evidence of compliance or performance the applicant(s) confirms that:

- to their knowledge the component or element of structure, which is the subject of this assessment, has not been subjected to a fire test to the Standard against which this assessment is being made, and
- they agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test by a test authority in accordance with the Standard against which this assessment is being made and the results are not in agreement with this assessment, and
- they are not aware of any information that could adversely affect the conclusions of this assessment and if they subsequently become aware of any such information, agree to ask the assessing authority to withdraw the assessment.

### 9.2 GENERAL CONDITIONS OF USE

This report may only be reproduced in full without modifications by the report sponsor. Copies, extracts or abridgments of this report in any form shall not be published by other organisations or individuals without the permission of Exova Warringtonfire Aus Pty Ltd.

### 9.3 AUTHORISATION ON BEHALF OF EXOVA WARRINGTONFIRE AUS PTY LTD

Prepared by:

Reviewed by:



K. G. Nicholls



D. Nicholson

### 9.4 DATE OF ISSUE

11/03/2016

### 9.5 EXPIRY DATE

31/03/2021

## APPENDIX A SUMMARY OF SUPPORTING DATA

### A.1 TEST REPORT – WFRA 41003

#### A.1.1 Report Sponsor

A.1.1.1 HB Fuller Australia Company Pty Ltd, 16-20 Red Gum Drive, Dandenong South, VIC 3175.

#### A.1.2 Test Laboratory

A.1.2.1 Warrington Fire Research (Aust) Pty Ltd, Unit 2, 409-411 Hammond Road, Dandenong South, Victoria, 3175.

#### A.1.3 Test Date

A.1.3.1 The test was conducted on 15th August 2003.

#### A.1.4 Test standards prescribed

A.1.4.1 The test was conducted in accordance with AS1530.4-1997 and AS4072.1-1992 as appropriate for control joints.

#### A.1.5 General description of tested specimens

A.1.5.1 The specimen comprised a 140mm hollow core concrete wall incorporating two control joints protected by FireSound grey trial acrylic sealant and various other services. The control joints of interest in this report were designated Control Joint G and H.

Specimen	Description
G	Control joint sealed on non-exposed side with Rocor FireSound New Grey Joint Sealant 30mm wide × 15mm deep with a urethane foam backing rod nominal 30mm × 20mm positioned directly behind the sealant prior to applying the sealant.
H	Control joint sealed on non-exposed side with Rocor FireSound New Grey Joint Sealant 10mm wide x 5mm deep.

#### A.1.6 Instrumentation

A.1.6.1 This was accordance with AS1530.4-1997 and AS4072.1-1992 as appropriate for control joints.

#### A.1.7 Test Results

No	Description	Integrity	Insulation
G	Control joint sealed on non-exposed side with Rocor FireSound New Grey Joint Sealant 30mm wide with a urethane foam backing rod	No failure at 181 minutes	75 minutes on Sealant 92 minutes on Blocks.
H	Control joint sealed on non-exposed side with Rocor FireSound New Grey Joint Sealant 10mm wide x 5mm deep.	No failure at 181minutes	148 Minutes on Sealant 141 Minutes on Blocks

A.1.7.1 The test was discontinued after a period of 181 minutes.

A.1.7.2 The calculated pressure in the furnace was 15Pa, 360mm from the bottom wall.

## APPENDIX B - ASSESSMENT OF SPECIFIC VARIATIONS

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### B.1 RELEVANCE OF WF 41003.1 TEST DATA TO AS1530.4-2014

#### B.1.1 General

B.1.1.1 The fire resistance test WF 41003.1 was conducted in accordance with AS1530.4-1997 and AS4072.1-1992, which differs from AS1530.4-2014.

B.1.1.2 The differences in test method considered capable of significantly altering specimen performance are discussed below,

#### B.1.2 Furnace Temperature Measurement

B.1.2.1 The specification for furnace thermocouples in AS1530.4-2014 and AS1530.4-1997 are not appreciably different.

#### B.1.3 Furnace Temperature Regime

B.1.3.1 AS1530.4-2014 specifies furnace temperature to follow the following trend:

$$T_{AS1530.4-2014} = 345 \log_{10}(8t + 1) + 20$$

B.1.3.2 AS1530.4-1997 specifies furnace temperature to follow the following trend:

$$T_{AS1530.4-1997} = 345 \log_{10}(8t + 1) + T_o \quad 10^{\circ}C \leq T_o \leq 40^{\circ}C$$

B.1.3.3 The ambient temperature of test WF 41003.1 was 17°C.

B.1.3.4 The parameters outlining the accuracy of control of the furnace temperature in AS1530.4-2014 and AS1530.4-1997 are not appreciably different.

#### B.1.4 Furnace Pressure Regime

B.1.4.1 AS1530.4-2014 specifies that a pressure of  $15 \pm 3$ Pa shall be established at the centre of the lowest penetration service.

B.1.4.2 Test report WF 41003.1 confirms that the pressure condition adhered to that prescribed by AS1530.4-2014.

#### B.1.5 Specimen Temperature Measurement

B.1.5.1 AS 1530.4-2014 specifies specimen thermocouples as Type K, MIMS thermocouples with a stainless steel sheaf having a wire diameter not exceeding 0.5 mm and an overall diameter of 3mm. The thermocouples shall be supported by a heat-resisting tube with the measuring junction protruding a minimum 25 mm. Each thermocouple shall have the tail of its measuring junction soldered to the centre of a 12mm diameter x 0.2mm thick copper disc. The disc shall be covered by  $30 \pm 0.5$ mm x  $30 \pm 0.5$ mm x  $2.0 \pm 0.5$ mm thick inorganic insulating pad having a density of  $900 \pm 100$ kg/m<sup>3</sup>.

B.1.5.2 AS 1530.4-1997 specifies specimen thermocouples as Type K, MIMS thermocouples with a stainless steel sheaf having a wire diameter not exceeding 0.5 mm and an overall diameter of 3mm. The thermocouples shall be supported by a heat-resisting tube with the measuring junction protruding a minimum 25 mm. Each thermocouple shall have the tail of its measuring junction soldered to the centre of a 12mm diameter x 0.2mm thick copper disc. The disc shall be covered by an oven-dry pad, not less than 30mm square, made from material having a value  $\sqrt{(kpc)}$  not greater than 600 at 150°C, and of such thickness as will give a thermal resistance ( $R = t/K$ ) of 0.015 K/W – 0.025 K/W at 150°C.

B.1.5.3 For control joints installed in vertical separating elements, AS1530.4-2014 requires thermocouples to be located as follows:

- a) At least three on the surface of the seal, with one thermocouple for each 0.3m<sup>2</sup> of surface area, up to a maximum of five, uniformly distributed over the area (one thermocouple being located at the centre of the seal).

- b) On the surface of the seal 25mm from the edge of the opening, with one thermocouple from each 500mm of the perimeter.
- c) On the surface of the separating element 25mm from the edge of opening, with one thermocouple for each 500mm of the perimeter.
- d) Thermocouples used for the evaluation of the insulation performance of control joints shall be positioned on the unexposed face of the sealing system and the separating element, except where the unexposed face of the seal is recessed within the separating element. Where this occurs, thermocouples shall only be fitted to the seal when the joint width is greater than or equal to 12mm. Under these circumstances, the size of the pad may be reduced to facilitate the fitting of the thermocouple.

B.1.5.4 AS 4072.1-1992 requires thermocouples used for the evaluation of the insulation performance of control joints shall be positioned on the unexposed face of the sealing system and adjacent separating element, except where the unexposed face of the seal is within the separating element. Where this occurs, thermocouples shall only be fitted to the seal when the joint width is greater than the distance of the seal from the non-fire side of the specimen.

B.1.5.5 Specimen H and G in test WF 41003.1 were sealed on the non-fire side of the wall separating element and recessed with the wall surface and the thermocouples were positioned in such a manner that they meet the requirements of AS1530.4-2014.

B.1.5.6 Based on the above discussion, it is considered the insulation performance of specimens G and H can be used to assess the performance in accordance with AS1530.4-2014.

#### **B.1.6 Integrity Performance Criteria**

B.1.6.1 AS1530.4-2014 deems integrity failure to have occurred upon collapse, sustained (10 seconds) flaming, ignition of an applied cotton pad or if a 6mm gap gauge can protrude into the furnace and can be moved 150mm along the gap (not applicable at the sill), or if a 25mm gap gauge can protrude into the furnace.

B.1.6.2 AS 1530.4-1997 deems integrity failure to occur upon collapse, the development of cracks, fissures, or other openings through which flames or hot gases can pass.

B.1.6.3 There were no observations made for the specimen relevant to this assessment in WF 41003.1 which are considered likely to have warranted the application of a cotton pad. Data collected from thermocouples located on the seals indicate that surface temperatures did not exceed 325°C, it is considered that a surface at this temperature not hot enough to cause flaming of a cotton pad.

#### **B.1.7 Insulation Performance Criteria**

B.1.7.1 The insulation criteria specified in AS1530.4-2014 and the same as those specified in AS1530.4-1997.

#### **B.1.8 Application of Test Data to AS1530.4-2014**

B.1.8.1 The minor variations in furnace heating regimes and specimen thermocouple specification are not considered likely to significantly affect the behaviour of the specimens relevant to this assessment.

B.1.8.2 In light of the above, it is considered that the integrity and insulation behaviour of the specimen G and H tested in WF 41003.1 can be used to assess the likely performance if the specimen was tested in accordance with AS1530.4-2014.

## **B.2 INCREASE THE CONTROL JOINT DEPTH**

### **B.2.1 General**

B.2.1.1 It is proposed the 10mm wide control joint shall be 10mm depth in lieu of 5mm tested in WF 41003.1

### **B.2.2 Discussion**

B.2.2.1 With reference to the test WF 41003.1, the control joint H was a vertical joint of 10mm wide and 5mm deep on the non-fire side of a 140mm thick concrete block wall that achieved 180 minutes integrity performance. The insulation performance on the unexposed surface of the blocks adjacent to the seal was 141 minutes.

B.2.2.2 With reference to discussion in B.1, it is considered the integrity and insulation behaviour of the specimen H tested in WF 41003.1 will not have any detrimental effect on the performance if tested in accordance with AS1530.4-2014.

B.2.2.3 AS 1530.4-2014 also stipulates that *“results obtained from a single test on a but joint may be applied to contoured joints provided the joints have equal width and equal or greater depth of sealant and equal or greater depth of fire separating element”*

B.2.2.4 It is therefore considered if the control joints were tested with a larger depth will not be considered that significantly affect the integrity and insulation performance.

B.2.2.5 In light of the above, it is considered the proposed construction will maintain 180 minutes integrity performance and 120 minutes insulation performance if tested in accordance with AS1530.4-2014.