

FIRESOUND

ACOUSTIC PERFORMANCE AND FIRE RATING IN ONE!

COMPREHENSIVE FIRE AND ACOUSTIC REPORT





Firesound's proven performance, backed by extensive performance testing, gives you the confidence that Firesound is the correct choice for your fire and acoustic sealant requirements.

Brochure Contents:

1. Summary of Fire Test and Appraisal Data.
2. Warrington Fire Research Fire Test Report and Assessment. Further fire reports and assessments are available on the CD accompanying this report.
3. Summary of Acoustic Test Data. Further acoustic reports and assessments are available on the CD accompanying this report.
4. Independent performance report regarding external exposure.
5. Testing summary regarding adhesion and flexibility in aerated concrete panel expansion joints.
6. Firesound technical data.

As part of the Firesound package to give specifiers, builders and owners peace of mind, HB Fuller issue site specific warranties on request – contact your HB Fuller representative for further details.

CD Contents:

- Firesound Acoustic Appraisal & Test Aerated Concrete + Plasterboard 05-'02
- Firesound Acoustic Appraisal & Test Brick, Walls and Plasterboard 11-'05
- Firesound Fire Appraisal AS Concrete Floor Joints 08-'02
- Firesound Fire Appraisal AS Masonry Wall Joints 03-'07
- Firesound Fire Appraisal BS Concrete Floor Joints 08-'02
- Firesound Fire Test AS Concrete Floor Joints 08-'03
- Firesound Fire Test AS Aerated Concrete Penetration and Joint 12-'06
- Firesound Fire Test AS Masonry Wall Penetration and Non Fire Joint 05-'03
- Firesound Fire Test AS Plasterboard Wall Joints 08-'03
- Firesound Fire Test BS Aerated Concrete Penetration and Joint 10-'06
- Firesound Information Video

Summary of Fire Test and Appraisal Data




FIRE TEST ASSEMBLY	Seal configuration			Report type		Conformance		Fire rating
	Both fire & non-fire side	Fire side only	Non-fire side only	Fire test	Appraisal	AS 1530.4-1997 & AS 4072.1	BS 476: Part 20: 1987	
Joints								
Aerated concrete wall joints*	Yes			Yes		Yes	Yes	Up to 3 hrs
Concrete walls and floor joints*	Yes	Yes		Yes	Yes	Yes	Yes	Up to 4 hrs
Masonry wall joint*	Yes		Yes	Yes		Yes		Up to 3 hrs
2 x 16mm Fire rated plasterboard wall joints*	Yes			Yes		Yes		Up to 3 hrs
Penetrations								
Aerated concrete pipe and cable penetrations**	Yes					Yes	Yes	Up to 3 hrs
Masonry pipe and cable penetrations**	Yes					Yes		Up to 4 hrs
2 x 13mm Firerated plasterboard pipe and cable penetrations**	Yes					Yes		Up to 90 mins

* - See individual test or appraisal data for information relating to joint configurations and wall/floor thickness.

** - See individual test or appraisal data for information relating to cable and pipe penetrations and wall thickness.

Fire Test conducted by Warrington Fire Research (Aust) Pty Ltd. PO Box 4282 Dandenong South, Victoria 3164.

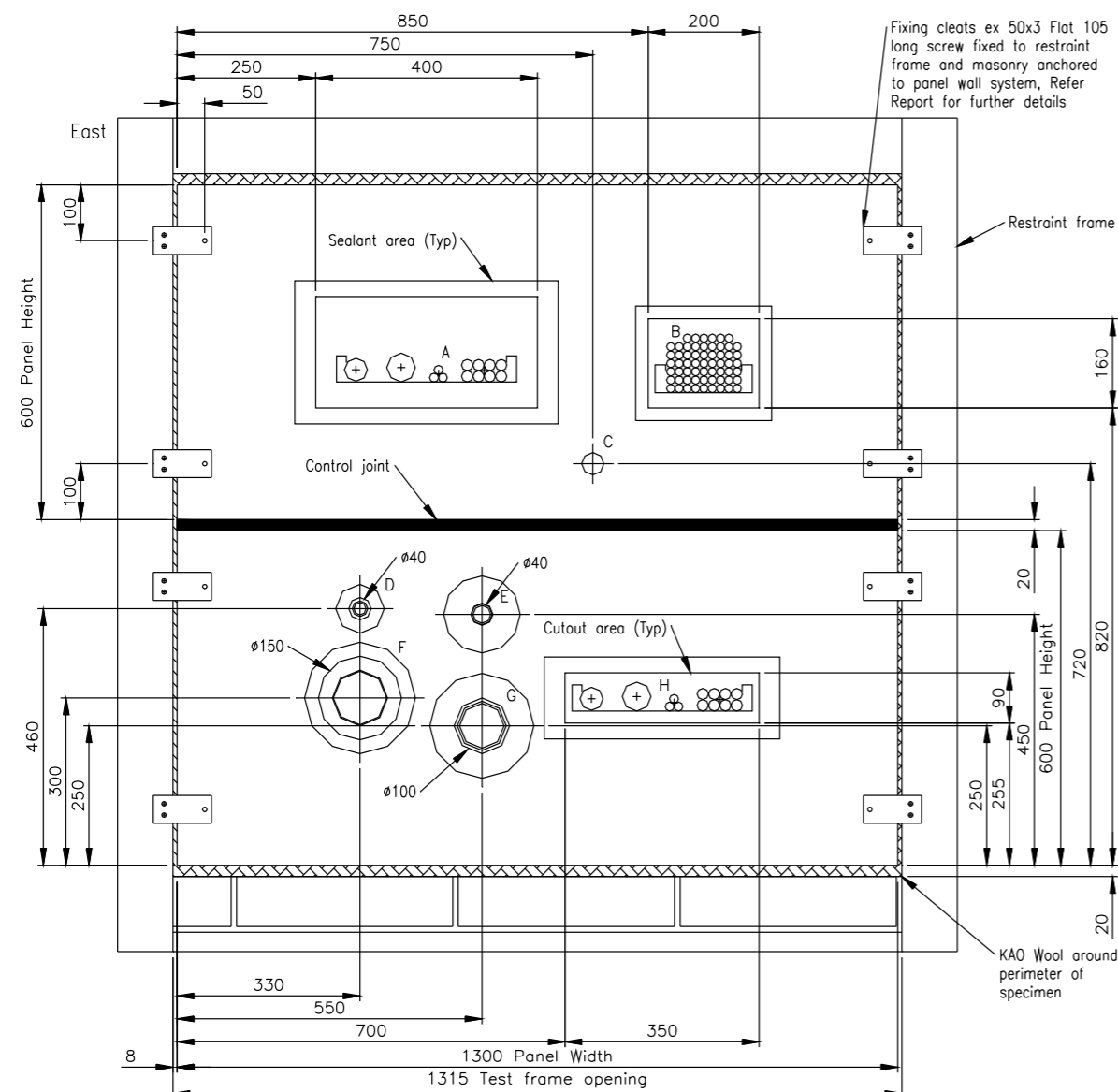
WFRA Test Certificate

WFRA TEST CERTIFICATE			CERTIFICATE No : SFC 41257.4	
 <p>CONSULTANCY • TESTING</p>			Sponsor	
			H.B. Fuller 16-22 Red Gum Avenue, Dandenong South, Vic, 3175.	
			Issue Date	26/04/06
Introduction				
The element of construction described below was tested by this laboratory on behalf of the test sponsor in accordance with the stated test standard and achieved the results stated below. Refer to the referenced test report(s) or Regulatory Information Reports for more information.				
Report Reference	Test Date	Test Standard	Variations from standard test procedures and conditions	
WFRA 41257.2	11/10/06	AS1530.4-2005	No Significant Variation	
Description of Specimen				
TEST ASSEMBLY - The test assembly comprised a nominal 1300mm wide x 1250mm x 150mm thick steel reinforced CSR Hebel Powerpanel™ wall system penetrated by the standard cable configurations for the evaluation of electrical and telecommunications cables, various sized metal pipes and a control joint, protected by HB Fuller Firesound, with exception of one penetration that also used Promaseal Pillows as shown in Figure 1. Refer to WFRA RIR 41257.2 or WFRA 41257.2 for detailed Specimen Description.				
ORIENTATION - The assembly was tested in the vertical orientation on a pilot furnace with a nominal opening of 1200 mm x 1200 mm.				
Test Results				
Service		FRL		
A		-/180/30		
B		-/180/120		
C		-/180/180		
D		-/180/180		
E		-/180/180		
F		-/180/-		
G		-/180/30		
H		-/180/90		
Control Joint		-/180/180		
THIS CERTIFICATE IS PROVIDED FOR GENERAL INFORMATION ONLY AND DOES NOT COMPLY WITH THE REGULATORY REQUIREMENTS FOR EVIDENCE OF COMPLIANCE. Reference should be made to the relevant test report or regulatory information report to determine the applicability of the test result to a proposed installation. The results of these fire tests may be used to assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all conditions.				
TESTING AUTHORITY	Warrington Fire Research (Aust) Pty Ltd			
Address	PO Box 4282 DANDENONG SOUTH VIC 3164 Unit 2, 409-411 Hammond Road DANDENONG VIC 3175			
Phone / Fax	61 (0)3 9767 1066 / 61 (0)3 9767 1001			
ABN	81 050 241 524			
Email / Home Page	testing@wfra.com.au / www.wfra.com.au			
Authorisation	Prepared By:	Reviewed By:		
				
	C. M. McLean	K. G. Nicholls		
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Test Specimen Elevation

BASIC DESCRIPTION OF PENETRATION ONLY –
REFER SCHEDULE OF COMPONENTS FOR FULL DESCRIPTION

- A: Power Cables tray installation (Hole size 400mm w x 200mm h)
- B: Telecommunication cable tray installation (Hole size 200mm w x 160mm h)
- C: Telecommunication cable installation (Hole diameter 40mm)
- D: Steel sprinkler pipe 22mm ID x 3mm wall thickness (Hole diameter 40mm)
- E: Steel sprinkler pipe 32mm ID x 3mm wall thickness (Hole diameter 40mm)
- F: Copper pipe 100mm ID x 2mm wall thickness (Hole diameter 150mm)
- G: Steel sprinkler pipe 80mm ID x 4mm wall thickness (Hole diameter 100mm)
- H: Power Cables tray installation (Hole size 350mm w x 90mm h)
- Control Joint: 20mm high x 15mm deep both sides of panel wall system



NOTES:
1. Wall consists of 2 layers of 75mm thick steel reinforced CSR Hebel Powerpanel bonded together with CSR Hebel Thin Bed Adhesive.
2. All dimensions shown are in mm and nominal.

Summary of Acoustic Test Data

ACOUSTIC TEST ASSEMBLY	Firesound seal configuration	Conformance	Rating	
			Rw	Rw + Ctr
209mm wall consisting 16mm FR plasterboard (reverberation side), 75mm aerated concrete, 50mm glasswool partition batts, 75mm aerated concrete, 13mm FR plasterboard (diffuse field room).	10mm x 10mm perimeter seal, on plasterboard edges (top, bottom and sides, both wall sides)	ISO 717.1	65	58
110mm single brick wall	10mm x 10mm joint in 10mm vertical gap in the full height of the wall (both wall sides)	AS/NZS 1276.1	45	41
220mm double brick wall	10mm x 10mm joint in 10mm vertical gap in the full height of the wall (both wall sides)	AS/NZS 1276.1	54	49
246mm wall, double brick with 13mm plasterboard on one side (mounted on 13mm metal battens)	10mm x 10mm joint in 10mm vertical gap in the full height of the wall (both wall sides, incl brick and plasterboard)	AS/NZS 1276.1	66	55

Firesound Sealant External Performance

Firesound has been used extensively as an internal fire-rated intumescent and acoustic sealant for many years. It has also been used in external applications where the question has been asked regarding its weathering performance in comparison to polyurethane fire retardant products in the market.

To answer this question, Firesound was independently tested in an analytical laboratory in Japan against a market leading competitor's fire retardant polyurethane, in a weathering unit to ISO 4892.

Test Details

Test details are as follows:

- Sample size: 10mm x 10mm x 3mm thick
- Open Flame: Carbon Arc (SWM)
- Power: 255W/m²
- Wavelength range: 300-700nm
- Black Panel: 63°C
- RH: 50%
- Cycle of 102min irradiation then 18min waterspray.

Samples are placed in the weatherometer and sampled periodically over the total exposure period of 3000hrs (approx 10 years equivalent).

Accelerated weathering simulates damaging effects of long term outdoor exposure of materials and coatings by exposing test samples to varying conditions of the most aggressive components of weathering - ultraviolet radiation, moisture and heat. Moisture is provided by forced condensation, and temperature is controlled by heaters.

We are advised that 300hrs of exposure corresponds to approximately 1 year real time, although due to variability in outdoor conditions no direct correlation can be made between accelerated weathering duration and actual outdoor exposure duration.

MicroPhotographical images of the surfaces of Firesound and the competitive Polyurethane were taken (below):

Results and Conclusion

The competitor's polyurethane shows cracks appearing after 540hrs (less than 2 years approx.) Firesound does not exhibit any cracking until 2100 hrs exposure (approx 7 years equiv), where some small hair-line cracks can be seen up to 0.2mm long. After 3000hrs (approx 10 years equiv), Firesound shows cracking up to 0.3mm long at a density of approximately 15 fissure per 2.5mm², whereas the polyurethane shows significant fissures up to 0.7mm long covering the total image.

While the extent of cracks in both sealants do not indicate that either sealant has degraded to the extent that its sealing function is no longer performing, the tests provide strong evidence that Firesound exhibits a greater resistance to weathering in external applications than the competitor polyurethane product.

HB Fuller recommends Firesound for external application, where application is undertaken as outlined in the Firesound Technical Data Sheet. On request HB Fuller will issue site specific warranties for Firesound for both internal and external use - contact your HB Fuller representative for details.

Adhesion & Flexibility of Firesound Sealant in Aerated Concrete Panel Expansion Joints

Introduction

HB Fuller has conducted testing to confirm that Firesound sealant provides sufficient adhesion and flexibility to be used on standard aerated concrete panel constructions, without breaking away from the substrate, or splitting it when it expands and contracts within the Firesound tolerance of +/- 20% movement.

Test Details

Sections of aerated concrete panel were cut into 20cm x 10cm sections. The sections were brushed to remove surface dust that may affect the adhesion of the sealant to the substrate. Both cast and cut edges were tested to ensure suitability of both substrates.

The edges of the separate panels were primed with a layer of Fuller Express 290D acrylic primer. The aerated concrete blocks were laid flat onto silicon release paper and a 10mm spacer was placed in between each set of two blocks (cast edge to cast edge, cut edge to cut edge). Firesound sealant was placed into the 10mm gap, and tooled off.

After curing 28 days at 40°C, and 28 days at ambient temperature, joint elongation testing was conducted using a tensiometer, connected to a computer recording stress levels. The machine slowly exerts a tensile stress on the samples in an attempt to pull the two blocks apart from each other, hence testing the sealant strength.

Joints were elongated in 1mm increments (10% of original joint width), and after every 1mm the elongation was paused and the samples examined. Samples were all elongated by at least 5mm (50% elongation) and results recorded via computer and printed out as a graph of load exerted versus extension.

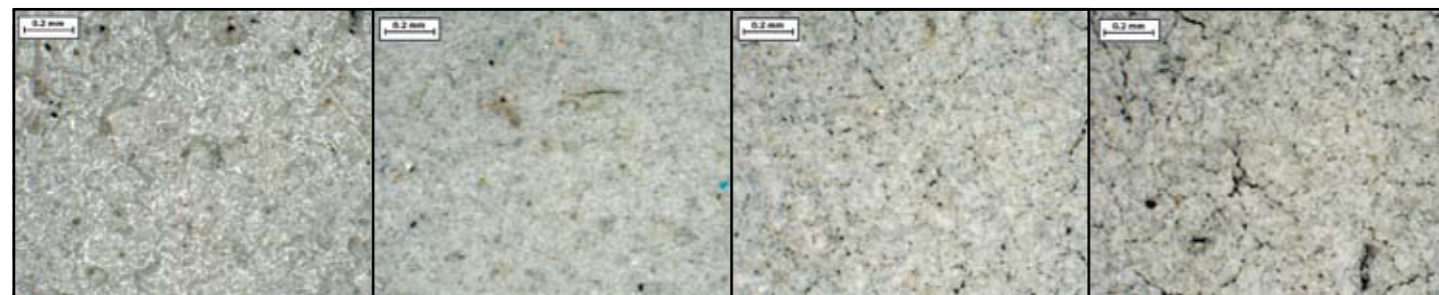
Results and Conclusion

All of the samples examined showed significant elasticity in the joint, combined with excellent adhesion (no sign of failure of the sealant to aerated concrete interface at the specified 20% flexibility for which Firesound is rated). Analysis of the computer tensiometer data shows the sealant flexibility does not start to fail until 30% extension - and even then the

sealant will extend to 100% before failing completely. This is 500% higher than the specification requires. There is also no loss of adhesion to the surface of the aerated concrete panel edge until around 80% extension, again far higher than the specification requires.

This testing shows that the Firesound does not suffer from cracking when exposed to stress within prescribed limits. Cracking generally occurs with some low performance sealants, where they are too inflexible to accommodate adequate movement. Firesound contains high quality, flexible acrylic polymer and plasticizers, ensuring high performance in joint sealing applications.

Firesound fire-rated sealant

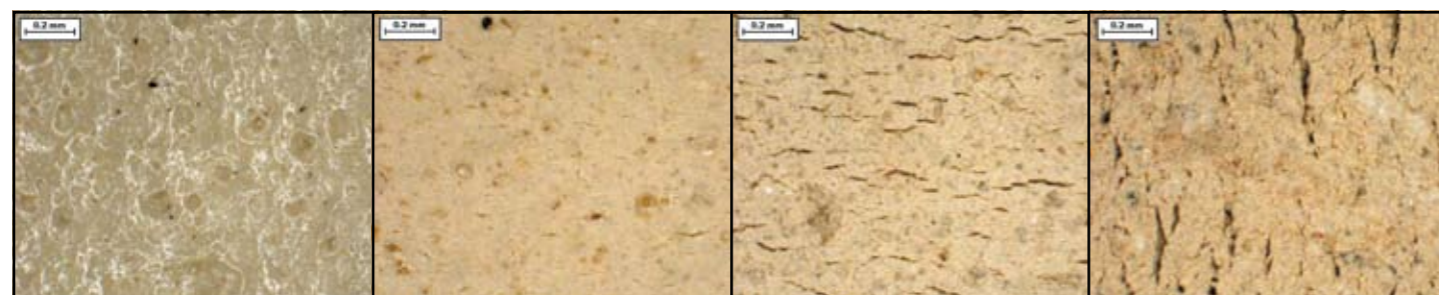


0hr

540hr

2100hr

3000hr



Polyurethane fire-rated sealant

Photo 1: Initial set-up



Photo 2: 60% expansion



Technical Data

Product Identification and Company Details

Product Name
Firesound™

Manufacturer
HB Fuller Company
Australia Pty Ltd

ABN
37 003 638 435

Street Address
16-22 Red Gum Drive
Dandenong South Vic 3175

Telephone
(03) 9797 6222

Facsimile
(03) 9797 6299

Description, Benefits and Application Instructions

Description

Firesound™ sealant is an acrylic based sealant, formulated primarily to perform as barrier to the incursion of fire through expansion joints. Firesound™ sealant is also an effective acoustic sealant.

Recommended Use

Sealing: exterior and interior construction joints that are subject to movement (up to ±20%) in pre-cast concrete panels, blockwork and brickwork • gaps around cables, metal pipes, conduits, busways and ducts that penetrate walls, floors and ceilings • if joint movement is not required, Firesound™ sealant can be used as a putty for filling holes in fire rated substances

Substrates: concrete • mortar
• plasterboard • cable coverings (PVC)
• steel • aluminium

Benefits

- Fire rating for gaps up to 50mm
- Good UV & weather resistance
- Good flexibility - joint movement ±20%
- Paintable
- One part - no mixing
- Excellent acoustic properties

- Very easy to apply and gives a smooth finish
- Low odour
- Non-toxic - contains no heavy metals such as antimony, cadmium, lead or mercury
- Contains no isocyanates
- Asbestos free
- Intumescent, expands when exposed to fire or heat above 90°C
- Priming not normally required
- Can be applied to damp surfaces
- Water clean up

Standards Compliance

Firesound™ sealant achieved a four (4) hour integrity fire rating when tested in accordance with AS1530.4-1997 supplemented by AS4072.1-1992 as well as BS476: part 20; 1987 and as appropriate on a gap-sealing system protecting joints between concrete panels. Due to variations in fire rating results using different thicknesses and types of substrates, advice should be sought concerning the suitability of Firesound™ in specific applications. Firesound™ has been tested in accordance with AS1276.1 and found to perform as an excellent acoustic sealant with Sound Transmission Class (STC) 65 rating in a wall constructed using 2 leaves of aerated concrete plus plasterboard facings. In tests involving 10mm joints in brick walls, Sound Insulation Rating of Rw + Ctr 49 was achieved in a 220mm brick wall, and Rw + Ctr 55 in a 220mm brick wall with plasterboard facing. However as acoustic performance is determined according to the type and dimension of substrates, advice should be sought regarding the overall design concept.

Surface Preparation

All surfaces must be clean, sound and free from dirt, grease and other contaminants. Ideally surfaces should be dry. Firesound™ sealant will adhere to slightly damp surfaces, but avoid wet surfaces. Areas adjacent to joints may be masked to provide a neat finish. Masking should be removed immediately after tooling. Ensure Firesound™ is applied to sealed edges of plasterboard. Unsealed edges (with no primer) may lead to a

weak bond being formed and/or loss of acoustic performance.

Priming

Should priming be needed to seal edges or increase adhesion then Fuller Express 290D primer should be used. A coat should be brushed on and left to dry before Firesound™ is applied. Priming is recommended for porous or difficult to clean surfaces.

Application

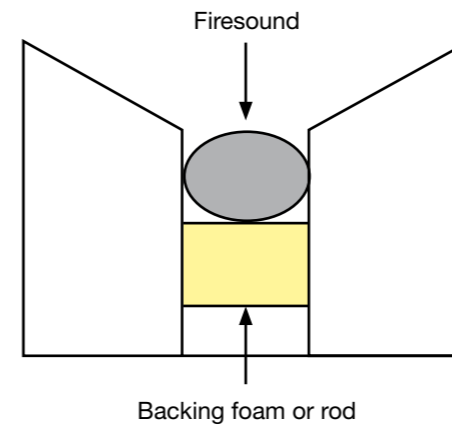
Apply Firesound™ in ambient conditions between 5 and 35 degrees centigrade. Higher temperatures should be avoided to prevent the possible bubbling of the sealant due to rapid moisture evaporation. Do not apply below 5 degrees centigrade. Fill joint with trowel or caulking gun, then tool off with a spatula and clean off excess with a damp cloth. Protect from water for at least 24 hours until a suitable skin has cured (will require significantly longer at temperatures below 15 degrees centigrade). All joints should be filled to required depth with backer rod or bond breaker tape prior to sealant application. Some shrinkage is normal during curing, and should be anticipated when measuring joints.

Joint Design Factors

The width of the joint should fall within the range of 10mm to 50mm. The maximum design movement must not exceed +/- 20% of the joint width. Joint width/depth ratio should be 1:1 for joints 10mm wide and rising to 2:1 for joints 20mm and greater. If joint movement is not required Firesound™ sealant can be used as a putty.

Joint Backing

Joints 10mm to 20mm deep should be filled to within 10mm of the surface with either closed-cell polyethylene foam or open-cell polyurethane backer rod. Use a diameter that will create a firm backing for the sealant to be applied against. In joints too shallow for backer rod, use a bond breaker tape to prevent three-sided adhesion.



Painting

Firesound™ sealant is suitable for painting when cured. To minimize paint cracking, at least 24 hours should be left before painting where possible. In standard conditions (25 degrees centigrade) Firesound™ may be painted after 6 hours, however, care should be taken to ensure a flexible acrylic coating is used and that a firm skin has developed. In cooler conditions or where the humidity is high, allow a longer cure period before painting.

Coverage

Yield: Approximate metres per litre of Firesound™ as per table

Joint Depth mm	Joint Width mm				
	10	20	30	40	50
10	10	5	-	-	-
15	-	-	2.2	1.6	-
20	-	-	-	1.25	1.0
25	-	-	-	-	0.8

Cure Time

Time to cure is highly variable and depends on weather conditions, ambient temperature and depth of joint. Allow longer curing times in cold or damp conditions. Do not allow water contact until at least a thick surface skin has formed.

Limitations

- Do not apply to wet surfaces.
- Firesound™ sealant may be used both for interior and exterior sealing, but not suitable for use in water retaining structures or where ponding may occur.
- Firesound™ sealant has good servicing characteristics when unprotected in internal applications.
- For external use, Firesound™ sealant must be protected from rain or water, until such time as the sealant builds up a thick skin to avoid washout. Therefore do not apply sealant when rain exposure is likely, or before a thick skin can develop. This is typically 24 hours in summer (25 to 30 degrees C), but will be significantly longer in winter, or at times of high humidity.

Clean Up

After applying Firesound™ sealant, clean all tools and metal surfaces with warm water while the sealant is still wet. Cured sealant will need to be removed mechanically.

Shelf Life

Do not store containers below 5°C, or above 32°C or in direct sunlight. When stored correctly in unopened containers Firesound™ sealant will last 12 months.

Pack Sizes

- 450g (~290mL) cartridge
- 925g (~600mL) sausage
- 15.4kg (~10L) pail

Performance Summary

Property	Data
Colour	Grey
Specific gravity	approx. 1.5
Skin time	@25°C 30 minutes
Working time	@25°C 15 minutes
Joint movement capability	±20%
Durometer Hardness (Shore A)	25-35
Service Temperature Range	-20 to +80°C

Hazard Information

Firesound™ sealant is not classified as hazardous according to criteria of Worksafe Australia. However, sound industrial hygiene procedures should be followed. Ensure adequate ventilation during use. Avoid skin and eye contact. KEEP OUT OF REACH OF CHILDREN.

A Material Safety Data Sheet and Technical Data Sheet is available from the H.B. Fuller representative or agent in your state. For Poisons Information Centre phone AUSTRALIA 13 11 26, NZ 0800 764 766.

Safety Data Sheets and Technical Data Sheets are regularly updated. Please ensure that you have the most recent edition. Please contact FULLER on 1800 423 855 for a Technical Data Sheet or a Material Safety Data Sheet.

Other Information

This Technical Data summarises to the best knowledge of FULLER, technical information of the product and in particular, how to safely handle and use the product in the workplace. Since HB Fuller Company Australia Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, review the Firesound Technical Data sheet in the context of how the user intends to handle and use the product in the workplace.

If clarification or further information is needed to ensure that an appropriate assessment can be made, the user should contact this company. Our responsibility for the products sold is subject to our standard terms and conditions, a copy of which is sent to our customers and is also available on request.

Firesound - a sound history!

Major projects where Firesound has been used:

Aurora, Brisbane, Qld
Brisbane Magistrates Court, Brisbane, Qld
Crown Millennium Towers, Sydney, NSW
Dock5 Project, Docklands, Melbourne, Vic
Eureka Towers, Melbourne, Vic
Federation Square, Melbourne, Vic
Harbour Lights, Cairns, Qld
Jacksons Landing, Pyrmont, NSW
Long Beach Resort, Ettalong, NSW
Montefiore Retirement Village, Randwick, NSW
National Gallery of Victoria, Melbourne, Vic
Prince of Wales Hospital, Randwick, NSW
Q1 Towers, Gold Coast, QLD
The Bond Building, Millers Point, NSW
The Distillery Hill Apartments, Pyrmont, NSW
The Sebel Heritage Lodge, Yarra Valley, Vic
The Verve Apartments, Melbourne, Vic
Westmead Hospital, Westmead, NSW
Woolworths Distribution Centre, Baulkham Hills, NSW
Wyong Hospital, Wyong, NSW
Yarra's Edge, Victoria Harbour, Melbourne, Vic



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