



# Reaction-to-fire test report

Test standard: AS 1530.1:1994 (R2016)

Test sponsor: Health Based Building

Product: Magnum board®




Job number: RTF200319

Test date: 28 and 31 August 2020 Revision: R1.0

Warringtonfire Australia: accredited for compliance with ISO/IEC 17025 – Testing



## Quality management

Revision	Date	Information about the report			
R1.0	12 September 2020	Description	Initial issue.		
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		Signature			

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## 1. Introduction

This report documents the findings of the reaction-to-fire properties of Magnum board® tested in accordance with AS 1530.1:1994 (R2016). The testing was undertaken on 28 and 31 August 2020.

Warringtonfire Australia did the test at the request of the test sponsor listed in Table 1.

**Table 1 Test sponsor details**

Test sponsor	Address
Health Based Building	1062 Colombo Street St Albans, Christchurch 8014 New Zealand


## 2. Test specimen

The description of the specimen in Table 2 has been prepared from the information provided by the test sponsor, unless otherwise specified.

Table 3 provides details of the specimen sizes.

Warringtonfire was not involved in sampling or selecting the specimens. However, we were commissioned to modify the specimens so they met the geometric requirements of the test standard. All measurements – unless indicated – were measured by Warringtonfire.

**Table 2 Product description**

Item	Detail
Product	Magnum board®
General description	12 mm thick board made from magnesium oxide, magnesium chloride, cellulose, perlite, a proprietary additive with 2 layers of glass fibre reinforcement mesh. The top surface was smooth whilst the bottom layer was rough (sanded). One layer of glass fibre mesh was embedded 0.2 mm in from the smooth face and one layer of glass fibre mesh was embedded approximately 0.5 – 1 mm in from the sanded face.
Average as received mass per unit area	12.5 kg/m <sup>2</sup>
Average mass per unit area after conditioning	12.0 kg/m <sup>2</sup>
Colour	Off-white
Photograph of specimen	

**Table 3 Specimen geometry**

Parameter	Unit	Specimen number				
		1	2	3	4	5
Diameter	mm	44	44	43.9	44	44
Height	mm	52.5	51.8	52.3	52.7	51.3
Volume	cm <sup>3</sup>	79.8	78.8	79.2	80.1	78.0

### 3. Test procedure

Table 4 details the test procedure for this reaction-to-fire test.

**Table 4 Test procedure**

Item	Detail
Statement of compliance	The test was performed in accordance with the requirements of AS 1530.1:1994 (R2016).
Variations	A suitable alternative insulating material was used to fill the annular space between the furnace tubes, as specified in clause 4.2 of ISO 1182:2010.
Pre-test conditioning	The specimens were conditioned inside a ventilated oven maintained at a temperature of $60 \pm 5$ °C for 20.25 hours. The samples were then cooled to room temperature in a desiccator until immediately prior to testing.
Specimen preparation and mounting	Prior to testing, the discs were stacked and tied together using two fine nickel-chromium wires.
Number of tests	Five
Test operator	Anthony Rosamilia

### 4. Test measurements and results

Table 5 shows the summary of results.

**Table 5 Test calculations**

Parameter	Symbol	Unit	Results					Arithmetic mean = $\sum \text{results}/5$
			1	2	3	4	5	
Cumulative total of duration of flaming (> 5 s)		s	0	0	0	0	0	0
Test duration		s	3600	3600	3300	3600	3600	3540
Specimen mass								
Initial	$m_{si}$	g	78.7	76.3	78.7	78.8	78.1	
Final	$m_{sf}$	g	42.1	41.4	41.9	42.9	42.1	
Mass loss	$\Delta m = [(m_{si} - m_{sf})/m_{si}] \times 100$	%	46.5	45.7	46.8	45.6	46.1	46.1
Furnace thermocouple temperatures								
Initial	$T_{fi}$	°C	754.0	749.4	749.8	752.0	753.0	
Maximum	$T_{fm}$	°C	778.9	792.4	782.0	792.1	792.7	
Final	$T_{ff}$	°C	776.6	790.7	780.9	790.2	791.3	
Temperature rise	$\Delta T_f = T_{fm} - T_{ff}$	°C	2.3	1.7	1.1	1.9	1.4	1.7
Specimen centre thermocouple temperatures								
Maximum	$T_{cm}$	°C	985.7	1074.8	968.5	1041.4	968.5	
Final	$T_{cf}$	°C	770.0	768.8	768.8	766.0	758.7	
Temperature rise	$\Delta T_c = T_{cm} - T_{cf}$	°C	215.7	306.0	199.7	275.4	209.8	241.3

Parameter	Symbol	Unit	Results					Arithmetic mean = $\sum \text{results}/5$
			1	2	3	4	5	
Specimen surface thermocouple temperatures								
Maximum	$T_{sm}$	°C	818.2	796.5	811.5	797.9	789.8	
Final	$T_{sf}$	°C	817.7	795.3	811.0	795.5	789.0	
Temperature rise	$\Delta T_s = T_{sm} - T_{sf}$	°C	0.5	1.2	0.5	2.4	0.8	1.1

## 4.1 Test observations

Observations of any significant behaviour of the specimen during the tests are summarised below.

- All specimens darkened during the first few minutes after being inserted into the furnace.
- At the end of the test the specimens were white and powdery.

## 4.2 Combustibility

The material is not deemed combustible according to the test criteria for combustibility specified in clause 3.4 of AS 1530.1:1994 (R2016).

A comparison between the failure criteria and the corresponding results determined from testing is presented in Table 6.

**Table 6 Test calculations**

Failure Criteria	Measured value	Unit	Result
Mean duration of sustained flaming $\geq 0$ s	0	s	Pass
Mean furnace thermocouple temperature rise $\Delta T_f \geq 50$ °C	1.7	°C	Pass
Mean specimen surface thermocouple temperature rise $\Delta T_s \geq 50$ °C	1.1	°C	Pass

## 5. Application of test results

### 5.1 Test limitations

These test results relate only to the behaviour of the test specimens of the material under the particular conditions of the test and they are not intended to be the sole criterion for assessing the potential fire hazard of the material in use.

Any significant variation with respect to size, construction details, loads, stresses, edge or end conditions is not addressed by this report. Any differences in composition or thickness of the product may significantly affect the performance and will therefore invalidate the test results. It is recommended that any proposed variation to the tested configuration should be referred to the test sponsor. The test sponsor should then obtain appropriate documentary evidence of compliance from Warringtonfire or another accredited testing authority.

The supplier of the product is responsible for ensuring that the product which is supplied for use is identical to the specimens that were tested.

### 5.2 Uncertainty of measurements

Because of the nature of reaction-to-fire testing and the consequent difficulty in quantifying the uncertainty of measurements obtained from a reaction-to-fire test, it is not possible to provide a stated degree of accuracy of the result.



# warringtonfire

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