



# Reaction-to-fire test report

Test standard: AS 1530.1:1994 (R2016)

Test sponsor: Melbourne Acrylic Coatings Victoria Pty Ltd

Product: MAC Hi-Build render




Job number: RTF200350

Test date: 6 and 9 November 2020 Revision: R1.0

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



## Quality management

| Revision | Date             | Information about the report |   |   |
|----------|------------------|------------------------------|---|---|
| R1.0     | 20 November 2020 | Description                  | Initial issue.  |   |
|          |                  |                              | Prepared by   | Reviewed by   |
|          |                  | Name                         | Atousa Aris   | Choose an item.   |
|          |                  | Signature                    |  |   |
|          |                  |                              |   |  |

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## 1. Introduction

This report documents the findings of the reaction-to-fire properties of MAC Hi-Build render tested in accordance with AS 1530.1:1994 (R2016). The testing was undertaken on 6 and 9 November 2020.

Warringtonfire did the test at the request of Melbourne Acrylic Coatings Victoria Pty Ltd listed in Table 1.

**Table 1 Test sponsor details**


| Test sponsor                                | Address   |
|---|---|
| Melbourne Acrylic Coatings Victoria Pty Ltd | 196-200 Hammond Road<br>Dandenong South VIC 3188<br>Australia |

## 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 geometry.

Warringtonfire was not involved in sampling or selecting the specimens. All measurements – unless indicated – were measured by Warringtonfire.

**Table 2 Product description**

| Item                       | Detail   |
|----------------------------|--|
| Product                    | MAC Hi-Build render  |
| General description        | The material was composed of HE (high early strength) class portland cement, re-dispersible polymer powders, graded sands, perlite and workability admixtures. |
| As received density        | 1,540 kg/m <sup>3</sup>  |
| Density after conditioning | 1,510 kg/m <sup>3</sup>  |
| Colour                     | Off-white  |
| Photograph of specimen     |   |

**Table 3 Specimen geometry**

| Parameter | Unit            | Specimen number |      |      |      |      |
|-----------|-----------------|-----------------|------|------|------|------|
|           |                 | 1               | 2    | 3    | 4    | 5    |
| Diameter  | mm              | 44.5            | 44.3 | 44.5 | 44.3 | 44.3 |
| Height    | mm              | 49.8            | 50.0 | 50.4 | 50.4 | 49.8 |
| Volume    | cm <sup>3</sup> | 77.5            | 77.1 | 78.4 | 77.7 | 76.8 |

### 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.<br>During the tests of specimen 2, 3, 4 and 5, the thermocouples did not reach equilibrium. The tests were ended after 3600 seconds as described in section 7.4.7 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 21 hours. The samples were then cooled to room temperature in a desiccator until immediately prior to testing.   |
| Number of tests         | Five  |
| End of test             | Out of the five specimens, only one reached equilibrium at 3600 s. All remaining tests were ended after 3600 seconds – as described in section 7.4.7 of ISO 1182:2010.  |
| Test operator           | Atousa Aris   |

### 4. Test measurements and results

Table 5 shows the summary of observations and calculations of the material samples.

**Table 5 Test results**

| 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  | 3600  | 3600  | 3600  | 3600                                      |
| Specimen mass                                   |  |      |         |       |       |       |       |   |
| Initial   | $m_{si}$   | g    | 114.6   | 115.0 | 114.4 | 116.6 | 112.3 |   |
| Final   | $m_{sf}$   | g    | 103.6   | 104.2 | 103.8 | 104.9 | 101.6 |   |
| Mass loss                                       | $\Delta m = [(m_{si} - m_{sf})/m_{si}] \times 100$ | %    | 9.6     | 9.4   | 9.3   | 10.0  | 9.5   | 9.6                                       |
| Furnace thermocouple temperatures               |  |      |         |       |       |       |       |   |
| Initial   | $T_{fi}$   | °C   | 752.8   | 753.7 | 753.7 | 752.6 | 753.6 |   |
| Maximum   | $T_{fm}$   | °C   | 774.5   | 776.6 | 777.0 | 780.3 | 773.4 |   |
| Final   | $T_{ff}$   | °C   | 772.0   | 774.6 | 775.4 | 778.7 | 772.0 |   |
| Temperature rise                                | $\Delta T_f = T_{fm} - T_{ff}$                     | °C   | 2.5     | 2.0   | 1.6   | 1.6   | 1.4   | 1.8                                       |
| Specimen centre thermocouple temperatures       |  |      |         |       |       |       |       |   |
| Maximum   | $T_{cm}$   | °C   | 748.9   | 747.1 | 734.2 | 751.9 | 694.6 |   |
| Final   | $T_{cf}$   | °C   | 748.8   | 747.0 | 734.2 | 751.8 | 691.4 |   |
| Temperature rise                                | $\Delta T_c = T_{cm} - T_{cf}$                     | °C   | 0.1     | 0.1   | 0.0   | 0.1   | 3.2   | 0.7                                       |

| Parameter                                  | Symbol                         | Unit | Results |       |       |       |       | Arithmetic mean = $\frac{\sum \text{results}}{5}$ |
|--|--------------------------------|------|---------|-------|-------|-------|-------|---|
|  |                                |      | 1       | 2     | 3     | 4     | 5     |   |
| Specimen surface thermocouple temperatures |                                |      |         |       |       |       |       |   |
| Maximum                                    | $T_{sm}$                       | °C   | 794.7   | 793.1 | 798.6 | 796.7 | 796.1 |   |
| Final                                      | $T_{sf}$                       | °C   | 794.5   | 792.7 | 798.5 | 796.5 | 795.9 |   |
| Temperature rise                           | $\Delta T_s = T_{sm} - T_{sf}$ | °C   | 0.2     | 0.4   | 0.1   | 0.2   | 0.2   | 0.2   |

## 4.1 Test observations

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

- Specimens discoloured during the first 20 minutes of being inserted into the furnace and changed back to its original colour as the test progressed.
- There were cracks on the specimens after the test.

## 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 Summary of results**

| Combustibility Performance Criteria                                      | Measured value | Unit | Result |
|--|----------------|------|--------|
| Mean duration of sustained flaming > 0 s                                 | 0              | s    | Pass   |
| Mean furnace thermocouple temperature rise $\Delta T_f > 50$ °C          | 1.8            | °C   | Pass   |
| Mean specimen surface thermocouple temperature rise $\Delta T_s > 50$ °C | 0.2            | °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.

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