



Fire assessment report

CSR Gyprock plasterboard and CSR Cemintel fibre
cement products assessed with Group numbers

Client: CSR Gyprock




Product: Plasterboard and fibre cement products

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Quality Management

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Executive summary

This assessment considers the performance of a range of CSR wall and ceiling linings when assessed against the criteria of Specification C1.10 of the National Construction Code of Australia (NCC) 2019 Amendment 1 and AS 5637.1:2015.

This report documents the findings of the assessment undertaken to determine the likely fire hazard properties of the CSR wall and ceiling lining products if tested in accordance with AS ISO 9705-2003 (R2016) and AS 5637.1:2015. The majority of the previously assessed products were based on data from tests conducted in accordance with AS 1530.3:1999 (R2016) and AS/NZS 3837:1998 (R2016). The sponsor had subsequent re-testing conducted on representative samples of the range of products to establish new baseline data in accordance with the current requirements of AS 5637.1:2015 and AS ISO 9705-2003 (R2016).

The analysis conducted in sections 5 to 6 of this report found that the proposed variations are likely to achieve group number and information on smoke production rates as shown in Table 1, if tested in accordance with AS ISO 9705-2003 (R2016) and AS 5637.1:2015. The variations and outcome of this assessment are subject to the limitations and requirements described in section 2, 0 and 7 of this report. The results of this report are valid until 31 August 2025.

Table 1 Variations and assessment outcome

Product	Reference test and assessment report	Assessment classification - group number
CSR Gyprock plasterboard products		
10~13 mm Gyprock Plus	RTF190098.1 and associated assessment report- FAS190127 R1.0	Group No. =1 $SMOGR_{ARC}$ (in $m^2 \cdot s^{-2} \times 1000$) ≤ 0.5 In accordance with AS ISO 9705-2003 (R2016) and AS 5637.1:2015 and Group No. =1-S Average smoke production rate (0 to 20 minutes) $\leq 0.16 m^2 \cdot s^{-1}$ In accordance with C/VM2 – Verification Method: Framework for Fire Safety Design (for applications in New Zealand).
10~13 mm Supaceil		
10~13 mm Sensitive		
10~16 mm Standard plasterboard		
10~13 mm Soundchek		
10~13 mm Aquachek		
Flexible- 6.5mm (used in two layers)		
Impactchek- 13mm		
Superchek- 10mm		
25 mm ShaftLiner MR panel		
25 mm ShaftLiner MP panel		
25 mm ShaftLiner panel		
13~16 mm Fyrchek		
13~16 mm Fyrchek MR		
13 mm EC08 Partition		
13~16 mm EC08 Complete		
13 mm EC08 Impact		
13 mm EC08 Impact MR		
Gyprock perforated plasterboard panels: <ul style="list-style-type: none"> - 13 mm perforated panel 6 mm Round - 12.5 mm Gyptone perforated ceiling panels- 12mm Square, 13 mm Square Minigrid, Slotted Minigrid - 12.5 mm Rigitone perforated ceiling panels- Matrix 8mm round, Astral, Matrix 12 mm Square, Galaxy 		

Product	Reference test and assessment report	Assessment classification - group number
- 6.5 mm Gyptone perforated panels- Flexible 12 mm Square, Flexible Slotted Minigrid Gyptone Access Panels- Frame-600 mm x 600 mm Hatch- 510 mm x 510 mm		
Gyprock plasterboard tiles: - Supatone- 10 mm - Freshtone - 10 mm - Perforated Tile- 13 mm		
Gyprock Habito H plasterboard of 12.5 mm thickness	RTF190098.1 , RTF200198 R1.0 and ASCRRTF200198 R1.0	Group No. =1 Average Specific Extinction Area (ASEA) $\leq 7.3 \text{ m}^2/\text{kg}$ In accordance with AS 5637.1:2015
13 mm EC08 Extreme	RTF190098.1 , RTF220062 R1.0 and RTF200198 R1.0 associated with assessment report FAS190127 R1.0	Group No. =1 Average Specific Extinction Area (ASEA) $\leq 3.1 \text{ m}^2/\text{kg}$ In accordance with AS 5637.1:2015
CSR Cemintel fibre cement products		
6~12 mm CeminSeal Wallboard	RTF190235.1	Group No. =1 SMOGR _{RC} (in $\text{m}^2\cdot\text{s}^{-2} \times 1000$) ≤ 0.2 In accordance with AS ISO 9705-2003(R2016) and AS 5637.1:2015 and Group No. =1-S Average smoke production rate (0 to 20 minutes) $\leq 0.1 \text{ m}^2\cdot\text{s}^{-1}$ In accordance with C/VM2 – Verification Method: Framework for Fire Safety Design (for applications in New Zealand).
6~9 mm Rigid Air Barrier		
6 mm Ceramic tile underlay		
7.5~9 mm Texture Base Sheet		
8~12 mm Rendaline		
6 mm Cladding sheet		
9 mm Simpleline		
6 mm Eaves lining		
9~24 mm Compressed Sheet		
9~12 mm Expresspanel		
9~12 mm Barestone Exterior with colour options/ 9~12 mm Barestone Bark		
9~12 mm Barestone Interior with colour options/ 9~12 mm Barestone Bark		
8 mm Edge		
8 mm Mosaic		
7.5 mm Plank – Smooth and Woodgrain		
10 mm Headland Weatherboard		
12 mm and 16 mm Scarborough Weatherboard		
10 mm Endeavour Weatherboard		
16 mm Balmoral Weatherboard		
6 mm Soffitline		
18~22 mm Constructafloor Interior		
18~22 mm Constructafloor Exterior		

Product	Reference test and assessment report	Assessment classification - group number
16 mm Territory		
8 mm Surround		
Notes: <ol style="list-style-type: none">1. The perforated plasterboard panels may include an acoustic fabric backing2. The plasterboard panels with vinyl facings are not included in this assessment.3. Mineral wool or glasswool panels are excluded from this assessment.4. All fibre cement products must have the same or similar equivalent percentage by weight composition of cellulosic fibres incorporated in the cement base as the tested 6 mm specimen.		

Contents

Quality Management	2
Contact information	3
General conditions of use	3
Executive summary	4
Contents	7
1. Introduction	8
2. Framework for the assessment	8
2.1 Limitations of assessment	8
2.2 Declaration	9
3. Description of the specimens and variations	9
3.1 Specimen description	9
3.2 Referenced test data	10
3.3 Variations to tested specimens	10
3.4 Purpose of the test	12
3.5 Requirements of NCC 2019 Amendment 1 - Specification C1.10 part 4. "Wall and ceiling linings"	12
4. Scope, objective and assumptions	12
5. Assessment 1 – Assessment of CSR Gyprock plasterboard products	13
5.1 Description of variations	13
5.2 Methodology	13
5.3 Assessment of variations to tested CSR Gyprock plasterboard specimen	14
5.4 Conclusion	15
6. Assessment 2 – Assessment of CSR Cemintel fibre cement products	16
6.1 Description of variations	16
6.2 Methodology	16
6.3 Assessment of CSR Cemintel fibre cement products based on tested fibre cement specimen	16
6.4 Conclusion	17
7. Validity	18
Appendix A Summary of supporting test data	19
A.1 Material properties for CSR products	19
A.2 Test results for ceiling panels, Gyprock Giptone, Gyprock Rigitone and Gyprock Plus.	20
A.3 Test report – RTF190098.1 and summary of assessment report FAS190127 R1.0	21
A.4 Test report – RTF190235.1	23
A.5 Test report – RTF200198.1 (& classification report ASCRRTF 200198.1)	24
A.6 Test report – RTF220062 R1.0	24

1. Introduction

This assessment considers the performance of a range of CSR wall and ceiling linings when assessed against the criteria of Specification C1.10 of the National Construction Code of Australia (NCC) 2019 Amendment 1¹ and AS 5637.1:2015².

This report documents the findings of the assessment undertaken to determine the likely fire hazard properties of the CSR wall and ceiling lining products if tested in accordance with AS ISO 9705-2003 (R2016)³ and AS 5637.1:2015. The majority of the previously assessed products were based on data from tests conducted in accordance with AS 1530.3:1999 (R2016)⁴ and AS/NZS 3837:1998 (R2016)⁵. The sponsor had subsequent re-testing conducted on representative samples of the range of products to establish new baseline data in accordance with the current requirements to AS 5637.1:2015 and AS ISO 9705-2003 (R2016).

This assessment was carried out at the request of CSR Gyprock. The sponsor details are included in Table 2.

Table 2 Sponsor details

Sponsor	Address
CSR Gyprock	376 Victoria Street Wetherill Park NSW 2164 Australia

2. Framework for the assessment

An assessment is an opinion about the likely performance of a component or element of structure if it were subject to a standard fire test.

No specific framework, methodology, standard or guidance documents exists in Australia for doing these assessments. Therefore, we have followed the Guide to Undertaking Assessments In Lieu of Fire Tests prepared by the Passive Fire Protection Federation (PFPF) in the UK⁶.

This guide provides a framework to undertake assessments in the absence of specific fire test results. 'Some areas where assessments may be offered are:

- *Where a modification is made to a construction which has already been tested*
- *Interpolation or extrapolation of results of a series of fire resistance tests, or utilisation of a series of fire test results to evaluate a range of variables in a construction design or a product*
- *Where, for various reasons – eg size or configuration – it is not possible to subject a construction or a product to a fire test.'*

Assessments will vary from relatively simple judgements on small changes to a product or construction through to detailed and often complex engineering assessments of large or sophisticated constructions.

2.1 Limitations of assessment

The assessment is limited to products with no added facings such as, but not limited to, vinyl facings or combustible coatings other than those already tested and assessed.

¹ National Construction Code Volume One - Building Code of Australia 2019 including Amendments, Australian Building Codes Board, Australia

² Standards Australia, Determination of fire hazard properties Wall and ceiling linings, 2015

³ Standards Australia, Fire tests - Full-scale room test for surface products, 2003 (R2016)

⁴ Standards Australia, Methods for fire tests on building materials, components and structures Simultaneous determination of ignitability, flame propagation, heat release and smoke release, 1999 (R2016)

⁵ Standards Australia, Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter, 1998 (R2016)

⁶ Guide to Undertaking Assessments In Lieu of Fire Test - The Passive Fire Protection Federation (PFPF), June 2000, UK.

2.2 Compliance with the National Construction Code

This assessment report has been prepared to meet the evidence of suitability requirements of the NCC 2019, including amendments under A5.2 (1) (d).

This assessment has been written in accordance with the general principles outlined in EN15725:2010 for extended application reports on the fire performance of construction products and building elements. It also references test evidence for meeting a performance requirement or deemed to satisfy (DTS) provision of the NCC under A5.6 that apply to the assessed system/s.

This assessment report may also be used to demonstrate compliance with the requirements for evidence of suitability under NCC 2016, including amendments.

2.3 Declaration

The guide to undertaking assessments in lieu of fire tests prepared by the PFPF in the UK requires a declaration from the client. By accepting our fee proposal dated 15 June 2020, CSR Gyprock confirmed 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.
- They agree to withdraw this assessment from circulation if the component or element of structure is 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.
- 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, they agree to ask the assessing authority to withdraw the assessment.

3. Description of the specimens and variations

3.1 Specimen description

There are two ranges of CSR specimens tested and assessed, namely:

- CSR Gyprock plasterboard wall and ceiling products and plasterboard ceiling tiles and access panels; and
- CSR Cemintel fibre cement products

As advised by the sponsor, the mineral fibre and glass fibre ceiling and wall tiles will be dropped from this assessment. Plasterboard with vinyl facing has also been dropped due to insufficient supporting test data.

3.2 Referenced test data

The assessment of the variations to the tested specimens and the determination of the likely performance is based on the results of the fire test/s documented in the reports summarised in Table 3. Further details of the tested system are described in Appendix A.

Table 3 Referenced test data

Report number	Test sponsor	Test date	Testing authority
RTF190235.1	CSR Gyprock	14 October 2019	Warringtonfire Australia
RTF190098.1 and associated assessment report-FAS190127 R1.0	CSR Gyprock	15 June 2019	Warringtonfire Australia
RTF200198 R1.0 and classification report ASCRRTF200198 R1.0	CSR Gyprock	25 June 2020	Warringtonfire Australia
RTF220062 R1.0	CSR Gyprock and Cemintel	25 August 2022	Warringtonfire Australia

3.3 Variations to tested specimens

An identical system has not been subject to a standard fire test. We have therefore assessed the products using baseline test information for similar products. The variations to the tested specimens, together with the referenced baseline standard fire tests – are described in Table 4.

Table 4 Variation to tested CSR Gyprock plasterboard specimens

Item and thickness	Item and thickness
10~13mm Gyprock Plus	25mm ShaftLiner MR panel
10~13mm Supaceil	25mm ShaftLiner panel
10~13 mm Sensitive	25 mm ShaftLiner MP
10~16 mm Standard plasterboard	13~16 mm Fyrcek
10~13 mm Soundcek	13~16 mm Fyrcek MR
10~13 mm Aquachek	13 mm EC08 Partition
Flexible- 6.5 mm (used in two layers)	13~16mm EC08 Complete
Impactcek- 13 mm	13 mm EC08 Impact
Supercek- 10 mm	13 mm EC08 Impact MR
12.5 mm Habito H	13 mm EC08 Extreme
Gyprock perforated plasterboard panels: <ul style="list-style-type: none"> - 13 mm perforated panel 6mm Round - 12.5 mm Gyptone perforated ceiling panels- 12 mm Square, 13mm Square Minigrid, Slotted Minigrid - 12.5 mm Rigitone perforated ceiling panels- Matrix 8mm round, Astral, Matrix 12 mm Square, Galaxy - 6.5 mm Gyptone perforated panels- Flexible 12 mm Square, Flexible Slotted Minigrid - Gyptone Access Panels- Frame-600 mm × 600 mm Hatch- 510 mm × 510 mm 	Gyprock plasterboard tiles: <ul style="list-style-type: none"> - Supatone- 10 mm - Freshtone - 10 mm - Perforated Tile- 13 mm
Notes: <ol style="list-style-type: none"> 1. The perforated plasterboard panels may include acoustic fabric backing 2. The plasterboard panels with vinyl facings are not included in the assessment. 	

Table 5 Variation to tested CSR Cemintel fibre cement products

Item and description	Item and description
6~12 mm CeminSeal Wallboard	8 mm Edge
6~9 mm Rigid Air Barrier	8 mm Mosaic
7.5~9 mm Texture Base Sheet	7.5 mm Plank – Smooth and Woodgrain
8~12 mm Rendaline	10 mm Headland Weatherboard
6 mm Cladding sheet	12 mm & 16 mm Scarborough Weatherboard
9 mm Simpleline	10 mm Endeavour Weatherboard
6 mm Eaves lining	16 mm Balmoral Weatherboard
9~24 mm Compressed Sheet	6 mm Soffitline
9~12 mm Expresspanel	18~22mm Constructafloor Interior
9~12 mm Barestone Exterior with optional colour finishes in Ash, Lunar and Graphite	18~22mm Constructafloor Exterior
9~12 mm Barestone Interior with optional colour finishes in Ash, Lunar and Graphite	16mm Territory
9~12 mm Barestone Bark	8mm Surround
6 mm Ceramic tile underlay	-

3.4 Purpose of the test

The test was performed in accordance with the requirements of AS ISO 9705:2003 (R2016) and AS 5637.1:2015 to determine the group number that may be assigned to the material using the classification schemes given in AS 5637.1:2015 and C/VM2 – Verification Method: Framework for Fire Safety Design

AS 5637.1:2015 sets out procedures for the assessment of internal wall and ceiling linings according to their tendency to ignite, release heat, cause flashover, release smoke and contribute to fire growth.

3.5 Requirements of NCC 2019 Amendment 1 - Specification C1.10 part 4. “Wall and ceiling linings”

Part 4 of Specification C1.10 in NCC 2019 Amendment 1 “Walls and ceiling linings” states that –

- a. A wall or ceiling lining system must comply with the group number specified in Table 3 and for buildings not fitted with a sprinkler system complying with Specification E1.5 have-
 - i a smoke growth rate index not more than 100; or
 - ii an average specific extinction area of less than 250 m²/kg.

A group number of a wall or ceiling lining and the smoke growth rate index or average specific extinction area must be determined in accordance with AS 5637.1:2015.

4. Scope, objective and assumptions

- The scope of this report is limited to an assessment of the variations to the tested systems described in section 3.3.
- This report details the methods of construction, test conditions and assessed results that would have been expected if the specific elements of construction described here had been tested in accordance with AS ISO 9705:2003 (R2016) and AS 5637.1:2015.
- The results of this assessment are applicable to plasterboard and fibre cement wall and ceiling lining, including plasterboard ceiling tiles.
- This report is only valid for the assessed products. Any changes with respect to size, construction details, loads, stresses, edge or end conditions, other than those identified in this report, may invalidate the findings of this assessment. If there are changes to the products, a reassessment will be needed to verify consistency with the assessment in this report.
- The data, methodologies, calculations and conclusions documented in this report specifically relate to the assessed system/s and must not be used for any other purpose.
- This report has been prepared based on information provided by others. Warringtonfire has not verified the accuracy and/or completeness of that information and will not be responsible for any errors or omissions that may be incorporated into this report as a result.

5. Assessment 1 – Assessment of CSR Gyprock plasterboard products

This revised assessment supersedes all previous discussion points with new test data based on test and assessment in accordance with AS 5637.1:2015 on representative product samples. All previous tests were conducted only in accordance with AS 1530.3 and are now deemed obsolete as there were no tests carried out in accordance with AS ISO 9705-2003 (R2016) to establish the baseline data. However, the old test data in accordance with AS 1530.3 has been retained for future reference on the combustibility of the products.

5.1 Description of variations

The group number of a material or a system is based on its 'time to flashover' in the AS ISO 9705-2003 (R2016) room burn test. A flashover usually occurs when the fire is fully developed and all combustible items in the room are involved in the fire. In AS 5637.1:2015, flashover is said to occur when the total heat release rate exceeds 1 MW (1000 kW). For example, the fire hazard properties of timber are dependent on multiple factors such as density, thickness, microstructure, and chemical composition. For veneered timber materials, additional factors such as the type and thickness of the adhesive layer also contribute to the fire.

In accordance with the procedures and requirements in AS 5637.1:2015, the variations to the tested specimen plasterboard product will be mainly in the changes in thickness or size and minor variations in the material composition of the plasterboard products. Products with a combustible facing and with a different core material other than that of plasterboard are therefore removed from this report and may be reinstated when new supporting test data in accordance with AS 5637.1:2015 is available.

This assessment was undertaken to determine the likely performance of the CSR Gyprock plasterboard products, as outlined in Table 4. Based on the data from referenced test reports RTF190098.1, RTF220062 and assessment report FAS190127 R1.0, with details provided in Appendix A.3.

Based on recent tests conducted in accordance with AS ISO 9705-2003 (R2016) fire test on standard gypsum plasterboard samples, there was sufficient evidence of correlation between the various plasterboard samples from CSR Gyprock. Therefore, the test conducted on the CSR Gyprock Habito H in accordance with AS/NZS 3837:1998 provided acceptable data for classification in accordance with AS 5637.1:2015.

Test report RTF220062, documented the results of the reaction to fire properties of 13 mm EC08 Extreme in accordance with ISO 5660-1:2015/Amd.1:2019. In order to assign the material a group number, a correlation between cone calorimeter results and a room burn test results must be established. In this case, the determination of group number is valid due to the existing correlation between the cone calorimetry and full-scale room burn test for painted or unpainted paper-faced gypsum plasterboard as specified in clause 5.3.3 of AS 5637.1:2015. The EC08 Extreme is compared with the perforated Rigitone matrix 12 square acoustic panel tested in FRT190098.1 in accordance with AS ISO 9705:2003 and achieved group 1. The average specific extinction area (ASEA) of EC08 Extreme is 3.1 m²/kg which is less than the 10.1 m²/kg ASEA of the Gyprock Perforated Plasterboard with Viledon fabric backing tested in FH 5549 which means the EC08 Extreme is expected to perform in a similar manner or better if compared with the Gyprock perforated plasterboard.

5.2 Methodology

The approach and method of assessment used for this assessment is summarised in Table 6.

Table 6 Method of assessment

Assessment method	
Level of complexity	Simple assessment – analysing data provided in the referenced fire test and comparing the physical properties of products.
Type of assessment	Comparative

5.3 Assessment of variations to tested CSR Gyprock plasterboard specimen

In test RTF190098, the tested specimen in the AS ISO 9705-2003 (R2016) fire test was perforated plasterboard with a cloth (polyester) backing on the unexposed side.

The tested plasterboard panel being perforated would be more onerous when exposed to fire compared with a solid plasterboard panel. It allowed oxygen and flames to infiltrate the back of the plasterboard, enabling both surfaces to burn simultaneously. It would have resulted in a higher peak heat release rate than if the panels were to be solid, with the front exposed surface burning through the paper lining and up to 10 minutes before the plasterboard back lining starts to combust.

It is noted from the test that:

- It appears that the paper lining of the perforated plasterboard, including the added fabric backing material, played only a small or insignificant part in the total heat release rate.
- The burning rate of the plasterboard specimen was measured by the subtraction of the burner's heat release rate from the total measured heat release rate. It represented no more than 25% of the total heat release rate, and the specimen burned at a steady rate without much spiking in the heat release. From the test data, the total heat release rate peaked at about 410 kW when the burner was ramed up to 300 kW.
- Smoke generation was minimal during the test.

The discussion in assessment report FAS190127 R1.0 concluded that the specimen plasterboard would perform similarly if the amount of free area in the perforations of the plasterboard were to be varied or if the plasterboard were to be decreased or increased in thickness. Since the perforated plasterboard tested was the most onerous, it is considered that solid plasterboard panels would perform equally or better if subjected to a fire test in accordance with AS ISO 9705:2003 (R2016) and would likely attain the same Group No.1.

The above assessment could be extended to cover all thicknesses of plasterboard with the same fabric lining as that tested. The main constituents that contributed to combustion in the fire test were the paper facing of the plasterboard and the fabric backing for the perforated plasterboard panels. Increasing the thickness of the plasterboard does not lead to additional facing material. The thicker panels will likely perform similarly to the tested specimen and achieve the same group number in accordance with AS 5637.1:2015.

It would also extend to other plasterboard panels with a composition mix of the core material, which includes fire rated plasterboard. It was evident from the test observations that the core plasterboard material provided minimal combustion and any variation in the core mix would only have a marginal variance in the rate of combustion as the core is virtually non-combustible.

The 25 mm ShaftLiner MP plasterboard panel has the same core gypsum material composition as the tested standard 12 mm ShaftLiner plasterboard panel except for an added fungicide. The additive is of minimal contribution by mass to the overall core material and, based on tests on similar plasterboard samples, the ShaftLiner MP is expected to perform at the same level and be assigned a Group 1 rating along with the other plasterboard samples.

The above assessment does include lining materials such as vinyl, which would melt and combust at relatively low temperatures, and there is insufficient baseline test data to support the assessment. The same exclusion applies to mineral wool or glass fibre core materials where such panels have not been subjected to a fire test in accordance with AS ISO 9705:2003 (R2016) and AS 5637.1:2015.

Following the above discussions and evidence from previous tests confirming minimal variance in performance between different mixes of plasterboards, the 12.5 mm Gyprock Habito H plasterboard specimen tested in RTF200198 in accordance with AS/NZS 3837:1998 and AS 5637.1:2015 is provided a group 1 classification and the 13 mm EC08 Extreme plasterboard specimen tested in RTF220062 in accordance with ISO 5660-1:2015/Amd.1:2019 was given a group 1 classification based on a correlation between the cone calorimetry and full-scale room burn test for painted or unpainted paper-faced gypsum plasterboard as specified in clause 5.3.3 of AS 5637.1:2015

The list of plasterboard products positively assessed in FAS190127 R1.0 has been appended to the list of plasterboard products in Table 4.

5.4 Conclusion

This assessment demonstrates that the range of plasterboard products as listed in Table 4 is likely to achieve Group 1 classification if they were tested in accordance with AS ISO 9705:2003 (R2016) and AS 5637.1:2015.

6. Assessment 2 – Assessment of CSR Cemintel fibre cement products

This revised assessment supersedes all previous discussion points with new test data based on test and assessment in accordance with AS 5637.1:2015 on representative product samples. All previous tests were conducted only in accordance with AS 1530.3 and are now deemed obsolete as there were no tests carried out in accordance with AS ISO 9705-2003 (R2016) to establish the baseline data. However, the old test data in accordance with AS 1530.3 has been retained for future reference on the combustibility of the products.

6.1 Description of variations

The group number of a material or a system is based on its 'time to flashover' in the AS ISO 9705-2003 (R2016) room burn test. A flashover usually occurs when the fire is fully developed and all combustible items in the room are involved in the fire. In AS 5637.1:2015, flashover is said to occur when the total heat release rate exceeds 1 MW (1000 kW). For example, the fire hazard properties of timber are dependent on multiple factors such as density, thickness, microstructure and chemical composition. For veneered timber materials, additional factors such as the type and thickness of the adhesive layer also contribute to the fire.

In accordance with the procedures and requirements in AS 5637.1:2015, the variations to the tested specimen fibre cement product will be mainly in the thickness and density, such as compressed fibre cement.

This assessment was undertaken to determine the likely performance of the CSR Cemintel fibre cement products, as outlined in Table 5, based on the data from referenced test report RTF190235.1 with CSR Cemintel fibre cement specimen panels and with details provided in the A.4.

6.2 Methodology

The approach and method of assessment used for this assessment is summarised in Table 7.

Table 7 Method of assessment

Assessment method	
Level of complexity	Simple assessment – analysing data provided in the referenced fire test and comparing the physical properties of products.
Type of assessment	Comparative

6.3 Assessment of CSR Cemintel fibre cement products based on tested fibre cement specimen

In test RTF190235, the tested specimen in the AS ISO 9705-2003 (R2016) fire test consisted of fibre cement panels mounted on a series of steel battens or an AFS Logicwall® system. The tested fibre cement panels would be considered more onerous compared with compressed fibre cement panels. The components that are likely to combust when tested are the embedded cellulose fibres. The fibres in the compressed fibre cement panels are harder to combust as the compressed cement would have a slightly higher thermal storage mass, less porous for air or oxygen ingress, hence it takes longer to heat up the fibres and combust.

The embedded fibres are relatively low compared to the total mass of the panel and hence contribute only minimal fuel for combustion in the test. From observation of the test data in RTF190235.1 with 6mm fibre cement sheets, there was virtually no combustion in the specimen fibre cement panels when the burner output was at 100 kW.

Ten minutes into the test, when the burner heat release rate was turned up to 300 kW, the total heat release rate was only averaging 350 kW, which equates to a contribution of a steady 50 kW from the combustion of the fibre cement panels. The peak total heat release rate was below 400 kW with no sharp peaks throughout the test duration.

It is noted from the test that:

- There was minimal burning of the fibre cement panels during the initial 10 minutes when the burner was on 100 kW output. There was no lateral flame spread.
- When the burner was ramed up to 300 kW, there was some lateral flame spread along the ceiling but minimal along the wall.
- Even though the fibre cement sheets cracked and fell off at the completion of the test, there was no continual burning of the debris.
- Smoke generation was minimal.

Based on the test data on a 6mm fibre cement sample, the contribution to the total heat release rate during the "high fire" of 300kW during the test, a thicker sample fibre cement panel will have a proportional increase in the total heat release rate with an increase in thickness. The deduction is based on the uniform nature of the combustion where the tested panels provided a flat heat release rate throughout the test. It can therefore be considered that if the panels were thicker in the test, the total heat release rate would be elevated in proportion to the thickness and at a steady combustion rate. It is assumed that the cellulosic fibres in the thicker panels would have been of the same concentration or percentage by weight. This has been confirmed in writing by the sponsor.

The thickest fibre cement panel provided by the sponsor is 24 mm, which is four times the thickness of the 6 mm tested specimen. If the 24 mm fibre cement panel were tested in accordance with AS ISO 9705-2003 (R2016), the equivalent contribution to the total heat release rate from the burning of the panels would be $4 \times 50\text{kW}$, or a total heat release rate of 500 kW (200 kW from specimen + 300 kW from burner), which would still be within the limits of 1 MW, ie. the specimen would unlikely cause a flashover for the full duration of the test.

The thickest fibre cement panel would likely achieve the same Group 1 rating in accordance with AS 5637.1:2015. Compressed fibre with the same percentage of cellulosic fibres embedded in the cement base would likely perform equally or better in that it would have a comparatively higher thermal storage mass than the normal fibre cement and, being denser, it would make it harder for oxygen to permeate the panels and, hence, it would likely burn at a slower rate.

The Barestone weatherboard panels have been provided with additional colour finishes with the addition of trace carbon elements to the core material, namely 0.2% for Ash colour, 0.6% for Lunar and 2.0% for Graphite. The Barestone Bark weather panels, which are basically sanded samples of the basic Barestone weatherboard panels. The addition of the trace elements of carbon is unlikely to cause any variance in the performance of the original base fibre cement core material.

The above assessment could be extended to cover all fibre cement panels up to 24 mm thick, provided that there is minimal variance in the composition of the embedded cellulosic fibres.

6.4 Conclusion

This assessment demonstrates that the range of CSR Cemintel fibre cement products as outlined in Table 5 is likely to achieve Group 1 classification if it were tested in accordance with AS ISO 9705:2003 (R2016) and AS 5637.1:2015.

7. Validity

Warringtonfire Australia does not endorse the tested or assessed product in any way. 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.

Due to 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.

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 subject to constant review and improvement. It is therefore recommended that this report be reviewed on or, before, the stated expiry date.

This assessment represents our opinion about the performance likely to be demonstrated on a test in accordance with AS ISO 9705-2003 (R2016) and AS 5637.1:2015, based on the evidence referred to in this report.

This assessment is provided to the CSR Gyprock for its own purposes and we cannot express an opinion on whether it will be accepted by building certifiers or any other third parties for any purpose.

Appendix A Summary of supporting test data

A.1 Material properties for CSR products

Table 8 CSR Gyprock plasterboard products

Product	Thickness mm	Mass kg/m ²	I I	AS 1530.3 indices		
				SOF	HE	SDI
CD Gyprock	10	6.5	13	0	1	2
	13	8.5				
Supacell	10	7.2	14	0	1	1
Soundchek	10	9.3	0	0	0	3
	13	13				
Aquachek	10	8	13	0	2	3
	13	10.4				
Flexible	6	4.3	13	0	1	2
Perforated	13	10	0	0	0	3
Fyrchek	13	10.5	0	0	0	3
	16	12.5				
Fyrechek MR	13	10.7	13	0	2	2
	16	13.5				
Shafteliner	25	19.8	0	0	0	3
Flamechek	10	NA	13	0	2	2
Impactchek	10	8.0	0	0	0	3
	13	10.5				

Notes -

1. Gyprock Plasterboard is machine made sheet composed of a gypsum core encased in heavy duty paper linerboard
2. The linerboard face and back 170-180 gsm.
3. Aquachek and Fyrchek MR contain Paraffin wax emulsion.
4. The mesh in Impactchek is located adjacent to the back linerboard.

Table 9 CSR fibre cement products

Product	Thickness mm	Mass kg/m ²	I I	AS 1530.3 indices		
				SOF	HE	SDI
Fibre cement panel coated with polyurethane (GBKS 261)	10	1196	0	0	0	1

Table 10 Ceiling panels

Product description	Thickness mm	Mass kg/m ²	EFH AS 1530.3
10 mm Supaceil Gyprock lay in panels with paint or vinyl facings	-	-	-
CSR Gyprock Freshtone Supatone (painted plasterboard)	10	7.3	0,0,0,4
CSR Gyprock Diamond White (Vinyl faced)			
CSR Gyprock Ultra Matt (Vinyl faced)			
Freshtone ceiling	10	65	NA

A.2 Test results for ceiling panels, Gyprock Giptone, Gyprock Rigitone and Gyprock Plus.

Table 11 Test results ceiling panels in general accordance with AS 5637.1:2015

Material	Test Reference	Group Number	Average Specific Extinction Area (m ² /kg)
Supaceil 10 mm thick	136806	1	46
Aquachek 10 mm thick	136808	1	38
Supaceil 10 mm thick faced with Vinyl Facing (Ultra matt)	136811	1	80
Cement-bonded fibrous wood particle panel- 16 mm thick	FNK 10457	1	41.3
Gyprock Perforated Plasterboard with Viledon fabric backing	FH 5549	1	10.1
Freshtone ceiling	18-002907	1	70.3
Notes -			
1. The above results have been superseded by new tests in accordance with AS 5637.1:2015 and are no longer valid.			
2. These results will be referenced for guidance on the combustibility of the materials as required.			

Table 12 Test results for Gyprock Gyptone, Gyprock Rigitone and Gyprock Plus in accordance with AS 3837:1998

Material	Test Reference	Group Number	Average Specific Extinction Area (m ² /kg)
Gyptone Big Quattro 41	15-005762	1	4.9
Gyprock Rigitone 10/23	15-005760	1	8.5
Gyprock Plus	16-002226	1	7.6

A.3 Test report – RTF190098.1 and summary of assessment report FAS190127 R1.0

Table 13 Information about test report

Item	Information about test report
Report sponsor	CSR Gyprock
Test laboratory	Warringtonfire Australia, Unit 2, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was completed on 25/06/2019.
Test standards	The test was done in accordance with AS ISO 9705-2003 (R2016) and AS 5637.1:2015.
Variation to test standards	None
General description of tested specimen	The tested system consisted of a 28 mm thick metal framing, incorporating J-tracks, clips and furring channels, which was clad with a 12 mm Rigitone Matrix 12 Square acoustic panel. The panels were screw fixed to the furring channels using 25 mm plasterboard screws. The J-tracks were first screw fixed to the room walls and ceiling and the furring channels were slotted into the tracks. The furring channels were also secured in place using clips that were installed along the length of the channels. The panels were then screw fixed on to the furring channels. Panel to panel joints were sealed using Rigitone sealant.
Instrumentation	The test report states that the instrumentation was in accordance with AS ISO 9705-2003 (R2016).

The test specimen achieved the following result:

Table 14 Classification for AS ISO 9705-2003 (R2016) and AS 5637.1:2015 (for applications in Australia).

Criteria	Results
Group number	1
SMOGR _{ARC} (in m ² ·s ⁻² × 1000)	0.5

Table 15 Classification for C/VM2 – Verification Method: Framework for Fire Safety Design (for applications in New Zealand).

Criteria	Results
Group number	1-S
Average smoke production rate (0 to 20 minutes)	0.16 m ² ·s ⁻¹

Table 16 Assessment outcome from FAS190127 R1.0 to the Building Code of Australian requirements

Item	Panel thickness	Description of Variations	Assessed Classification for AS ISO 9705-2003 (R2016) and AS 5637.1:2015	
			Group No.	SMOGR _{ARC} (in m ² ·s ⁻² × 1000)
Gyprock Rigitone Matrix 12 mm Square	12.5 mm	As tested. Perforated plasterboard with 12 mm square holes at 23% total free open area and black fabric backing	1	0.5

Item	Panel thickness	Description of Variations	Assessed Classification for AS ISO 9705-2003 (R2016) and AS 5637.1:2015	
			Group No.	SMOGR _{ARC} (in m ² ·s ⁻² × 1000)
Gyprock Rigitone Matrix 8 mm Round	12.5 mm	8mm round holes with 15.5% total free open area		
Gyprock Rigitone Astral	12.5 mm	Staggered pattern 12 mm and 20 mm round hoers with 16.6% total free open area		
Gyprock Rigitone Galaxy	12.5 mm	Scattered pattern 15 mm and 20 mm round holes with 10% total free open area.		
Gyprock Gyptone 12 mm Square	12.5 mm	12 mm square holes with 16.0% total free open area		
Gyprock Gyptone 12 mm Square Minigrid	12.5 mm	12 mm square holes with 6% total free open area in a mini grid layout		
Gyprock Gyptone Slotted Minigrid	12.5 mm	6 mm x 80 mm rectangular holes with 13% total free open area		
Gyprock Gyptone Flexible 12 mm Square	6.5 mm	12 mm square holes with 16.0% total free open area		
Gyprock Gyptone Flexible Slotted Minigrid	6.5 mm	6 mm × 80 mm rectangular holes with 13% total free open area		
Gyprock Gyptone Access Panels	-	Frame- 600mm × 600mm Hatch- 510mm × 510mm All of perforated plasterboard from one of 3 patterns from Gyprock Gyptone 12mm S, Gyprock Gyptone 12mm Square Minigrid and Gyprock Gyptone Slotted Minigrid		
Gyprock 6 m Round	13 mm	6 mm diameter holes of 8.3% total free open area		

Table 17 Assessment outcome from FAS190127 R1.0 to New Zealand Building Code requirements

Item	Panel thickness	Description of Variations
Gyprock Rigitone Matrix 12 mm Square	12.5 mm	As tested. Perforated plasterboard with 12 mm square holes at 23% total free open area and black fabric backing
Gyprock Rigitone Matrix 8 mm Round	12.5 mm	8 mm round holes with 15.5% total free open area
Gyprock Rigitone Astral	12.5 mm	Staggered pattern 12 mm and 20 mm round holes with 16.6% total free open area
Gyprock Rigitone Galaxy	12.5 mm	Scattered pattern 15 mm and 20 mm round holes with 10% total free open area.
Gyprock Gyptone 12 mm Square	12.5 mm	12 mm square holes with 16.0% total free open area
Gyprock Gyptone 12 mm Square Minigrd	12.5 mm	12 mm square holes with 6% total free open area in a mini grid layout
Gyprock Gyptone Slotted Minigrd	12.5 mm	6 mm x 80 mm rectangular holes with 13% total free open area
Gyprock Gyptone Flexible 12mm Square	6.5 mm	12 mm square holes with 16.0% total free open area
Gyprock Gyptone Flexible Slotted Minigrd	6.5 mm	6 mm x 80 mm rectangular holes with 13% total free open area

A.4 Test report – RTF190235.1

Table 18 Information about test report

Item	Information about test report
Report sponsor	CSR Gyprock
Test laboratory	Warringtonfire Australia, Unit 2, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was completed on 14/10/2019.
Test standards	The test was done in accordance with AS ISO 9705-2003 (R2016) and AS 5637.1:2015.
Variation to test standards	None
General description of tested specimen	The test specimen consisted of 6 mm fibre cement sheet panels that were fixed onto a steel framing system. The steel framing system lined the internal face of the test room walls and ceiling.
Instrumentation	The test report states that the instrumentation was in accordance with AS ISO 9705-2003 (R2016).

The test specimen achieved the following result:

Table 19 Classification for AS ISO 9705:2003 (R2016) and AS 5637.1:2015

Criteria	Results
Group number	1
SMOGR _{RC} (in m ² /s ² x 1000)	0.2

Table 20 Classification for C/VM2 – Verification Method: Framework for Fire Safety Design

Criteria	Results
Group number	1-S
Average smoke production rate (0 to 20 minutes) (in m ² /s)	0.1

A.5 Test report – RTF200198.1 (& classification report ASCRRTF 200198.1)

Table 21 Information about test report

Item	Information about test report
Report sponsor	CSR Gyprock
Test laboratory	Warringtonfire Australia, Unit 2, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was completed on 25/06/2019.
Test standards	The test was done in accordance with AS/NZ 3837.1:1998.
Variation to test standards	None
General description of tested specimen	Three test samples of the specimen consisting of 12.6 mm (measured) plasterboard panels of gypsum plaster encased in paper liners. All specimens were wrapped in a single layer of aluminium foil, covering the sides and bottom prior to testing.
Instrumentation	The test report states that the instrumentation was in accordance with AS/NZ 3837.1:1998.

The test specimen achieved the following result:

Table 22 Classification for AS/NZS 3837:1998 and AS 5637.1:2015

Criteria	Results
Group number	1
Average Specific Extinction Area (ASEA)	7.3 m ² /kg

A.6 Test report – RTF220062 R1.0

Table 23 Information about test report

Item	Information about test report
Report sponsor	CSR Gyprock and Cemintel
Test laboratory	Australian Wool Testing Authority – 1 st . Floor, 191 Racecourse Road, Flemington, Victoria, 3031
Test date	The fire resistance test was completed on 25/08/2022.
Test standards	The test was done in accordance with ISO 5660-1:2015/Amd.1:2019
Variation to test standards	None
General description of tested specimen	Three test samples consisted of a plasterboard core with green paper facing on both faces. The specimen was reinforced with a glass fibre mesh between the plasterboard core and the green paper facing the rear face of the board.

Instrumentation	The test report states that the instrumentation was in accordance with ISO 5660-1:2015/Amd.1:2019
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The test specimen achieved the following result:

Table 24 Results of ISO 5660-1:2015/Amd.1:2019

Criteria	Results
Average Specific Extinction Area (ASEA)	3.1 m ² /kg