Product Evaluation Report
for

RESCOM
BUILDING PRODUCTS

Report Reference: RES-PEVR2023

Scope & Summary of Report

Assessment to the products suitability for use in building and construction under the 2018 IBC and 2018 IRC requirements, the BS/EN and the AS/NZ National Construction Codes:

ResCom® Cellulous Sorel Cement (CSC) products have been independently audited and certified under ISO:8336 Standards as that of a Cellulose Fibre Cement Flat Sheet products and is compliant and fit for purpose use throughout global building and construction codes and standards equivalent to:

- AS/NZS 2908.2 or ISO:8336
- ASTM:1186/85 or ISO:8336
- BS/EN: 12467 or ISO:8336

- ResCom® Cellulous Sorel Cement (CSC) board are a patented magnesium oxide cold ceramic mineral base sheeting.
- ResCom® Cellulous Sorel Cement (CSC) board are a construction, insulation and decoration panels that can be used in interior and exterior surfaces of all buildings.
- ResCom® Cellulous Sorel Cement (CSC) board can be shaped to suit various configurations can be joined and can be joined using normal building practices.
- ResCom® Cellulous Sorel Cement (CSC) board can be used to obtain construction elements for differing purposes by combining with various insulation materials to deliver protection from: fire, mould, water, sound, impact and vermin.
- ResCom® Cellulous Sorel Cement (CSC) can be used with insulating materials such as ESP, XPS, Rockwool, Fibreglass and polyurethane foam that provide high heat, sound, and fire insulation for partition walls and sandwich panels.

Product Use:

ResCom® Cellulous Sorel Cement (CSC) boards are used on interior surfaces, as defined in IBC Section 2502, as substrate sheets suitable for decoration with paint, wallpaper, ceramic tile, natural stone or dimension stone on walls in interior dry areas, and on walls and ceilings, as permitted in IBC Section 2509.2 and IRC Section 702.4.2.

ResCom® Cellulous Sorel Cement (CSC) board can be used as structural sheathing applied to interior and exterior wood or metal framed walls, to resist uniform transverse loads and racking shear loads.

The boards are suitable for use in all construction types under the IBC and in buildings constructed under the IRC, BBA2021 and NCC:2019 when installed into building systems as per the minimum recommendation of the jurisdiction building codes and that of the manufacturers recommendations.

RGBP Whanau Trust ITF
ResCom Building Products
P.O.Box 816
Moffat Beach Queensland
Australia 4551
PH: +61 7 54329890
Web: www.rescombp.com
Email: admin@rescombp.com

ResCom® Cellulous Sorel Cement (CSC) board has been independently assessed as being fit for purpose use in building and construction when installed as per the requirements of the ResCom® Technical Installation Manual 2019 and applied as detailed in the related evidence-based testing reports as referenced in this Product Technical Statement Report #100108

Evaluation Scope:

Compliance with the following codes:

- International Building Code (IBC) 2021
- International Residential Code (IRC) 2021
- International Fire Code (IFC) 2021
- National Construction Code (NCC) 2022

Properties evaluated:

- Structural
- Durability
- Construction Types I-IV
- Surface-burning characteristics

Evidence Submitted

- Data in accordance with the ICC-ES Acceptance Criteria for Fibre-reinforced Magnesium-oxide-based Sheets (AC386) dated October 2007.
- Data in accordance with the ICC-ES Acceptance Criteria for Reinforced Cementitious Sheets Used as Wall and Ceiling Sheathing and Floor Underlayment (AC376), dated February 2009.
- Data in accordance with the ICC-ES Acceptance Criteria for Racking Shear Evaluation of Proprietary Sheathing
- Materials Attached to Light-framed Walls with Proprietary Fasteners (AC269), dated October 2009.
- Data in accordance with the ICC-ES Acceptance Criteria for Fibre-cement Interior Substrate Sheets Used in Wet and
- Dry Areas (AC378), dated August 2012.

Evaluation Report Opinion Extract

Subject to the following Conditions & Limitations:

- The product must be installed in accordance with report holders published manual.
- Sound resistance varies with board thickness, consult manufacturers specifications for STC ratings
- Full technical information is available at www.rescombp.com or upon request.

PRODUCT DESCRIPTION

- ResCom Cellulous Sorel Cement (CSC) board range in thickness from .16” (4mm) to 2” (50mm) which are magnesium-oxide sheets, reinforced with fiberglass mesh on both faces, available in standard 4ft (1220mm) width and lengths of either 8ft (2440mm), 9ft (2745mm) and 10ft (3050mm).
- Special sizes can be manufactured to meet a projects needs on request.
- The boards exhibit a maximum deflection of .06"(1.6 mm) in humidified deflection testing in accordance with ASTM C1396.
- ResCom Cellulous Sorel Cement (CSC) board has a flame spread index of 10 or less and a smoke-developed index of 5 or less, when tested in accordance with ASTM E84. ResCom boards are classified as non-combustible building materials in accordance with ASTM E136.
- ResCom Cellulous Sorel Cement (CSC) board is a lightweight and integrated insulating, cladding and finishing systems for new residential and commercial constructions.
- ResCom Cellulous Sorel Cement (CSC) sheeting is suitable for a wide range of general building uses and for applications that require fire resistance, mould and mildew control, as well as sound control applications and many other benefits.
- As an environmentally friendly building material, has strength and resistance due to strong bonds between magnesium and oxygen atoms that form the magnesium oxide molecules.

ResCom® Cellulous Sorel Cement (CSC) sheeting can be used in place of traditional gypsum drywall as wall and ceiling covering material and sheathing. It may also be used as flooring and a number of other construction applications such as:

- Fascia’s
- Soffit
- Tile backer
- Flooring overlay
- Shaft-liner
- Electrical cable tray liner
- Electrical barge boards
- Façade cladding
- Rapid Air Barrier
- Substrates for coatings and insulated systems such as finish systems, EIFS, and some types of stucco.

Benefits

ResCom® Cellulous Sorel Cement (CSC) board provide the following benefits:

- Can be used as interior and exterior facing in all kinds of construction.
- Can be used in the place of traditional drywall or cement boards. No special tools required.
- For places where high level of sound insulation is required (for thickness of 8mm and above).
- Used as roof sheathing panels .40" to .63" (10mm, 12mm, 14mm, & 16mm).
- Resistant to impact.
- Lightweight, can be carried easily.
- Made completely of natural materials and is environment and nature friendly.
- Does not include any materials such as asbestos, toxic materials and heavy metals that are hazardous to human health.
- Is not affected by ultraviolet rays.
- Does not need special treatment.
- Is not affected by insect pests.

- Can be painted or coated with any render / stucco / lime wash / traditional coating.
- Can be easily processed and assembles with convenient hand tools.
- Provides material and labour savings in painting, side coating, insulation and thin putty up to 50 to 60%.
- Is highly resistant against chemicals.
- Is a breathing material.
- Is accommodated to various insulation materials.
- Can be used as sandwich panels for various purposes.
- Hard non-absorbent surface – no paper.
- Can be used in applications to replace Portland Cement-based FC and OSB siding.
- Available in colours. Gray, Brown, Light Blue, Pink and Creamy White.

Ratings and Testing:

- Fire-resistant (UL 055 and ASTM-Tested and A-Rated, AS/NZ and BS/EN Group 1).
- Standard test method of Surface burning Characteristics of building materials ASTM E84-12a or equivalent
- Standard test method for fire wall protection under ASTM 119 from 60 to 180min FRL or equivalent
- Waterproof (Freeze/Thaw-Tested for 36 months) ASTM 1185/1186c or equivalent
- Mold / fungus / bug free (non-nutritious to mold, fungus, insects ASTM G-21). or equivalent
- Impact-resistant (ASTM D-5628) or equivalent
- NYC Approved (MEA # 359-02-M). or equivalent
- Silica / Asbestos / Formaldehyde free.
- CHPD/EHLB/Standard Method V1.1,2010 Emissions Test California specifications 01350: ISO16000-3 & 6:2011 ISO16000-9 & 11:2006
- STC-Rated 53 to 62. or equivalent

Design & Installation

Transverse Load Resistance: When installed in accordance with Section 4.2 of this report, ResCom Cellulous Sorel Cement (CSC) board sheathed walls resist a maximum transverse load of 40 psf (1915 Pa).

Racking Shear Resistance: When installed in accordance with Section 4.2 of this report, "ResCom" sheathed walls have a maximum racking shear resistance of 140 plf (2043 N/m), a maximum wall height of 8ft (2.44m) and a shear wall height-to-length aspect ratio of 1-to-1.

Use of ResCom® Cellulous Sorel Cement (CSC) board as shear wall sheathing is limited to resisting wind loads and seismic loads in Seismic Design Categories A, B and C.

Installation:

- ResCom® Cellulous Sorel Cement (CSC) board must be installed on wood framing members spaced not more than 16” (406 mm) on centre on minimum 2-by-4 studs.
- The framing members must have a minimum specific gravity of 0.42 for transverse load resistance and 0.50 for racking shear resistance.
- The panel joints must occur over framing. The boards must be installed using corrosion-resistant, 1.5" No. 8, self-drilling screws at a maximum spacing of 6” (152 mm) on centre around the perimeter and 12" (305 mm) on centre in the field. When installing the board in corrosive environments / zones the installer must use high-grade stainless-steel fixtures and fittings

Protection of Materials when Applied as Exterior and Wet area Lining

- ResCom® Cellulous Sorel Cement (CSC) panels are to be treated with a water impermeable and UV resistant sealer.
- This treatment is to be maintained over the life of the product as stipulated by the coatings manufacturer.
- Impermeable protection is required to be applied to the panels prior to installation as an external sheeting / cladding or as a wet area lining.
- Applicators must avail themselves of the technical data and MSDS of the materials supplied by the coatings company prior to handling and installation.

Primer, Coatings and Finishes:

ResCom® Cellulous Sorel Cement (CSC) boards are compatible with commercially available paint or render systems.

ResCom Building Products advises it is best to seek professional opinion by your preferred coatings specialist to the best products suitable for your application.

Partition Wall Construction:

- In general terms construction that is prepared using C, U, galvanised or box profiles. ResCom® Cellulous Sorel Cement (CSC) are fixed on both surfaces using countersunk head screws, rock wool or fibre glass depending on the FRL and STC performance requirements of the wall systems using as standard .31", .40", .50", & .63" (8mm, 10mm, 12mm, 14mm & 16mm) panels.
- Refer to the technical installation manual or contact ResCom Building products for guidance on bidirectional and single directional fire protection FRL configurations.

Roof Application:

As per the installation manual .50", .47" & .63" (12mm, 14mm & 16mm) ResCom® Cellulous Sorel Cement (CSC) is used instead of wood-based plates.

Suspended Ceilings:

ResCom® Cellulous Sorel Cement (CSC) board are fixed to construction prepared by using C, U or M galvanised profile, or iron profile by using either pointed or self-screwing screws. In ceilings .24", .31" & .40" (6mm, 8mm & 10mm) ResCom® Cellulous Sorel Cement (CSC) panels are used.

Raised Floor System:

- ResCom® Cellulous Sorel Cement (CSC) board used in raised floor construction use structural panels utilising 16mm to 20mm thickness in structural load bearing panels.
- Recommended adhesives for flooring use include ceramic adhesive mortar, flexmortel, polyurethane foam and acrylic mastic.
- ResCom® Cellulous Sorel Cement (CSC) boards can be fixed to either timber or a lightweight metal frame subfloor systems. Such framing must be constructed in accordance with relevant state requirements.
- The frame must comply with the local building regulations and the requirements of the applied loads as per engineering compliance and specifications.

- Maximum frame centres for fixing sheets to the frame is 23.62" (600mm) centre to centre (Consult technical manual and engineering to assure performance criteria of live and point loads.
- It is a requirement of construction that in order to provide sufficient support for screws or nails, a minimum stud width of 1.65” (42mm) (for timber) or 1.4” (36mm) (for a metal frame) is required.
- Where this is not possible, an additional stud will be required to ensure fasteners can be fixed at a minimum distance of .50" (12mm) from the sheet edge.
- When installing ResCom board to metal frames it is a requirement to place a moisture separation of water-resistant silicon or similar to the face of the steel member before installing the board.

Board Layout:

- ResCom® Cellulous Sorel Cement (CSC) can be fixed to framing vertically or horizontally.
- Planning the sheet layout before fixing is important in order to minimize the number of sheet joints.
- It is recommended that wherever possible the installer should avoid horizontal sheet configuration.
- Horizontal sheet layout is only recommended where the maximum depth of cladding is 4ft (1220mm) or 2ft - 11" (900mm) (one sheet width).
- Horizontal sheet installation is more suitable for applications such as fascia’s, spandrels, parapets etc.

Board installation:

- When installing ResCom® Cellulous Sorel Cement (CSC) board the fasteners must be fixed at minimum of .50" (12mm) from the sheet edges and 1.96” (50mm) from the sheet corners.
- Fasteners must be fixed along the edge of the sheet and the distance between the centres of the fasteners must not exceed 7.9” (200mm).

Framing & Fixing:

- All studs and noggins must be checked with a log straight edge for line and face accuracy, to ensure the stud wall has a true and accurate outside face as any warping will be visible after paint or texture.
- The recommended tolerance should be less than .08" (2mm) per 19.7" (500mm).

Timber Framing:

- Timber framing used in conjunction with ResCom® board must comply with “Residential Timber Framed Construction”. The timber used for house construction must have the level of durability appropriate for the relevant climate and expected service life and condition.
- Timber frame thickness (stud width) at sheet joints must have a minimum of 1.65" (42mm).
- Timber with less than 1.65" (42mm) wide must not be used at any sheet joint because of insufficient sheet landing width, and should provide double studs at sheet joints.
- In the case of a supporting frame in the middle of the sheet, the fasteners should be fixed in the body of the sheet, and the distance between the centres of the fasteners must not exceed 11.8” (300mm).
- Control joints should be installed where there is a significant structural moment expected.
- If a continuous run of sheeting exceeds at 18ft (5.4mtrs) at flooring level, it must be broken with control joint.

Vertical control joints:

- Any vertical control joint must be installed in any wall run that exceeds 18ft (5.4mtrs).
- The control joint will require a .50" gap between sheets and the joint must be supported by double studs.
- Back blocking to vertical joints mid span using a min 5.9" (150mm) rip of matching panel which is then glued using an appropriate structural polyurethane adhesive and screwed using non-corrosive fixings.

Horizontal control joints:

- Any horizontal joints must be located in walls at 12ft (3.6mtrs) maximum centres.
- They are also required at floor joint level and at garble ends.
- Back blocking to horizontal joints mid span using a min 5.9" (150mm) rip of matching panel which is then glued using an appropriate structural polyurethane adhesive and screwed non-corrosive fixings.

Metal Framing:

- ResCom® Cellulous Sorel Cement (CSC) boards can be fixed directly to lightweight metal frame which complies with AS3623;
- The metal frame must have a minimum flange width of 1.4" (36mm) per sheet joints, as this is deemed provide adequate support for fixing two sheet edges.
- Where narrow sections are used, double studs at the sheet joints must be incorporated.
- When fixing ResCom® board to a rigid framing, it is required that the frame be batten out using either timber battens or light steel top hats sections prior to fixing.
- Any battens supporting the sheet joints must have a minimum face width of 1.77" (45mm).
- Hot rolled steel structural sections must be battened out with timber or steel top hat battens before sheets are fastened.

Conditions of Use:

ResCom® Cellulous Sorel Cement (CSC) boards as described in this report complies with, and is a suitable alternative to what is specified in the codes listed in this Product Evaluation Report, subject to the following conditions:

- Panels must be installed in accordance with this report and the manufacturer's published installation instructions.
- In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.
- When used as a component of shear walls (racking shear), the panels are recognized for use in Seismic Design Categories A, B and C under the IBC and IRC or equivalent.
- The support framing must be designed for a maximum allowable deflection of L/360 under seismic or wind loads for exterior or interior areas.
- Use of ResCom® Cellulous Sorel Cement (CSC) board as floor sheathing or floor underlayment is outside of the scope of this Evaluation Report.
- Installation of a vaper retarder in exterior walls must be in accordance with code requirements.
- ResCom® Cellulous Sorel Cement (CSC) board must not be exposed to the weather and must not be used in wet areas as defined in IBC Section unless coated with an appropriate water proofing system or equivalent
- Use of the panels in horizontal diaphragms is outside of the scope of this Evaluation Report.
- ResCom® Cellulous Sorel Cement (CSC) board is covered by this Product Evaluation Report only when manufactured by a factory under a quality control program with independent QA inspections undertaken by PCME, IGNIS FIRE ENGINEERING or INTERTEK LCC.

- Under the IRC, the substrate sheets must not be used in wet areas unless sealed with appropriate waterproof binder sealer and then treated with a suitable waterproofing membrane that is installed by a qualified applicator as per the requirements of the relevant building code for waterproofing of wet areas or equivalent

Cyclic Water Pressure Test Results (AS/NZS 4284:2008) Rep #T0369		
Test Pressure (Pa)	**Duration (mins)**	**Comments**
227 - 455	5	No Water Penetration
303 - 606	5	No Water Penetration
455 - 910	5	No Water Penetration
Static Pressure Water Penetration Test Results (AS/NZ 4284:2008)		
Test Pressure (Pa)	455 Pa	
Test Duration	15 minutes	

A series of static and cyclic pressure water penetration tests were carried out on Extra High Wind Zone serviceability pressure of 1515 Pa. No water penetration was observed on the cladding sample during the testing

Product Identification

ResCom products are colour coded to assure visual identification and they clearly bear the:

- ResCom® logo,
- Product brand name,
- Quality control batch number
- Independent 3rd Party QA inspection brand and number (PCME / IGNIS / INTERTEK)

Foundation of The Product Evaluation Report

The Product Evaluation Report has been issued as per international ISO 9001, ISO14001 and ISO1720 protocol and the following aspects have been evaluated during this process:

- Manufacturing and quality control procedures.
- Product recall policies and procedures.
- Installation procedures.
- Physical Properties.
- Independent Review of Full-Scale Test Reports carried out by ILAC accredited and licensed testing facilities
- Review and confirmation of independent fire and structural engineering reports
- Review and confirmation of Independent 3rd party quality assurance programs in place with NAMI and Intertek
- Cross evaluation of international testing results under ASTM/UL, BS/EN, ISO and AS/NZ Standards
- Review of performance testing and reports to meet the requirements of the IBC 2021.
- Review of performance testing and reports to meet the requirements of the IRC 2021.
- Review of performance testing and reports to meet the requirements under the NCC 2022.

Bibliography

The following documents and inspections were used in carrying out the Evaluation Report:

- Manufacturers and Installation Information:
- ResCom® Building Products Technical Installation Manual
- Technical Construction drawings supplied by RGBP and available on the RGBP website: www.rescombp.com
- Technical data sheets and PCME / IGNIS / INTERTEK / ILAC laboratory test results issued by accredited testing facilities
- Licensed engineering reports.
- Manufacturers QA and in house laboratory results
- Onsite compliance inspections of product installation and applications
- Manufacturing inspection and audit of operations

Test Reports:

PHYSICAL PROPERTY	CONDITION	RESULT	STANDARD
Average Bending Strength F^L	Wet	>14MPa	ASTM C1185-08 (2012)
Average Bending Strength Wall	Wet	>12MPa	EN 12467:2012 Sec 5.4.4 & 7.3.2
Density in kg/m^3	1000		ASTM C1185-08 (2012)
Water tightness		Passes	ASTM C1185-08 (2012)
Water absorption	13.2%		ASTM C1185-08 (2012)
EQ Moisture content		<5%	ASTM C1185-08 (2012)
Moisture movement 30-90% relative humidity*		0.064	ASTM C1185-08 (2012)
Humidified deflection (mm) 32c,40%RH, 48hrs	2.18		ASTM C473-12
Dimensional conformance		Passes	ASTM C1185-08 (2012)
Water Impermeability Category A		Pass	EN 12467:2012
Vapour Permeability Category D		u=80	EN 12467:2012 Sec 5.4.6 & 7.3.4
Freeze-Thaw Category A		Pass	EN 12467:2012 Sec 5.5.2 & 7.4.1
Heat Rain Category A		Pass	EN 12467:2012 Sec 5.5.3 & 7.4.2
Soak-Dry Category A		Pass	EN 12467:2012 Sec 5.5.5 & 7.3.6
Swelling & Thickness	Wet	<0.2%	EN 317:1993
TVOC, Formaldehyde	0	Pass	ISO 16000-3, 6,9 & 11: 2006 & 2011
Calorific Value		0.1092 to 0.2554	UNE-EN ISO1716 & 1182:2011
Thermal Resistance m^2.K/W		0.027 & 0.045	ASTM C518-10
Thermal Conductivity W/mk		0.44	ASTM C518-10
Fire classification building		Class $A1_{FL}$	EN 13501-1:2007+A1:2009
Flame Spread & Combustibility	0 / 0 / 0	Class A1 / Class 1	ASTM E84-12a
Flame Spread & Combustibility	0 Flame / 5 Smoke Development		ASTM E2768-11
Flame Spread & Combustibility	0 / 0 / 0	Class A1 / Class 1	AS1530.1
FRL Performance	>120min		ASTM E119
FRL Performance	Exterior Facade	Pass	AS 5113
FRL Performance	Exterior & Interior Wall Lining	Pass	AS 1530.4
FRL Performance	Exterior & Interior Wall	Pass	BS 476 p22
FR Performance	Exterior & Interior Wall		BS 476 p4, 5, 6, 7 & 11
Freeze thaw		Passed	ASTM C1185-08 (2012)
Nail-Head pull through (N)	789		ASTM D1037-12 (Section 15)
Lateral nail resistance (N)	2278		ASTM D1037-12 (Section 13)
Falling ball impact	Unbroken @ 3mtr heights	Passed	ASTM D1037-12 (section 21)
Diaphragm capacity		Passed	ASTM E455-11 & AS/NZS2908.2:2000

Additional Supporting Evidence:

- Fenestration Test Reports ASTM E72, ASTM E330-02, TAS 201-94, TAS 202-94 & TAS 203-94.
- FAB Test Reports ASTM E455-11.
- FAB Test Report ASTM E386.
- USQ Test Report ASTM E72.
- BRANZ Test Report ASTM C518-10.
- SGS Test Report EN13501-1:2007 Class A1.
- SGS Test Report EN13501-1:2007 Class A1FL.
- SGS Test Report ISO 5660-1:2002.
- Warrington's Laboratories (UK) BS:476.22
- IGNIS Fire Laboratories AS:1530.1
- IGNIS Fire Laboratories AS:1530.3
- IGNIS Fire Laboratories AS:5113
- IGNIS Fire Laboratories AS:1530.4
- SGS Test Report AS/NZS 1530.4-2005.
- SGS Test Report AS/NZS 3837:1998.
- FAB Test Reports AS/NZS 2908.2-2000.
- University Auckland Test reports AS/NZS4063.1:2010.
- APL Test Reports AS/NZS 4284:2008 and NZS 4211:2008 / E2 VM1.
- CSIRO Fire test report.
- CSIRO Report to AS1530.4.
- CSIRO Report Magnesium Oxide Board Lined framed wall system.
- ALS Group VOC Test Report.
- NRC Test Report GB/T 10295-2008.
- Killargo Test Report ISO10140 Airborne Sound.

Notice: