

Evaluation Report

For



CMI-ER3100R-2

Revision May 2016



Scope & Summary of Evaluation Report

MgO Corp "ResCom[®]" is a magnesium oxide cold ceramic sheeting.

MgO Corp "ResCom[®]" are construction, insulation and decoration panels that can be used in interior and exterior surfaces of all buildings. MgO Corp "ResCom[®]" can be shaped to suit various configurations can be joined and can be joined using normal building practices.

MgO Corp "ResCom[®]" 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.

MgO Corp "ResCom[®]" can be used with insulating materials such as ESP, XPS, Rock Wool, Fibreglass and polyurethane foam that provide high heat, sound, and fire insulation for partition walls and sandwich panels.

Evaluation Report Holder

Magnesium Oxide Board Corporation Pty Ltd In Association with MgO Corp America LLC

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The company named above has been awarded this Evaluation Report for the product described herein. The product has been assessed by CMI as being fit for its intended use provided it is installed, used, and maintained as set out in related documents, including this Evaluation Report. CertMark is a registered accredited certification body under ISO17065.

	Date of Revision 8/05/2016	08/05/2019
John C Thorpe CertMark International	Date if original issue 29/09/2015	Date of expiry

Evaluation Scope

Compliance with the following codes:

- 2015 International Building Code® (IBC)
- 2015 International Residential Code® (IRC)

Properties evaluated:

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

Validity of Opinion

Condition:

This CMI Evaluation Report applies only to product described herein.

Withdrawal:

The CMI Evaluation Report will be withdrawn or amended if CMI considers that a change in any documentation, design or manufacturing quality renders the basis of the Certification or Evaluation Report invalid, or if reported field experience convinces CMI of unsatisfactory quality or performance.

Term of Validity:

This CMI Evaluation Report will lapse two years after the date of issue unless revalidation has been granted.

Use

MgO Corp "ResCom®" is 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. MgO Corp "ResCom®" can be used as structural sheathing applied to interior and exterior wood-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.

Evidence Submitted

- Data in accordance with the ICC-ES Acceptance Criteria for Fiber-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 Fiber-cement Interior Substrate Sheets Used in Wet and Dry Areas (AC378), dated August 2012.

Evaluation Report Opinion Extract

Subject to the following Conditions & Limitations:

- a. Must be installed in accordance with Report holders published manual.
- b. Specific sound resistance varies with board thickness, consult manufacturers specifications for applicable $R_w + C_{tr}$.
- c. Full technical information is available at www.mgoboard.com.au or upon request.

Inspections:

CMI Evaluation Report representatives have inspected installations of the systems and found the level of performance satisfactory.

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Appraisal

DESCRIPTION

MgO Corp "ResCom[®]" products 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. MgO Corp "ResCom[®]" 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. MgO Corp "ResCom[®]" are classified as noncombustible building materials in accordance with ASTM E136.

MgO Corp "ResCom[®]" is a lightweight and integrated insulating, cladding and finishing systems for new residential and commercial constructions.

MgO Corp "ResCom[®]" 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.

MgO Corp "ResCom[®]" sheeting can be used in place of traditional gypsum drywall as wall and ceiling covering material and sheathing. It may as flooring and a number of other construction applications such as:

- Fascia's
- Soffit
- Shaft-liner
- Substrates for coatings and insulated systems such as finish systems, EIFS, and some types of stucco.

Benefits

MgO Corp "ResCom[®]" products 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.
- Due to its structure, it can be painted with any paint or coated with any render.
- 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 like cement-based 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).
- Standard test method of Surface burning Characteristics of building materials ASTM E84-12a
- Waterproof (Freeze/Thaw-Tested for 36 months).
- Mold/fungus/bug free (non-nutritious to mold, fungus, insects ASTM G-21).
- Impact-resistant (ASTM D-5628).

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- NYC Approved (MEA # 359-02-M).
- Silica/asbestos free.
- STC-Rated 53 to 54.

Design & Installation

Design:

Transverse Load Resistance: When installed in accordance with Section 4.2 of this report, MgO Corp "ResCom[®]" 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, MgO Corp "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 shearwall height-to-length aspect ratio of 1-to-1. Use of MgO Corp "ResCom[®]" as shearwall sheathing is limited to resisting wind loads and seismic loads in Seismic Design Categories A, B and C.

Installation:

MgO Corp "ResCom[®]" must be installed on wood framing members spaced not more than 16" (406 mm) on center 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 center around the perimeter and 12" (305 mm) on center in the field.

Paint and renders:

- MgO Corp "ResCom[®]" panels are compatible with commercially available paint or render systems.
- MgO Corp 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 is prepared using C, U, galvanised or box profiles.
- MgO Corp "ResCom[®]" are fixed on both surfaces using countersunk head screws, using rock wool or fibre glass depending on the FRL and Rw qualities of the wall systems using as standard .31", .40", .50", & .63" (8mm, 10mm, 12mm, 14mm & 16mm) panels.

Roof Application:

- As per the installation manual .50", .47" & .63" (12mm, 14mm & 16mm) MgO Corp "ResCom[®]" is used instead of wood based plates.

Suspended Ceiling Construction:

- MgO Corp "ResCom[®]" 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) MgO Corp "ResCom[®]" panels are used.

Raised Floor Construction:

- MgO Corp "ResCom[®]" used in raised floor construction are done panels with a minimum of .50" to 1.97" (14mm to 50mm) thickness in structural load bearing panels.
- Raised floor construction is only to be used with either iron profiles or ready-made fixed legged and belted raised floor systems.
- Recommended adhesives for flooring use include ceramic adhesive mortar, flexmortel, polyurethane foam and acrylic mastic.
- MgO Corp "ResCom[®]" can be fixed to either a timber frame or a lightweight metal frame. 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 brochure MgO Corp "ResCom[®]" must be supported and fixed to the frame and must not be joined without fixing the frame.
- Maximum frame centres for fixing sheets to the frame is 23.62" (600mm) centre to centre.
- 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.

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Sheet Layout:

- MgO Corp "ResCom[®]" 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 where ever 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 fascias, spandrels, parapets etc.

Sheet installation:

- When installing the MgO Corp "ResCom[®]" sheets 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 MgO Corp "ResCom[®]" 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:

- MgO Corp "ResCom[®]" can be fixed directly to lightweight metal frame which complies with AS3623; however the metal frame should not exceed .06" (1.6mm) in thickness.
- 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 MgO Corp "ResCom[®]" 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.

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Conditions of Use

MgO Corp "ResCom[®]" as described in this Evaluation Report complies with, and is a suitable alternative to what is specified in the codes listed in this 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.
- 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 MgO Corp "ResCom[®]" as floor sheathing or floor underlayment is outside of the scope of this Evaluation Report.
- Installation of a vapor retarder in exterior walls must be in accordance with code requirements.
- MgO Corp "ResCom[®]" 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.
- Use of the panels in horizontal diaphragms is outside of the scope of this Evaluation Report.
- MgO Corp "ResCom[®]" is covered by this Evaluation Report only when manufactured by a factory under a quality control program with inspections undertaken by CMI. These currently include: Tanyi Town, Feixian Country and Shandong China (Mainland).
- Under the IRC, the substrate sheets must not be used in wet areas unless treated with a suitable waterproofing membrane.

Cyclic Pressure Water Penetration:

Test Pressure (Pa)	Duration (mins)	Comments
227 - 455	5	No water penetration observed
303 - 606	5	No water penetration observed
455 - 910	5	No water penetration observed

No water penetration was observed through the Southpark Corporation Ltd MgO cladding test sample.

Identification

Each panel bears MgO Corp Pty Ltd's Brand Products name, the product name, the evaluation report number, and the name of the inspection agency. - ResCom[®], CMI-ER31004, CertMark International Pty Ltd.

Basis of The Evaluation Report

CMI Evaluation Report has assessed the following aspects in undertaking:

- a) Manufacturing and quality control procedures.
- b) Installation procedures.
- c) Physical Properties.
- d) The ability of the installation and performance details to meet the requirements of the IBC 2015.
- e) The ability of the installation and performance details to meet the requirements of the IRC 2015.
- f) In relation to meet the fit for purpose application under the BCA Code of Australia 2015.
- g) In relation to meet the fit for purpose application under the NZBC Code of New Zealand 2015.

Bibliography

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

Manufacturer's and Installation Information:

- MgO Corp Board[™] Installation Manual (GIM-Edition 3-2014) or the MgO Corp Board[™] Fire and Acoustic Walls, Ceilings and Floors Installation Manual (FIM-Edition 4-2014).
- Technical Construction drawings supplied by MgO Corp and available on the MgO Corp website: www.mgoboard.com.au
- Technical data sheets and in house laboratory results supplied by the manufactures NATA accredited testing facility and others.

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Test Reports:

- SGS Test Report ASTM D1037.12 Sections 13.15, and 21.
- SGS Test Report ASTM C473.12.
- SGS Test Report ASTM C1186-08.
- SGS Test Report ASTM E84-12a.
- 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.
- 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.
- Palmer Acoustics AS/NZS 1276.1.
- Kilargo Test Report ISO10140 Airborne Sound.
- New York Product Testing Services Inc for Fire Tests of Building Construction and Materials, beams, building construction, building materials, ceiling assemblies.
- Southwest Research Institute Test fire-test-response test method which covers the determination under specified laboratory conditions of combustion characteristics of building materials.
- BRE testing report to BS 5234-2:1992 for Partitions, Construction systems parts, Wall linings, Walls, Non-load bearing walls.
- New York Product Testing Services Inc Report Standard Test Methods for Fire Tests of Building Construction and Materials, beams, building construction, building materials, ceiling assemblies.
- New York Product Testing Services Inc Report Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi, fungal biosusceptibility, fungal decay.
- Report from DR Thomas Haupmann/ Anbus Analytical of Essen in Germany, Organ-chemical material Analysis.
- New York Product Testing Services Inc Report, Smoke density, Toxicity, Modus of elasticity, Shear Strength, Shear Modulus, tensile strength.
- New York Product Testing Services Inc Report, measurements of surface flame spread and smoke density measurements.
- Red Test Report, Determination of the fire resistance of uninsulated door-sets and shutter assemblies.
- PSB Test Report, spread of flame.
- PSB Test Report fire propagation.
- RED Report Fire Test on Building materials & Structures – Non combustibility Test for materials.

Other Documents:

- MgO Corp Board™ Installation Manual (GIM-Edition 3-2014).
- MgO Corp Board™ Fire and Acoustic Walls, Ceilings and Floors Installation Manual (FIM-Edition 4-2014).
- ResCom® GIM-Edition 3.
- ResCom® FIM-Edition 5.
- ResCom® Reference Manual.

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