

## 1. Scope

1.1 This standard defines the minimum prescriptive quality and performance requirements for Fiber-reinforced Magnesium Cement Board products intended for use in buildings in North America. For the purpose of this standard, Magnesium Cement Board is defined as a *Mineral composite panel product, fibreglass reinforced, consisting primarily of magnesium oxide, magnesium sulphate and/or magnesium chloride, intended for use as a building material.*

1.2 The standard classifies magnesium cement board into five product grades as follows;

“G Grade” – General interior use, and interior wet use. Applications include interior wallboard and tile backer board. All board materials of higher grade shall also meet the G requirements.

“E Grade” – Exterior use. Applications include siding and outdoor applications that allow for direct weather exposure.

“NC Grade” – Non-combustible for Canada; meets the requirements of CAN/ULC S 114.

“S Grade” – Structural grade. Applications include SIP panels and wall and floor sheathing; meets impact and racking shear and other structural requirements, and shall be 7/16” (11 mm) minimum thickness.

“FR Grade” – Fire Resistant grade. Eligible for used in MOCA fire resistant wall and floor/ceiling assemblies.

1.3 Quality Control and Certification – Products conforming to this standard shall be Listed or certified by a North American accredited third party certification agency (ULI, Intertek, QAI Laboratories etc.) and be produced in accordance with a MOCA accepted quality control manual.

## 2. Referenced Documents

ASTM E-84 *Standard Test Method for Surface Burning Characteristics of Building Materials*  
ASTM E 136 *Test Method for Behaviour of Materials in a Vertical Tube Furnace at 750°C*  
ASTM E 119 *Test Methods for Fire Tests of Building Construction and Materials*  
ASTM E 72 *Standard Test Methods of Conducting Strength Tests of Panels for Building Construction*  
ASTM E 330 *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*  
Can/ULC S124 *Standard Methods of Test of Thermal Barriers*  
ASTM C1185  
ICC ES, Inc. AC 367 *Acceptance Criteria for Fiber-Reinforced Cement Sheet Structural Floor Sheathing*  
ICC ES, Inc. AC386 *Acceptance Criteria for Fiber-reinforced Magnesium Oxide-Based Sheets*  
ICC ES, Inc. AC376 *Acceptance Criteria for Reinforced Cementitious Sheets Used As Wall and Ceiling Sheathing and Floor Underlayment*  
ICC ES, Inc. AC 378 *Acceptance Criteria for Reinforced Cementitious Interior Substrate Sheets Used in Wet and Dry Areas*  
ICC ES, Inc AC 10 *Acceptance Criteria for Quality Documentation*  
JC 688-2006 *Professional Standard of the People's Republic of China Glass Fiber & Magnesium Cement Board*  
BS EN 12467:2000 *British Standard Fiber-cement flat sheets- Product specifications and test methods*  
CAN/ULC S114 *Standard Method of Test For Determination of Non-combustibility in Building Materials*  
CAN/ULC S101 *Standard Methods of Fire Endurance Tests of Building Construction and Materials*

## 3. Grade Specific Requirements

3.1 All products covered by the MOCA standard shall meet the G Grade requirements in addition to the requirements for other applicable product grades.

### 3.2 G Grade requirements

3.2.1 Chloride Ion Content –Maximum 5% when tested to JC 688-2006 *Glass Fiber & Magnesium Cement Board*.

3.2.2 Surface Burning Characteristics - Flame spread Rating of 10 or less, and Smoke Developed Rating of 5 or less when tested to ASTM E 84.

3.2.3 Non-combustibility (USA) – shall meet the requirements of ASTM E 136 (see section 3.2.8).

3.2.4 Dimensions and tolerances – Per ASTM C1185 and C1186; Length and Width tolerance +/- 2.5 mm, thickness tolerances: < 6 mm +/- 0.20 mm, 6-10 mm +/- 0.30 mm, >10 mm +/- 0.4 mm, Density tolerance +/- 10%. Squareness tolerance: +/- 4 mm. Density tolerance shall be – 0%, +10%.

3.2.5 Surface Finish of Exposed Face – Finish shall be uniform and smooth in surface with no ripple, grooves or cracks, and no bubbles or other visible defects. Corners shall be square. There shall be no delamination visible at face or at edges.

3.2.6 Delivery Moisture Content – Maximum 8% based on dry weight.

**3.2.7 Mechanical Properties -**

Mechanical Property	Test Method	Minimum Required Value	Maximum Required Value
Flexural strength	ASTM C 1185	580 psi (4000kPa)	N/A
Freeze/Thaw Cycling	ASTM C 666	5 specimens- 25 cycles with no disintegration	N/A
Moisture Movement	ASTM C 1185	N/A	0.05% from 30-90% MC
Water Absorption	ASTM C 473	N/A	10% by weight after 48 hrs
Humidified Deflection	ASTM C 473	N/A	0.0639" ( 1.6 mm)
Compression Indentation	ASTM D 2394	N/A	1250 psi (8620 kPa) at < 0.05" ( 1.3mm), 5 specimens
Nail-head Pull-through	ASTM D 1037	125 psi (560 N), nail head 0.375" (10 mm), 5 specimens	N/A
Fastener Lateral Load	ASTM D 1037	< ½" (12.5 mm) -60 lbf (Kg mm) >½" (12.5 mm) -90 lbf	N/A
Falling Ball Impact	ASTM D 1037	12" (305 mm) drop, no damage, 5 specimens	N/A
Shear Bond Strength	ANSI A 118.1	50 psi (345 kPa) at 7 days for Dry-set Portland Cement and Latex-Portland Cement Mortar	N/A
Mold Resistance	ASTM G 21	No growth	N/A

**3.2.8 Products Containing EPS Aggregate (do not comply with ASTM E136)**

To verify that no thermal barrier is required, compare performance to ½" conventional gypsum wallboard conforming to ASTM C 1396. Room fire tests shall be conducted in accordance with NFPA 286 or UL 1715, and maximum heat release rate, total heat release rate and smoke generation shall be no greater than for gypsum wallboard.

**3.2.9 Fiber Glass Reinforcing Mesh Alkali Resistance**

Fiber glass reinforcing mesh shall be alkali resistant such that the product structural characteristics are retained for at least 10 years. Accelerated aging under elevated temperature and humidity with subsequent structural testing is required to ensure conformance to this requirement.

### **3.3 E Grade requirements**

3.3.1 Freeze/Thaw Performance – Shall survive 100 cycles with no deterioration when tested to ASTM C 666, 5 specimens required.

3.3.2 Minimum Panel Thickness – 7/16” (11 mm).

3.3.3 If a component of an exterior wall assembly containing doors and windows, may require testing for air/water/structural performance in accordance with ASTM E 330.

3.3.4 For siding on non-combustible construction in Canada, products that do not meet the requirements of CAN/ULC S114 non-combustibility shall be tested to CAN/ULC S 135 for determining heat release rate.

### **3.4 NC Grade requirements**

3.4.1 NC Grade covers boards that comply with the Canadian Building Codes for construction that is required to be non-combustible. Products shall comply with CAN/ULC S114 test method. This method requires the testing of a small (35 mm X 35 mm X 50 mm) cube of the material in a tube furnace at 750 °C similar to ASTM E 136. There are limitations to temperature rise, flaming and the maximum allowable weight loss is 20 %.

### **3.5 S Grade requirements**

3.5.1 S Grade panels shall be tested for resistance to transverse loads and racking loads as applicable, in accordance with ASTM E 72. Tests shall be conducted on 3 panels for each loading arrangement to be tested. The Test installation shall conform to the installation and fastening requirements supplied by the manufacturer, however adhesives shall not be used. The resulting allowable loading values shall be based on a design factor of three applied to the average ultimate load from each test configuration.

3.5.2 Structural Insulated Panels (SIP)

Structural insulated panels are proprietary systems. In this case structural performance qualification testing is required. If the MgO board is used for protection of foam plastic, thermal barrier testing in accordance with CAN/ULC S 124 for Canada, or UL 1715 for the USA is required.

### **3.6 FR Grade requirements**

3.6.1 FR Grade panels shall be tested for fire resistance as a component of a wall or floor/ceiling assembly. Testing shall be performed in accordance with ASTM E 119 for the USA and CAN/ULC S101 for Canada.