



HOME of MAGNUM BOARD®

“The New Generation **GREEN** Building Material”

“Install It for Health & Safety-Install It for Life”

Sheathing, Flooring & Roofing Substrate & Siding Products

MAGNUM “MgO” FIBER REINFORCED BUILDING MATERIALS

CERTIFIED TEST SUMMARY

Magnum Board® Fiber Reinforced MgO Building Materials are the most tested and certified MgO building materials in the World. Certifications include International Code Council (ICC) to ASTM test methods and standards, Underwriters Laboratories (UL), and Conformité Européenne (CE) for fire testing.

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| TECHNICAL BULLETIN No.: | 070115.1451 |
| Subject: | Magnum Product Certified Testing Summary & Product Specifications –MBP-IP LLC |
| Industry Specification | ICC - Acceptance Criteria (AC308) For Fiber-reinforced Magnesium-Oxide-based Sheets ¹ |
| Test Procedures | ASTM and UL Test Procedures with additional testing for specific products and as required. |
| Original Issuance Date: | July 1, 2015 |
| Revision No., / Revised (Month / Year).: | XXXV / April 2024 |



¹ ICC -Acceptance Criteria (AC386) will be represented as ICC-AC386 throughout this document (See List of Acronyms).

Standard Density Structural and Performance Product Testing Conducted by:

RADCO – Long Beach, CA.

Test Report Numbers: RAD-4224, RAD-4224-S1 and RAD-4451, Rev. 1

PRI Construction Materials Technologies, LLC – Tampa, FL

Test Report Numbers: MBP-001-02-01, MBP-002-02-01, MBP-003-02-01, MBP-004-02-01
and MBP-005-02-01

Fire Testing Conducted / Witnessed by:

Southwest Research Institute – San Antonio, TX

Test Report Numbers: 01.1521.01.101c, 01.11813.02.046, 01.11810.165a,
01.11810.01.165b and 01.11850.01.431

Underwriters Laboratories – Northbrook, IL

File Number: R26120 USA Design Number UO61

Underwriters Laboratories – Toronto, Canada

Design Number W490

Exova Warrington Fire – North America

Report Number: 13-002-529 (A)

SGS Testing Labs

Report Number: AJFS1805004403FF-01

Additional Testing Conducted By

EMSL Analytical – Cinnaminson, NJ

Intertek

Florida Product Approval

Magnum MgO Building Materials has achieved Florida Product Approval.
Please refer to report ICC-ES Evaluation Service Report (ESR) 2880.

LIST OF ACRONYMS

| Acronym | Item |
|---------------------------------|--|
| AC | Acceptance Criteria |
| ANSI | American National Standards Institute |
| ASTM | ASTM International |
| BXUV | UL Fire Resistance Product Code |
| CCMC | Canadian Construction Materials Centre |
| CE | Conformité Européenne |
| EN | Europäische Norm ("European Norm") |
| ICC-ES ESR 2880 | International Code Council Evaluation Service Report 2880 |
| FBC | Florida Building Code |
| HSC | Hygrometric Coefficient of Expansion |
| IAW | In Accordance With |
| ICC Acceptance Criteria (AC386) | ICC-AC386 |
| Kpa (kPa) | Kilopascal |
| LBF | Pound-Force |
| LEED | Leadership in Energy and Environmental Design |
| mm | millimeter |
| OSB | Oriented Strand Board |
| Psf | Pounds per square foot |
| psi | Pounds per square inch |
| RH | Relative Humidity |
| R Value | Thermal Resistance |
| SDS | Safety Data Sheet |
| STC | Sound Transmission Class |
| TBA | TO Be Annouced |
| UL | Underwriters Laboratory |
| ULC | Under Writers of Canada |
| USA | United States of America |
| WVT | Water Vapor Transmission |

| <u>TEST RESULTS</u> | | | |
|---|---|---------------------------|--|
| TEST / STANDARD | RESULTS | | |
| Flexural Strength ASTM C1185 | AS RECEIVED | | |
| | <u>THICKNESS</u> | <u>DIRECTION</u> | <u>AVER FLEXURAL STRENGTH (PSI)</u> |
| | 6mm | Machine | 2296 PSI |
| | | Cross | 2054 PSI |
| | 10mm | Machine | 1900 PSI |
| | | Cross | 1694 PSI |
| | 12mm | Machine | 1038 PSI |
| | | Cross | 1508 PSI |
| | SATURATED | | |
| | <u>THICKNESS</u> | <u>DIRECTION</u> | <u>AVER FLEXURAL STRENGTH (PSI)</u> |
| | 6mm | Machine | 2,023 PSI |
| | | Cross | 1,707 PSI |
| | 10mm | Machine | 1,376 PSI |
| | | Cross | 1,068 PSI |
| 12mm | Machine | 1,110 PSI | |
| | Cross | 649 PSI | |
| | ICC-AC 386 specifies a minimum average flexural strength of 580 psi. Magnum Board® exceeds this requirement. | | |
| Compressive Strength ASTM D2394 | <u>THICKNESS</u> 12mm | <u>PSI</u> 3190 | |
| | NOTE: In-House test results exceeds the requirements of D2394. | | |
| Dimensions and Tolerances per ASTM Section C1325-04 of ASTM C1186 | Length: Meets requirements of section 7.4 of ASTM C1186 Width: Meets requirements of section 7.4 of ASTM C1186 Thickness: Meets requirements of section 7.5 of ASTM C1186 Squareness: Meets requirements of section 7.6 of ASTM C1186 Edge Straightness: Meets requirements of section 7.7 of ASTM C1186 Surface Finish: Front surface finish is glass smooth. Back side can be either coarse back or rolled back. | | |
| Moisture Movement ASTM C1186 | <u>Thickness</u> | <u>Direction</u> | <u>Average Dimensional Change</u> |
| | 6mm | Machine | 0.01% |
| | | Cross | 0.03% |
| | 10mm | Machine | TBA |
| | | Cross | TBA |
| | 12mm | Machine | 0.004% |
| | Cross | 0.003% | |
| Water Absorption ASTM C1186 | 12mm = 23% | | |
| Standard Test Method for Resistance to Growth of Mold and Mildew ASTM D3273 | Magnum Board® is ranked 10 for 10 and exceeds the requirements of test method ASTM D3273. Magnum Board® is not a nutrient for mold and /or mildew. | | |
| Compression Indentation ASTM C1325 | No residual deformation was noted following loading and the rest period. Exceeds requirements of C1325. | | |

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|--|--|---------------|--------------------------------------|----------|--------|-------|--------|
| Nail Head Pull Through ASTM C1325 | 12mm = 174.lbs Magnum Board® exceeds the requirements of C1325 | | | | | | |
| Falling Ball Impact ASTM C1325 | All Magnum Board® specimens exceed the 12" requirements per C1325 by nearly 2x | | | | | | |
| Shear Bond Strength ASTM C1325 | <table border="0"> <tr> <td>Mortar</td> <td>Average Shear Strength –(PSI)</td> </tr> <tr> <td>Portland</td> <td>168.82</td> </tr> <tr> <td>Latex</td> <td>234.32</td> </tr> </table> <p>Magnum Board® exceeds the requirements of C1325 NOTE: Refer to endorsement by Mapei and the Mapei installation instructions for backer board.</p> | Mortar | Average Shear Strength –(PSI) | Portland | 168.82 | Latex | 234.32 |
| Mortar | Average Shear Strength –(PSI) | | | | | | |
| Portland | 168.82 | | | | | | |
| Latex | 234.32 | | | | | | |
| Humidified Deflection ASTM C1396-06A | Magnum Board® exceeds requirements of test protocol ASTM C1396-06A and ICC-AC386 | | | | | | |
| Surface Burning Characteristics ASTM E84-05 | 6mm - - Classification A 12mm - - Classification A Magnum Board® exceeds the test criteria presented in test protocol ASTM E84-05 and is classified as non-flammable. | | | | | | |
| Surface Burning Characteristics – Europe EN13501-1:2007+A1:2009 | Reaction to fire classification: A1 Rating | | | | | | |
| Non-Combustible Construction – ASTM E136 | Magnum Board® exceeds the test criteria presented in ASTM E136 and is classified as non-combustible. | | | | | | |
| Underwriters Laboratory Fire Rating UL-263, ULC S101-07, ULC S102-10, ULC S135-04 and ASTM E119 | <p>Exceeds requirements for single 12mm (15/32" layer one (1) hour fire wall rating. File No. R26120 USA Design No. U061, BXUV – Fire Resistance Ratings – ANSI / UL Certified for United States.</p> <p>Canada Design No. – W490 Wall Assembly Design Number S102 for zero smoke develop / zero flame spread BXUV7 – Fire Resistance Ratings – CAN/ULC-S101 Certified for Canada.</p> <p>NOTE: Two (2) hour ASTM E119 single layer wall fire testing has been conducted and hose stream passed, but is not UL certified. This test Conducted by Southwest Research Institute. These tests were conducted on single layer walls. Magnum Board® did not require retesting at one-half the time to pass hose stream as do gypsum based products. These are true one and two hour fire wall test.</p> | | | | | | |
| Xenon Arc Accelerated Weathering ASTM G155 ➤ 20 years of weathering in all weather and temperature conditions. | All five (5) specimens were examined under 5x magnification following 2,000 hours of exposure. No signs of surface cracking, checking, crazing, erosion, or chalking were observed. Magnum Board® exceeds the requirements of ASTM G155 which represents greater than twenty (20) hours of accelerated weathering. Zero defects. | | | | | | |
| Freeze / Thaw ASTM C1185 | Magnum Board® exceeds the requirements of ASTM C1185 and ICC-AC386. Magnum Board® exceeds the combustion toxicity protocol developed at the University of Pittsburgh, and the requirements for interior finish material as defined by Title 27, Chapter 1, subchapter 5, Article 5, of the Building Code of the City of New York. NOTE: Magnum Board® is classified as non-toxic and is carcinogen, asbestos and silica free. | | | | | | |
| VOC Testing ASTM D5116 | Magnum Board® contains NO Toxic VOC's and exceeds the overall requirements of the "US Green Buildings Council LEED Standard for VOC's" | | | | | | |

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| Structural Performance ASTM E72 | Magnum Board® exceeds the structural requirements of ASTM E72 and ICC-AC386. | | | | |
| Permenance (Vapor Transmission) ASTM E96 / ASTM E96M-05 | Results at bottom of this report | | | | |
| Density | All Magnum Board® products range in density from 1.0g/cm ³ to 1.05g/cm ³ (1000kg/m ³ to 1050kg/m ³) except Fire, Roofing and Flooring Substrate which has a density of approximately 1.25 g/cm ³ (1250 kg/m ³). | | | | |
| Surface Texture | Magnum Board® Sheathing Textures Front: Smooth Back: Sanded or Rolled. Magnum 1-11 Front: Wood Grain, Smooth or Sanded Back: Sanded or Rolled Magnum Siding Front: Wood Grain, Smooth, or Sanded Back: Sanded or Rolled | | | | |
| Color | Off white | | | | |
| Basic Compounds | Refer to Magnum Board® SDS which can be obtained from our website: www.magnumbp.com or by contacting our home office. | | | | |
| Transverse Load (IAW) ICC-AC386 – ASTM E72 | | Positive Load Ultimate Failure | | Negative Load Ultimate Failure | |
| | Test Sample | Psf | Kpa | Psf | Kpa |
| | 1 | 133.12 | 6.37 | 111.80 | 5.35 |
| | 2 | 142.48 | 6.82 | 140.82 | 6.74 |
| | 3 | 161.30 | 7.72 | 139.36 | 6.67 |
| | Average. | 145.63 | 6.97 | 130.66 | 6.26 |
| | Standard Deviation | 14.35 | 0.69 | 16.35 | 0.78 |
| | Results of transverse loads exceed the requirements of ICC-AC386. | | | | |
| Wet Racking Shear IAW ICC-AC386 - ASTM E72 Section 15.05 | Test Number | Ultimate Load (LBF) | | LBG / Lineal FT | |
| | 1 | 3,600 | | 450 | |
| | 2 | 3,600 | | 450 | |
| | 3 | 2,900 | | 363 | |
| | Average | 3,367 | | 421 | |
| | Standard Deviation | 404 | | 51 | |
| Standard Test Method to Determine the Coefficient of Linear Thermal Expansion ASTM D696-08 | Thermal Coefficient of Lineal Expansion, al, [in/in-°F] 38-90°F Result: 3.97 X 10 ⁶ | | | | |
| Determine Hygrometric Coefficient of Expansion | Hygrometric Coefficient of Expansion-(HCE), unrestrained, for Magnum® Board, 18mm nominal thickness; [in/in/%RH] 10% - 90% RH Result: 2.08 X 10 ⁵ | | | | |
| Determine the Thermal Coefficient of Linear Expansion of Magnum Board® | Thermal Coefficient of Linear Expansion, 3.97 X 10 ⁻⁶ [in/in-°F] Result: 38 – 90°F | | | | |
| Asbestos | Magnum Board® is Asbestos free | | | | |
| Carcinogens | Magnum Board® is Carcinogen free. Refer to Magnum Board® University of Pittsburgh toxicity test report above. | | | | |
| Formaldehyde | Magnum Board® is formaldehyde free | | | | |
| Off-gassing – The emission of especially noxious gasses | Magnum Board® Products do not off gas | | | | |

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| STC Values | STC-48 based on a standard wall system using 12mm Magnum Board® sheathing on both sides of a wall with either wood or metal stud construction and batts. NOTE: These results are in house test lab results and are not certified by an approved ICC testing laboratory. |
| R Values | Magnum Board® thermal insulation “R” value per inch is 1.2 as compared to: Cement Board 0.8 Plywood 1.2 Gypsum Wallboard 0.9 Gypsum Sheathing 1.1 OSB 1.0 |
| Florida Product Approval | Magnum Fiberglass Reinforced MgO Building Materials are Florida Product approved. Please refer to page 3 of 3, section 2.0 entitled “Conclusions” of our ICC ES ESR-2880 FBC Supplement dated December 2021 thru December 2022 for specific information regarding this approval. |

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Permeance (Vapor Transmission):

Table 1. ASTM E96 results for 3 mm Magnum® Board in U.S. Customary Units

ASTM E96 (Procedure A)
WVT (grains/h·ft²) 3.67 0.43
Permeance (Perms) 8.93

ASTM E96 (Procedure B)
WVT (grains/h·ft²) 13.9
Permeance (Perms) 34.0

Table 2. ASTM E96 results for 3 mm Magnum® Board in SI Units

ASTM E96 (Procedure A)
WVT (g/h·m²) 2.55
Permeance (ng/Pa·s·m²) 511

ASTM E96 (Procedure B)
WVT (g/h·m²) 9.7
Permeance (ng/Pa·s·m²) 1,947

Table 3. ASTM E96 results for 18 mm Magnum® Board in U.S. Customary Units

ASTM E96 (Procedure A)
WVT (grains/h·ft²) 1.40
Permeance (Perms) 3.42

ASTM E96 (Procedure B)
WVT (grains/h·ft²) 6.78
Permeance (Perms) 14.6

Table 4. ASTM E96 results for 18 mm Magnum® Board in SI Units

ASTM E96 (Procedure A)
WVT (g/h·m²) 0.98
Permeance (ng/Pa·s·m²) 196

ASTM E96 (Procedure B)
WVT (g/h·m²) 4.17
Permeance (ng/Pa·s·m²) 836

IMPORTANT NOTES – PLEASE READ BEFORE SPECIFYING

1. For technical details, refer to Magnum Board® specifications.
2. For installation instructions, refer to specific Magnum Board® product installation instructions.
3. See footer for contact instructions