ICC-ES Evaluation Report

ESR-4642

Reissued October 2025

Subject to renewal October 2026

This report also contains:

- City of LA Supplement
- CA Supplement
- FL Supplement

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DIVISION: 09 00 00—FINISHES **Section: 09 28 15—Magnesium Oxide Backing Panels**	**REPORT HOLDER: TWIN OAKS MADISON, LLC** **ADDITIONAL LISTEE: JINCHENG MAGNESIUM MATRIX (JIANGSU) INTERNATIONAL TRADE CO., LTD.**	**EVALUATION SUBJECT: MAGMATRIX MAGNESIUM OXIDE (MGO) SULFATE BOARD**	

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2021, 2018 and 2015 *International Building Code*® (IBC)
- 2021, 2018 and 2015 *International Residential Code* (IRC)

Properties evaluated:

- Structural
- Physical properties
- Non-combustibility
- Surface-burning characteristics
- Fire-resistant-rated Assembly

1.2 Evaluation to the following green standards:

- 2020, 2015, 2012 and 2008 ICC 700 *National Green Building Standard™* (ICC 700-2020, ICC 700-2015, ICC 700-2012 and ICC 700-2008)

Attributes verified:

See Section 3.0

2.0 USES

Twin Oaks MagMatrix MgO sulfate boards are intended for use in any type of construction as exterior structural sheathing (½-inch-thick boards only), floor underlayment and 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. The boards may also be used as interior and exterior facers for sandwich panels. When used in fire-resistant-rated construction, the boards must be installed in wall assembly complying with Section 4.3 of this report.

3.0 DESCRIPTION

Twin Oaks MagMatrix MgO sulfate boards are magnesium-oxide sheets, reinforced with fiberglass mesh on both faces. The boards are available in nominally 1/4 inch (6 mm actual), 1/2 inch (12 mm actual), and 11/16 inch (18 mm actual) in thicknesses, 4 foot (1220 mm) in width and 8 feet (2440 mm) and 10 feet (3050 mm) in lengths.

The flexural strength of the boards exceeds the minimum average flexural strength of 580 psi (4000 kPa), when tested in accordance with ASTM C1185.

The boards exhibit no humidified deflection when tested in accordance with ASTM C473 and the change in length of 0.11 percent maximum in the machine direction and 0.23 percent maximum in the cross-machine direction, based on a relative humidity change from 30 to 90 percent, when tested in accordance with ASTM C1185.

The boards have a nail-head pull-through resistance of 96 lbf (427 N), when tested in accordance with ASTM D1037.

The boards are classified as noncombustible materials when tested in accordance with ASTM E136 and Class A interior finish materials when tested in accordance with ASTM E84.

The attributes of the Twin Oaks MagMatrix MgO sulfate boards have been verified as conforming to the provisions of (i) ICC 700-2020 Sections 602.1.11, 11.602.1.11, 1202.8 and 13.104.16; (ii) ICC 700-2015 and ICC 700-2012 Sections 602.1.11, 11.602.1.11 and 12.1.602.1.11; and (iii) ICC 700-2008 Sections 903.1 for tile backer board. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 Use As Structural Sheathing on Walls: Twin Oaks MagMatrix MgO sulfate ½-inch-thick boards may be used as exterior wall sheathing. Use on exterior walls requires the boards to be protected by a water-resistive barrier in accordance with IBC Section 1402.2. When installed in accordance with Section 4.2 of this reports, the sheathed walls are limited to the allowable uniform loads as described in Table 1. When installed in accordance with Section 4.2 of this report, the sheathed walls are limited to the allowable shear resistance values shown in Table 2. Use of the panels for shear resistance is limited to resisiting wind loads and seismic loads in Seismic Design Categories A, B and C.

4.1.2 Use as Floor Underlayment: Twin Oaks MagMatrix MgO sulfate boards may be used as floor underlayment on top of structural subfloor and framing sized and constructed to meet applicable building code requirements.

4.2 Installation:

4.2.1 General: Installation of boards must be in accordance with this report and the manufacturer's published installation instructions.

4.2.2 Shear Wall Applications: Twin Oaks MagMatrix MgO sulfate ½-inch-thick boards must be installed on wood framing members spaced not more than 16 inches (406 mm) on center. Sheathing must be installed vertically. Framing members must be nominal 2x lumber with a minimum specific gravity of 0.50. All panel joints and edges must be backed by framing. Shear wall values in Table 2 are limited to walls with a 1:1 aspect ratio for use in Seismic Design Categories A, B and C. The boards must be attached to framing using a minimum of 0.113-inch by 2.5-inches (2.87-mm by 63.5 mm) long ring shank nails with minimum 3/8-inch (9.5 mm) distance to edges at the joints and minimum ¾-inch (19.1 mm) distnance to outer edges of board around perimeter. The faster spacing shall be 8 inches (203 mm) on center perimieter and field.

4.2.3 Other Wall Applications: Twin Oaks MagMatrix MgO sulfate ½-inch-thick (12.7 mm) boards not used for shear walls must be installed in accordance with Section 4.2.2.

4.2.4 Use as Floor Underlayment: Twin Oaks MagMatrix MgO sulfate boards must be fully supported by structural subfloor designed to limit the maximum deflection, including live and dead loads, to L/360 of the span, in accordance with the applicable code.

4.3 Fire-resistant-rated Wall Assembly

4.3.1 Two-hour Fire-resistance-rated Load Bearing Wall (Full design load): Two layers of ½-inch-thick boards must be installed on each side of 3.5-inch by 1.62-inch (88.9 mm by 41.1 mm) by 20 ga. [0.033-inch-thick (0.838 mm)], 33 ksi (28 MPa) C steel studs spaced 24 inches (610 mm) on center in a vertical orientation with all board edges backed by framing. The stud cavity must be filled with 3-inch-thick (76.2 mm), 4 pcf (64 kg/m^3) Rockwool™ Cavityrock® mineral wool insulation. The base layer of the boards must be attached to framing using Type S-12 self-drilling bugle head screws at 12 inches (305 mm) on center at the perimeter

and field. The face layer of boards must be attached to the framing with 1.625-inch-long (41.2 mm) Type S-12 self-drilling bugle head screws at 12 inches (305 mm) on center, staggered 6 inches (152.4 mm) from the base layer fasteners. Screws at vertical joints must be located within ½-inch (12.7 mm) of the board edges. Screws at the perimeter from the outside edges of the boards must be located ¾-inch (19.1 mm) and screws along the horizontal joints must be located 1 inch (25.4 mm) from the board ends.

5.0 CONDITIONS OF USE:

Twin Oaks MagMatrix MgO sulfate board described in this report complies with, or is a suitable alternative to what is specified in those codes listed in Section 1.0 of his report, subject to the following conditions:

5.1 The Twin Oaks MagMatrix MgO sulfate boards 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.

5.2 The supporting framing shall be designed for a maximum allowable assembly deflection of L/360 under applicable loads for exterior and interior walls.

5.3 The boards must not be exposed to the weather and must not be used in wet areas as defined in IBC Section 2509. Under the IRC, the boards must not be used in showers.

5.4 Installation of vapor retarder in exterior walls must be in accordance with code requirements.

5.5 Fasteners and metal components in contact with boards must be corrosion resistant or be separated by non-metallic material.

5.6 The ½-inch-thick boards when used as a component of shear walls, are limited to use in Seismic Design Categories A, B and C under the IBC and IRC.

5.7 Use of boards in fire-resistant rated construction must comply with Section 4.3 of this report.

5.8 The boards used as exterior sheathing must be covered by code approved water-resistive barrier and exterior wall covering.

5.9 Exterior wall coverings (siding) installed over boards must be installed in accordance with the code into the framing.

5.10 The Twin Oaks MegaMatrix MgO sulfate boards are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Data of physical properties in accordance with the ICC-ES Acceptance Criteria for Fiber-reinforced Magnesium-oxide-based Sheets, AC386 (24) 3rd Edition, published April 2025, excluding Appendix A regarding the corrosion effects in contact with common metals requirements.

6.2 Data in accordance with applicable sections of the ICC-ES Acceptance Criteria for Reinforced Cementitious Sheathing and Floor Underlayment (AC376), dated August 2012 (editorially revised January 2021).

6.3 Data in accordance with applicable sections of the ICC-ES Acceptance Criteria for Reinforced Cementitious Interior Substrate Sheets in Wet and Dry Areas (AC378), dated August 2012 (editorially revised January 2021).

6.4 Data in accordance with ASTM E136 and ASTM E119.

7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4642) along with the name, registered trademark, or registered logo of the report holder or the listee, must be included in the product label.

7.2 In addition, each Twin Oaks MagMatrix sulfate board shall be identified by a stamp or label on the board bearing the name and address of the report holder (Twin Oaks Madison, LLC), the board name (MagMatrix MgO Sulfate Board), and the thickness.

Alternatively, each Jincheng Magnesium Matrix MagMatrix sulfate board shall be identified by a stamp or label on the board bearing the name and address of the listee (Jincheng Magnesium Matrix (Jiangsu) International Trade Co.,Ltd.), the board name (MagMatrix MgO Sulfate Board), and the thickness.

7.3 The report holder's contact information is the following:

TWIN OAKS MADISON, LLC
2930 KERRY FOREST PARKWAY, SUITE 101
TALLAHASSEE, FLORIDA 32309
www.twinoaksfl.org

7.4 The additional listee's contact information is the following:

JINCHENG MAGNESIUM MATRIX (JIANGSU) INTERNATIONAL TRADE CO., LTD.
NO. 9 DAIWANG ROAD
TAIXING CITY 2254200, JIANGSU PROVINCE, CHINA
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David.Zhao@MagMatrixBoards.com
www.magmatrixboards.com

TABLE 1—ALLOWABLE TRANSVERSE WIND LOADS[1,2,3,4]

Nominal Board thickness, inch	Fastener Requirements		Allowble Wind Load, psf	
	Fastener Specifications	Fastener Spacing	Positive	Negative
½	0.113-inch-diameter ring shank by 2.5 inches long	8 inches field and perimeter.	53	22

For SI: 1 inch= 25.4, 1 psf= 47.9 N/m^2.

1. Framing must be minimum specific gravity of 0.5 and have a maximum spacing of 16 inches.
2. Fasteners must be placed minimum 3/8-inch from board edges at joints and 3/4 inch around perimeter outside board edges.
3. Boards edges and joints must be backed by framing.

TABLE 2—ALLOWABLE SHEAR WALL CAPACITY[1,2,3,4]

Nominal board thickness,inch	Fastenering Requirements		Allowable Shear capacity, plf
	Fastener Specifications	Fastener spacing	
½	0.113-inch-diameter ring shank by 2.5 inches long	8 inches perimeter and field	126

For SI: 1 inch= 25.4, 1 plf= 14.6 N/m.

1. Framing must be minimum specific gravity of 0.5 and have a maximum spacing of 16 inches.
2. Fasteners must be placed minimum 3/8-inch from board edges at joints and 3/4 inch around perimeter outside edges.
3. Boards edges and joints must be backed by framing.
4. Deflection at allowable shear capacity does not exceed 0.2-inch.

DIVISION: 09 00 00—FINISHES
Section: 09 28 15—Magnesium Oxid Backing Panels

REPORT HOLDER:

TWIN OAKS MADISON, LLC

EVALUATION SUBJECT:

MAGMATRIX MAGNESIUM OXIDE (MGO) SULFATE BOARD

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that MagMatrix MgO sulfate boards, described in ICC-ES evaluation report ESR-4642, have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2023 *City of Los Angeles Building Code* (LABC)
- 2023 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

MagMatrix MgO sulfate boards, described in Sections 2.0 through 7.0 of the evaluation report ESR-4642, comply with the LABC Chapters 6, 8, 14 and 23 and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Structural Insulated Panels described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-4642.
- The design, installation, conditions of use and identification of the Structural Insulated Panels are in accordance with the 2021 *International Building Code®* (IBC) and 2021 *International Residential Code®* (IRC) provisions, as applicable, noted in the evaluation report ESR-4642.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16, 17 and 23, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.
- Under the LABC and LARC, the panels shall not be used as part of the lateral force resisting system.

This supplement expires concurrently with the evaluation report, reissued October 2025.

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DIVISION: 09 00 00—FINISHES
Section: 09 28 15— Magnesium Oxide Backing Panels

REPORT HOLDER:

TWIN OAKS MADISON, LLC

EVALUATION SUBJECT:

MAGMATRIX MAGNESIUM OXIDE (MGO) SULFATE BOARD

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the MagMatrix MgO Sulfate boards, described in ICC-ES evaluation report ESR-4642, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2019 *California Building Code*® (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2019 *California Residential Code*® (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The MagMatrix MgO Sulfate boards, described in Sections 2.0 through 7.0 of the evaluation report ESR-4642, comply with CBC Chapters 6 and 8, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report.

2.1.1 OSHPD: The applicable OSHPD Sections of the CBC are beyond the scope of this supplement.

2.1.2 DSA: The applicable DSA Sections of the CBC are beyond the scope of this supplement.

2.2 CRC:

The MagMatrix MgO Sulfate boards, described in Sections 2.0 through 7.0 of the evaluation report ESR-4642, comply with CRC Chapter 7, provided the design and installation are in accordance with the 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report.

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ICC-ES Evaluation Report

ESR-4642 FL Supplement

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REPORT HOLDER:

TWIN OAKS MADISON, LLC

EVALUATION SUBJECT:

MAGMATRIX MAGNESIUM OXIDE (MGO) SULFATE BOARD

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the MagMatrix MgO Sulfate boards, described in ICC-ES evaluation report ESR-4642, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2020 *Florida Building Code—Building*
- 2020 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The MagMatrix MgO Sulfate boards, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-4642, comply with the *Florida Building Code—Building* and *Florida Building Code—Residential*, provided the design requirements are determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential,* as applicable. The installation requirements noted in ICC-ES evaluation report ESR-4642 for the 2018 *International Building Code®* (IBC) meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential,* as applicable.

Use of the MagMatrix MgO Sulfate boards for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* or the *Florida Building Code—Residential* has not been evaluated and is outside the scope of this supplemental report.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

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