Technical Evaluation Report

TO ASSIST WITH CODE COMPLIANCE

IWS-FAST® Board **TER No. 1505-04**

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Intelligent Wood Systems (IWS), Ltd
Shore Road, The Harbour
Perth, PH2 8BD, United Kingdom
enquiries@intelligentwoodsystems.com
www.intelligentwoodsystems.com

DIVISION: 06 00 00 – Wood, Plastics and Composites
Section: 06 10 00 – Rough Carpentry
Section: 06 16 00 – Sheathing
Section: 06 16 63 – Cementitious Sheathing

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1. Products Evaluated:

1.1. IWS-FAST® Board

1.2. For the most recent version of this report, visit drjengineering.org. For more detailed state professional engineering and code compliance legal requirements and references, visit drjengineering.org/statelaw. DrJ is fully compliant with all state professional engineering and code compliance laws.

2. Applicable Codes and Standards:[1]

2.1. *2009*, *2012* and *2015 International Building Code* (*IBC*)

2.2. *ASCE/SEI 7 – Minimum Design Loads for Buildings and Other Structures*

2.3. *AISI S213 – North American Standard for Cold-Formed Steel Framing - Lateral Design*

2.4. *ASTM E564 – Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings*

2.5. *AWC SDPWS – Special Design Provisions for Wind and Seismic*

[1] Unless otherwise noted, all references in this code compliant technical evaluation report (TER) are from the 2012 version of the codes and the standards referenced therein, including, but not limited to, *ASCE 7*, *SDPWS* and *WFCM*. This product also complies with the 2000-2009 and 2015 versions of the *IBC* and the standards referenced therein. As required by law, where this research report is not approved, the building official shall respond in writing, stating the reasons this research report was not approved. For variations in state and local codes, if any, see Section 8.

DrJ is a Professional Engineering Approved Source

Learn more about DrJ's Accreditation

- DrJ is an ISO/IEC 17065 accredited product certification body through ANSI Accreditation Services.
- DrJ provides certified evaluations that are signed and sealed by a P.E.
- DrJ's work is backed up by professional liability insurance.
- DrJ is fully compliant with *IBC* Section 1703.

ANSI Accredited Program PRODUCT CERTIFICATION #1131

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2.6. *BS EN 594 – Timber structures – Test methods – Racking strength and stiffness of timber frame wall panels*

3. Performance Evaluation:

3.1. IWS-FAST® Board has been evaluated as a structural sheathing product to determine the structural performance under lateral load conditions for wind loading for use:

3.1.1. With the *IBC* performance-based provisions, Section 2306.1 and 2306.3, for light-frame wood wall assemblies.

3.1.2. As an alternative to *SDPWS* Section 4.3 Wood-Frame Shear Walls.

3.1.3. With the *IBC* performance-based provisions, Section 2211, for cold-formed steel light frame wall assemblies.

3.2. Any code compliance issues not specifically addressed in this section are outside the scope of this report.

4. Product Description and Materials:

4.1. IWS-FAST® Board is a Magnesium Oxychloride board with silicate developed specifically to be used as a robust sheathing board in light frame construction.

4.1.1. Materials

4.1.1.1. Active high-purity magnesium oxide (MgO), high-quality magnesium chloride ($MgCl_2$), alkali-resistant glass fiber material, silicate, wood fibers and perlite filler. The product does not contain radioactive substances, asbestos or formaldehyde.

4.1.2. Thickness: ⅜" (9.5 mm)

4.1.3. Length: 96" (2438 mm) or 108" (2743 mm)

4.1.4. Width: 48" (1219 mm)

4.1.5. Nominal Density: 0.0415 lbs/in^3 (1150 kg/m^3)

4.1.6. Weight: 2 lbs per ft^2 (0.96 kPa)

5. Applications:

5.1. IWS-FAST® Board is used in the following applications:

5.1.1. Structural wall sheathing to provide lateral load resistance (wind) for braced wall panels used in wood and cold-formed steel light-frame construction.

5.1.2. Wall sheathing in buildings constructed in accordance with the *IBC* requirements for Types I-V construction.

5.2. General Structural Applications

5.2.1. Except as otherwise described in this Technical Evaluation Report (TER), IWS-FAST® Board shall be installed in accordance with the applicable codes listed in Section 2 using the provisions set forth therein for the design and installation of wood structural panels (WSP).

5.2.2. Anchorage for in-plane shear shall be provided to transfer the induced shear force into and out of each shear wall. Shear wall anchorage shall be in accordance with the applicable code referenced in Section 2.

5.2.3. Where used as wall bracing, the maximum aspect ratio for IWS-FAST® Board shall be 3.5:1 and the minimum full height panel width shall be 24".

5.2.4. Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and good technical judgment.

5.3. General Structural Provisions – Wood Construction

5.3.1. IWS-FAST® Board is permitted to be designed for light-frame wood construction in accordance with *SDPWS* for the design of shear walls using the methods set forth therein, including the perforated shear wall methodology, and subject to the *SDPWS* boundary conditions, except as specifically allowed in this TER using the capacities shown in Table 1.

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5.3.2. IWS-FAST® Board shear walls are permitted to resist lateral wind load forces using the allowable shear loads (in pounds per linear foot) set forth in Table 1.

5.3.3. Installation is permitted for single top plate or double top plate applications.

5.4. General Structural Provisions – Cold-Formed Steel Framed Construction

5.4.1. IWS-FAST® Board panels used in wall assemblies designed as shear walls are permitted to be designed in accordance with the methodology used in *AISI S213* for cold-formed steel light-frame construction using the capacities shown in Table 1.

5.4.2. IWS-FAST® Board shear walls are permitted to resist horizontal wind load forces using the allowable shear loads (in pounds per linear foot) set forth in Table 1.

IWS-FAST® Board Nominal Unit Shear Capacity (NUSC) & Allowable Strength Design (ASD) Capacity for Wood or Steel Construction – Wind				
IWS-FAST® Board	**Maximum Stud Spacing (in.)**	**Fastener Spacing (edge:field)**	**Nominal Unit Shear Capacity (plf)**	**Allowable Unit Shear Capacity (plf)**
	24" o.c.	2:4	770	385
		6:12	460	230
1. Nominal and Allowable Unit Shear Capacities apply to wall assemblies using either wood or cold-form steel framing members. 2. For wood construction, minimum fastener size is 0.113" diameter x 2" nails. 3. For cold-form steel construction, minimum fastener size is #8 screws with minimum penetration of 3 threads beyond the framing member. Minimum framing member thickness - 33 mil.				

Table 1: Nominal Unit Shear & Allowable Unit Shear Capacities for IWS-FAST® Board – Wind

6. Installation:

6.1. General for Structural Applications

6.1.1. IWS-FAST® Board shall be installed in accordance with the manufacturer's published installation instructions and this TER.

6.1.1.1. IWS-FAST® Board must be stored flat and under cover. Panels should not be stored on edge for extended periods of time.

6.1.1.2. IWS-FAST® Board must be lifted by at least two persons.

6.1.1.3. When cutting, always use dust extraction equipment and wear face masks. Panels are intended to be cut with a utility knife.

6.1.2. The instructions within this TER govern, if there are any conflicts between the manufacturer's instructions and this TER.

6.2. Orientation

6.2.1. IWS-FAST® Board may be installed in either the vertical or horizontal orientation. To be recognized for the structural values listed in this report, all joints must be backed by studs, plates, or blocks and fastened.

6.3. Fastener Type

6.3.1. IWS-FAST® Board

6.3.1.1. Minimum 0.113" x 2" nail for wood construction

6.3.1.2. Minimum #8 screw for cold-formed steel construction. Screws shall extend through the steel framing a minimum of 3 exposed threads.

6.3.2. Gypsum Wallboard

6.3.2.1. Where required, gypsum wallboard shall be a minimum ½" thickness and shall be attached with one of the following:

6.3.2.1.1. For wood framing – #6 x $1^{1}/_{4}$" type W or S screws or 5d cooler nails

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6.3.2.1.2. For cold-formed steel framing – minimum #6 bugle head screw. Screws shall extend through the steel framing a minimum of 3 exposed threads.

6.4. Fastener Edge Distance – Wood or Cold-formed Steel Framing

6.4.1. Fasteners shall be installed with a nominal edge distance of $^{3}/_{8}$" for IWS- FAST® Board and gypsum.

7. Test and Engineering Substantiating Data:

7.1. Lateral load testing and analysis based on *ASTM E564* and *BS EN 594*.

7.2. Analysis of wood (*SDPWS*) and cold-formed steel (*AISI S213*) lateral load capacities.

7.3. The product(s) evaluated by this TER falls within the scope of one or more of the model, state or local building codes for building construction. The testing and/or substantiating data used in this TER is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.

7.4. The provisions of model, state or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineered alternative means of compliance. This TER assesses compliance with defined standards, generally accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.

7.5. Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate as it undertakes its engineering analysis.

7.6. DrJ has reviewed and found the data provided by other professional sources are credible. This information has been approved in accordance with DrJ's procedure for acceptance of data from approved sources.

7.7. DrJ's responsibility for data provided by approved sources is in accordance with professional engineering law.

7.8. Where appropriate, DrJ relies on the derivation of design values, which have been codified into law through codes and standards (e.g., *IRC*, *WFCM*, *IBC*, *SDPWS*, etc.). This includes review of code provisions and any related test data that helps with comparative analysis or provides support for equivalency to an intended end-use application.

8. Findings:

8.1. When installed in accordance with the manufacturer installation instructions and this TER, IWS-FAST® Board complies with, or is a suitable alternative to, the applicable sections of the codes listed in Section 2 for the following applications:

8.1.1. Lateral load resistance due to wind carried by shear walls.

8.2. *IBC* Section 104.11 and *IRC* Section R104.11 (*IFC* Section 104.9 is similar) state:

> **104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code. … Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.[2]

8.3. This product has been evaluated with the codes listed in Section 2, and is compliant with all known state and local building codes. Where there are known variations in state or local codes that are applicable to this evaluation, they are listed here:

8.3.1. No known variations.

8.4. This TER uses professional engineering law, the building code, ANSI/ASTM consensus standards and generally accepted engineering practice as its criteria for all testing and engineering analysis. DrJ's professional engineering work falls under the jurisdiction of each state Board of Professional Engineers, when signed and sealed.

[2] The last sentence is adopted language in the 2015 codes.

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9. Conditions of Use:

9.1. Where required by the authority having jurisdiction (AHJ) in which the project is to be constructed, this report and the installation instructions shall be submitted at the time of permit application.

9.2. Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the code official for review and approval.

9.3. Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.

9.3.1. Allowable shear loads shall not exceed values in Table 1 for wind loads.

9.4. This report and the installation instructions shall be available to the jurisdiction in which the project is to be constructed.

9.5. IWS-FAST® Board shall not be used as a nailing base for claddings, trim, windows and doors. Fastening through the IWS-FAST® Board into the framing is acceptable.

9.6. When used in accordance with the *IBC* in high wind areas, special inspections shall comply with *IBC* Section 1705.10[3].

9.7. Design

9.7.1. Building Designer Responsibility

9.7.1.1. Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer (e.g., Owner, Registered Design Professional, etc.) for the Building and shall be in accordance with *IRC* Section R106 and *IBC* Section 107.

9.7.1.2. The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with *IRC* Section 301 and *IBC* Section 1603.

9.7.2. Construction Documents

9.7.2.1. Construction Documents shall be submitted to the Building Official for approval and shall contain the plans, specifications and details needed for the Building Official to approve such documents.

9.8. Responsibilities

9.8.1. The information contained herein is a product, engineering or building code compliance research report performed in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering procedures, experience and good technical judgment.

9.8.2. DrJ research reports provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated section.

9.8.3. The engineering evaluation was performed on the dates provided in this TER, within DrJ's professional scope of work.

9.8.4. This product is manufactured under a third-party quality control program in accordance with *IRC* Section R104.4 and R109.2 and *IBC* Section 104.4 and 110.4.

9.8.5. The actual design, suitability and use of this research report for any particular building is the responsibility of the Owner or the Owner's authorized agent, and the report shall be reviewed for code compliance by the Building Official.

9.8.6. The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party inspection process, proper installation per the manufacturer's instructions, the Building Official's inspection and any other code requirements that may apply to assure accurate compliance with the applicable building code.

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[3] *2015 IBC* Section 1705.11

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10. Identification:

10.1. IWS-FAST® Board described in this TER is identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.

10.2. Additional technical information can be found at intelligentwoodsystems.com.

11. Review Schedule:

11.1. This TER is subject to periodic review and revision. For the most recent version of this report, visit drjengineering.org.

11.2. For information on the current status of this report, contact DrJ Engineering.

- Mission and Professional Responsibilities
- Product Evaluation Policies
- Product Approval – Building Code, Administrative Law and P.E. Law

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