

Updated Test Results Submitted to ICC for Review

Filing Category: WALLCOVERING (288)

SURE-BOARD® SERIES 200 and 200W STRUCTURAL PANELS
INTERMAT
2045 PLACENTIA AVENUE
COSTA MESA, CALIFORNIA 92627

SUBJECT

Sure-Board® Series 200 and 200W Structural Panels.

2.0 DESCRIPTION

2.1 General:

Sure-Board® Series 200 and 200W Structural Panels are panels attached to light-gage steel framing for shear wall applications. The panels are limited to applications where there is no direct exposure to the weather or damp environments.

The shear walls are an alternative to steel stud shear wall systems described in Division VIII, Chapter 22, of the 1997 Uniform Building Code (UBC), or cold-formed steel light-framed shear walls described in Section 2211 of the 2003 International Building Code (IBC). The shear walls may also be used where an engineered design is submitted in accordance with Section R301.1.2 of the 2003 International Residential Code (IRC).

2.2 Materials:

2.2.1 Sure-Board® Series 200 and 200W Structural Panels:

Sure-Board® Series 200 Structural Panels consist of 1/2 or 5/8-inch thick (12.7 or 15.9 mm), tapered or square-edged, non-rated or Type X gypsum wallboard complying with ASTM C 36-97, or water resistant core gypsum sheathing complying with ASTM C 79-97 and ASTM C1396, also approved with glassmat gypsum substrate ASTM C 1177 and fiber-reinforced gypsum panels ASTM C 1278 laminated with water-soluble adhesive to sheet steel. The sheet steel is No. 22 gage (0.027 inch / 0.686 mm) base-metal thickness complying with ASTM A 653 CS, Grade 33, and is provided with a G40 hot-dipped galvanized coating conforming to ASTM A 924. Available in widths of 48 inches (1219 mm) and standard lengths of 8,10 and 12 feet (2438, 3048 and 3658 mm).

Sure-Board® Series 200W Structural Panels consist of 1/8" (3.2mm) thick Medium Density Fiberboard (MDF) panels square edged sheet complying with ANSI A208.2, laminated with a water-soluble adhesive to sheet steel. The sheet steel is No.22 gage (0.027 inch / 0.686mm) base-metal thickness complying with ASTM A 653 CS, Grade 33, and is provided with a G40 hot-dipped galvanized coating conforming to ASTM A 924. Available in widths of 48 inches (1219 mm) and standard lengths of 8,10 and 12 feet (2438, 3048 and 3658mm)

2.2.2 Fasteners:

The fasteners used for attaching the Sure-Board® Series 200 Structural Panels to steel framing are self-drilling/self tapping bugle head screws. No. 6 minimum diameter

(0.138 inch / 3.5 mm), with a minimum 0.3145-inch (8.0mm) head diameter and 1.25 inches (31.7 mm) long, complying with SAE J78 and ASTM C 954.

The fasteners used for the attaching the Sure-Board® Series 200W Structural Panels to steel framing are No.10 minimum diameter 0.19-inch (4.83mm), with a minimum 0.3145-inch (8.0 mm) diameter pan head and .75 inch (19.0mm) long screw, complying with SAE J78 and ASTM C954.

2.2.3 Steel Framing: In this report, for steel framing members refer to the following gage numbers, minimum design base-metal thicknesses:

No. 14 gage : 0.071 inch (1.81mm)

No. 16 gage : 0.054 inch (1.37 mm)

No. 18 gage : 0.043 inch (1.09 mm)

No. 20 gage : 0.033 inch (0.84 mm)

Steel studs for shear walls are C-shaped , with a minimum depth of 3 ½ inches (89mm) and a minimum flange width of 1 5/8 inches (41mm) , with a 3/8-inch (9.5 mm) return lip for C-shaped stud. Tracks shall be a minimum of 3 ½ inches (89mm) wide, with minimum 1¼-inch (31.7 mm) flanges. No.14 and No.16 gage steel members must comply with ASTM A 653 CS Grade 50, with minimum yield and tensile strengths of 50 ksi (340 MPa) and 65 ksi (450 MPa), respectively. The No.18 and No.20 gage members must comply with ASTM A 653 CS Grade 33, with minimum yield and tensile strengths of 33 ksi (230 MPa) and 45 ksi (310 MPa), respectively. Structural properties shall be determined in accordance with Chapter 22, Division VII, of the UBC or Section 2209 of the IBC.

2.3 Shear Wall Design:

Shown in Table 1, 2 and 3 are nominal shear values for wind or earthquake forces and approximate deflections at the nominal loads for shear walls using the Sure-Board® Series 200 and 200W Structural Panels attached to light-gauge steel studs. Nominal shear values shall be multiplied by the appropriate strength reduction factor to determine design strength, or divided by the appropriate safety factor to determine allowable shear values in accordance with footnote 4 of table 1, 1A and footnote 5 of Tables 2 and 3 as set forth in Section 2219.3 UBC and Section 2211.2.1 of the IBC. The maximum shear-wall to height-to-width ratio is 2 ¼: 1. Panels must be fastened in accordance with footnote 2 of Table 1, 1A, 2 and 3.

Design of shear wall connections, such as uplift hold-downs, shear to base anchorage, and shear transfer from horizontal elements, are beyond the scope of this report. The connection design shall comply with the UBC and IBC and to be sized to exceed the loads resisted by the shear wall.

Steel framing design for out-of-plane and axial loads shall comply with the UBC and IBC. For installations in Seismic Zones 3 and 4, additional requirements in Section 2220.1 of the UBC apply. For installation in Seismic Design Category D, E and F, additional requirements in Section 2211, except 2211.4.4 of the IBC apply.

2.4 Installation:

Installation must be in accordance with this report and the manufacturer's published installation instructions. Sure-Board® Series 200 and 200W Structural Panels are placed with the long dimension parallel to stud framing. The steel face must be in contact with the framing. All panel edges, top and bottom must be fully blocked by framing studs, track, or flat strap and doubled (back-to-back) C-shaped studs minimum at shear wall ends. Maximum stud spacing as tested shall not exceed 24 inches (610 mm) on center. Screws attaching panels are installed in one operation through the panels into the framing. Screw heads should be located 3/8" from panel edges. Screw heads can be flush with surface and must penetrate at least three exposed threads into framing members.

2.5 Identification:

The Sure-Board® Series 200 and 200W Structural Panels are identified by a label located on the top right and bottom left hand corners of the metal facing. The label notes the Intermat company name, product name and the evaluation report number (ES ER-5762).

3.0 Evidence Submitted:

Data in accordance with the ICC- ES Interim Criteria for Cyclic Racking Tests for Metal-Sheathed Shear Walls with Steel Framing (AC154), dated March 2000, and a quality control manual.

4.0 Findings:

That the Sure-Board® Series 200 and 200W Structural Panels, described in this report, comply with the 1997 Uniform Building Code (UBC), the 2003 International Building Code (IBC) and the 2003 International Residential Code (IRC), subject to the following conditions:

- 4.1 Panels are manufactured, identified and installed in accordance with this report.
- 4.2 Nominal shear values for shear walls are limited to the values noted in Table 1, 2 and 3. To determine the allowable shear values or design strength values, the appropriate safety factor or strength reduction factor, in accordance with Section 2219.3 of the UBC or Section 2211 except 2211.4.4 of the IBC, must be applied.
- 4.3 Plans and calculations demonstrating compliance with code and this report are submitted to the building official for approval.
- 4.4 Applied loads are adjusted in accordance with Section 1612.3 and either Section 2210 or 2213.5.1 of the UBC or Section 1605 and 2211.3.3 of the IBC. Calculations shall demonstrate, In addition to other requirements as stipulated by the building official, that the applied loads are less than the design loads described in the UBC or IRC and this report.
- 4.5 The panels are produced at CEMCO, INTERMAT facilities.

TABLE 1 - NOMINAL SHEAR RESISTANCE TO WIND OR EARTHQUAKE FORCES AND DISPLACEMENT (inches) FOR SHEAR WALLS WITH SURE-BOARD® SERIES 200 STRUCTURAL PANELS ATTACHED TO LIGHT GAGE STEEL C-STUDS AT 24" O.C. WITH SCREWS (pounds per foot) ¹

STEEL FRAMING	FASTENER SPACING AT PANEL EDGES (Inches) ⁶											
	6			4			3			2		
	Load (lb/linear foot) ^{2,3,4}	Δ_n (inch)	Δ_s (inch)	Load (lb/linear foot) ^{2,3,4}	Δ_n (inch)	Δ_s (inch)	Load (lb/linear foot) ^{2,3,4}	Δ_n (inch)	Δ_s (inch)	Load (lb/linear foot) ^{2,3}	Δ_n (inch)	Δ_s (inch)
20 (0.033 inch)	1,085	0.55	0.10	1,545	0.70	0.11	1,730	0.70	0.14	1,915	0.70	0.12
18 (0.043 inch)	1,405	0.82	0.11	1,925	0.97	0.13	2,145	0.97	0.16	2,360	0.83	0.13
16 (0.054 inch)							2,895	1.01	0.20	3,460	1.24	0.18
14 (0.071 inch)										3,302	1.64	0.24
14 (0.071 inch) 2-Sided										4,633	1.42	0.40

For SI: 1 inch = 25.4 mm, 1 lb/linear = 0.0146 N/mm.

¹These values are for short-term loads due to wind or earthquake.

²The screws are described in Section 2.2.2 and are installed in accordance with Section 2.4 of ICC ES ER-5762.

³Tabulated values are for panels applied to one side or two sides of a wall.

⁴For allowable stress design (ASD) loads, the tabulated load values must be divided by the safety factor $\Omega = 2.5$. For load and resistance factor design (LRFD) loads, the tabulated load values must be multiplied by the resistance factor $\Phi = 0.55$.

⁵Section 2.2.3 in ICC ES ER-5762, describes minimum base metal thickness associated with gages.

⁶All panel edges must be blocked. Panels are installed vertically. Fasteners must be spaced a maximum of 12 inches on center along intermediate framing members.

Δ_n = approximate deflection at nominal load.

Δ_s = approximate deflection at design load.

TABLE 1A - NOMINAL SHEAR RESISTANCE TO WIND OR EARTHQUAKE FORCES AND DISPLACEMENT (inches) FOR SHEAR WALLS WITH SURE-BOARD® SERIES 200 STRUCTURAL PANELS ATTACHED TO LIGHT GAGE STEEL C-STUDS AT 16" O.C. WITH SCREWS (pounds per foot) ¹

STEEL FRAMING	FASTENER SPACING AT PANEL EDGES (Inches) ⁶											
	6			4			3			2		
	Load (lb/linear foot) ^{2,3,4}	Δ_n (inch)	Δ_s (inch)	Load (lb/linear foot) ^{2,3,4}	Δ_n (inch)	Δ_s (inch)	Load (lb/linear foot) ^{2,3,4}	Δ_n (inch)	Δ_s (inch)	Load (lb/linear foot) ^{2,3}	Δ_n (inch)	Δ_s (inch)
14 (0.071 inch) 2-Sided	-----	----	----	-----	----	----	-----	----	----	5085	1.98	0.46

For SI: 1 inch = 25.4 mm, 1 lb/linear = 0.0146 N/mm.

¹These values are for short-term loads due to wind or earthquake.

²The screws are described in Section 2.2.2 and are installed in accordance with Section 2.4 of ICC ES ER-5762.

³Tabulated values are for panels applied to two sides of a wall.

⁴For allowable stress design (ASD) loads, the tabulated load values must be divided by the safety factor $\Omega = 2.5$. For load and resistance factor design (LRFD) loads, the tabulated load values must be multiplied by the resistance factor $\Phi = 0.55$.

⁵Section 2.2.3 in ICC ES ER-5762, describes minimum base metal thickness associated with gages.

⁶All panel edges must be blocked. Panels are installed vertically. Fasteners must be spaced a maximum of 12 inches on center along intermediate framing members.

Δ_n = approximate deflection at nominal load.

Δ_s = approximate deflection at design load.

TABLE 2 - NOMINAL SHEAR RESISTANCE TO WIND OR EARTHQUAKE FORCES AND DISPLACEMENT (inches) FOR SHEAR WALLS WITH SUREBOARD® SERIES 200W STRUCTURAL PANELS ATTACHED TO LIGHT GAGE C-STUDS AT 16" O.C. WITH #10 SCREWS¹

STEEL FRAMING	#10 SCREW SPACING AT PANEL EDGES AND FIELD 2/6, INCHES ON CENTER ^{2,3}		
Minimum Gage ⁹	S_{nom} ^{4,5,6} Load	Δ_n ⁷ Lateral Displacement	Δ_s ⁸ Lateral Displacement
18-Ga. (0.043 in.)	2,169	0.790	0.229
16-Ga. (0.054 in.)	2,705	1.140	0.270
14-Ga. (0.071 in.)	2,755	0.970	0.329
14-Ga. (0.071 in.) 2 Sided	5,102	2.090	0.491

For **SI**: 1 inch = 25.4 mm, 1 plf = 0.0146 N/mm.

¹These values are for short term loads due to wind or earthquake

²The screws as described in Section 2.2.2 and installed in accordance with Section 2.4 of ICC ES ER-5762.

³All panel edges must be blocked. Panels are installed vertically. Fasteners must be spaced a minimum of 6 inches on center along intermediate framing members.

⁴Tabulated values are for panels applied to one or two side of wall.

⁵For allowable stress design (ASD) loads, the tabulated resistance values must be divided by the safety factor of 2.5. For load and resistance factor design (LRFD), the tabulated resistance values must be multiplied by 0.55.

⁶ S_{nom} = nominal strength

⁷ Δ_n = Lateral displacement at S_{nom}

⁸ Δ_s = Lateral displacement at S_{design}

⁹Section 2.2.3 in evaluation report ICC ES ER-5762, describes minimum base metal thickness associated with gages.

TABLE 3 - NOMINAL SHEAR RESISTANCE TO WIND OR EARTHQUAKE FORCES AND DISPLACEMENT (inches) FOR SHEAR WALLS WITH SUREBOARD® SERIES 200W STRUCTURAL PANELS ATTACHED TO LIGHT GAGE C-STUDS AT 24" O.C. WITH #10 SCREWS¹

STEEL FRAMING	#10 SCREW SPACING AT PANEL EDGES AND FIELD 2/6, INCHES ON CENTER ^{2,3}		
Minimum Gage ⁹	S_{nom} ^{4,5,6} Load	Δ_n ⁷ Lateral Displacement	Δ_s ⁸ Lateral Displacement
20-Ga. (0.033 in.)	1,519	0.652	0.140
18-Ga. (0.043 in.)	1,792	0.786	0.150

For **SI**: 1 inch = 25.4 mm, 1 plf = 0.0146 N/mm.

¹These values are for short term loads due to wind or earthquake

²The screws as described in Section 2.2.2 and installed in accordance with Section 2.4 of ICC ES ER-5762.

³All panel edges must be blocked. Panels are installed vertically. Fasteners must be spaced a minimum of 6 inches on center along intermediate framing members.

⁴Tabulated values are for panels applied to one or two side of wall.

⁵For allowable stress design (ASD) loads, the tabulated resistance values must be divided by the safety factor of 2.5. For load and resistance factor design (LRFD), the tabulated resistance values must be multiplied by 0.55.

⁶ S_{nom} = nominal strength

⁷ Δ_n = Lateral displacement at S_{nom}

⁸ Δ_s = Lateral displacement at S_{design}

⁹Section 2.2.3 in evaluation report ICC ES ER-5762, describes minimum base metal thickness associated with gages.