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Wei-Wen Yu Center for Cold-Formed Steel Structures

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DIRECTOR: ROGER A. LABOUBE, PH.D., P.E.
FOUNDING DIRECTOR: WEI-WEN YU, PH.D., P.E.

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New Options for Steel Sheet Sheathed Shear Wall Assemblies

Jay W. Larson, P.E, F. ASCE and Roger A. LaBoube, Ph.D, P.E.

The North American Standard for Cold-Formed Steel Framing – Lateral Design, 2007 Edition with Supplement No. 1 (AISI S213-07/S1-09), is the recognized source for design values for cold-formed steel framed shear walls. However, at the time of its development, options were limited to 18-mil and 27-mil steel sheet sheathing. As the use of cold-formed steel framing for mid-rise construction has increased, so has the need for more robust shear walls.

Based on recently completed tests performed at the University of North Texas (Yu and Chen, 2009), nominal strength values for 30-mil and 33-mil steel sheet shear walls have been approved by the AISI Committee on Framing Standards. This CCFSS Technical Bulletin provides these values, along with additional limitations associated with these values.

It is important to note that these values must be used in conjunction with the limitations for tabulated systems and other applicable requirements of AISI S213-07/S1-09.

Table C2.1-1
United States and Mexico
Nominal Shear Strength (R_n) for Wind and Other In-Plane Loads for Shear Walls [1,4,6,7,8]
(Pounds Per Foot)

Assembly Description	Maximum Aspect Ratio (h/w)	Fastener Spacing at Panel Edges[2] (inches)			
		6	4	3	2
0.030" steel sheet, one side	2:1 [5]	795	960	1005	1055
0.033" steel sheet, one side	2:1 [5]	1035	1145	1225	1300

Two additional footnotes are added to Table C2.1-3:

9. Special seismic in-line blocking and flat strapping shall be installed. See Section C2.2.1.
10. Blocking is not required unless Section C2.2 item 8 or footnote 9 applies.

Table C2.1-3
United States and Mexico
Nominal Shear Strength (R_n) for Seismic and Other In-Plane Loads for Shear Walls [1,4,7,8]
(Pounds Per Foot)

Assembly Description	Max. Aspect Ratio (h/w)	Fastener Spacing at Panel Edges[2] (inches)				Designation Thickness[5,6] of Stud, Track and Blocking[10] (mils)	Required Sheathing Screw Size
		6	4	3	2		
0.030" steel sheet, one side	2:1[3]	910	1015	1040	1070	43 (min.)	8
	2:1[3]	-	-	-	1355[9]	43 (min.)	10
0.033" steel sheet, one side	2:1[3]	1055	1170	1235	1305	43 (min.)	8
	2:1[3]	-	-	-	1505[9]	43 (min.)	10
	2:1[3]	-	-	-	1870	54 (min.)	8
	2:1[3]	-	-	-	2085[9]	54 (min.)	10

A sixth limitation for tabulated systems, sheet steel sheathing in the United States and Mexico, is added in Section C2.2.1:

6. Where required, in accordance with Table C2.1-3, special seismic in-line blocking and flat strapping shall be installed at mid-height for 8 foot (2.44 m) walls and at one-third points for 9 and 10 foot (2.74 and 3.05 m) walls. In-line blocking shall be a stud or track section with the same web depth as the studs and a minimum thickness as specified in Tables C2.2-1 and C2.2-3, as applicable. Flat strapping shall be a minimum thickness of 33 mils with a minimum width of 1-1/2 inches (38.1 mm). In-line blocking shall be installed between studs at the termination of all straps and at 12 foot (3.66 m) intervals along the strap. Flat strapping shall be attached to the flanges of each stud with a minimum of one No. 8 screw and to the flanges of the in-line blocking with a minimum of two No. 8 screws.

References:

AISI S213/S1-09, North American Standard for Cold-Formed Steel Framing – Lateral Design 2007 Edition with Supplement No. 1, American Iron and Steel Institute, Washington, DC, 2009.
Yu, C. and Chen, Y. (2009), Steel Sheet Sheathing Options for Cold-Formed Steel Framed Shear Wall Assemblies Providing Shear Resistance - Phase 2, Report No. UNT-G70752, Department of Engineering Technology, University of North Texas, Denton, TX, 2009.