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 (mils)	Required Sheathing Screw Size
		6	4	3	2		
15/32" Structural 1 sheathing (4-ply), one side	2:1[3]	780	990	-	-	33 or 43	8
	2:1	890	1330	1775	2190	43 or 54	8
						68	10
7/16" OSB, one side	2:1[3]	700	915	-	-	33	8
	2:1[3]	825	1235	1545	2060	43 or 54	8
	2:1	940	1410	1760	2350	54	8
	2:1	1232	1848	2310	3080	68	10
0.018" steel sheet, one side	2:1	390	-	-	-	33 (min.)	8
0.027" steel sheet, one side	4:1	-	1000	1085	1170	33 (min.)	8

1. *Nominal strength* shall be multiplied by the *resistance factor* (ϕ) to determine *design strength* or divided by the *safety factor* (Ω) to determine *allowable strength* as set forth in Section C2.1.
2. Screws in the field of the panel shall be installed 12 inches (305 mm) o.c. unless otherwise shown.
3. *Shear wall* height to width aspect ratios (h/w) greater than 2:1, but not exceeding 4:1, shall be permitted provided the *nominal strength* values are multiplied by 2w/h. See Section C2.1.
4. See Section C2.1 for requirements for sheathing applied to both sides of wall.
5. Unless noted as (min.), substitution of a *stud* or *track* of a different *designation thickness* is not permitted.
6. Wall *studs* and *track* shall be of ASTM A1003 Structural Grade 33 (Grade 230) Type H steel for members with a *designation thickness* of 33 and 43 mil, and A1003 Structural Grade 50 (Grade 340) Type H steel for members with a *designation thickness* equal to or greater than 54 mils.
7. For wood structural panel sheathed shear walls, tabulated R_n values applicable for short-term load duration (seismic loads). For other in-plane lateral loads of normal or permanent load duration as defined by the AF&PA NDS, the values in the table above for wood structural panel sheathed shear walls shall be multiplied by 0.63 (normal) or 0.56 (permanent).
8. For SI: 1" = 25.4 mm, 1 foot = 0.305 m, 1 lb = 4.45 N

(This document is an excerpt from *AISI S213-07 North American Standard for Cold Formed Steel Framing - Lateral Design* for convenience only, and should be considered a guideline only. For design of a constructed metal stud shear wall should be performed by a qualified design professional.)

Setbacks of structural walls shall not exceed the *web* depth of the floor *joist* except when designed for the additional loads, but in no case shall the setback exceed four times the *web* depth of the floor *joist* member.

C2.1 Available Strength (Factored Resistance)

The *available strength* [*factored resistance*] shall be determined by using the *nominal strength* [*nominal resistance*] shown in Tables C2.1-1 through C2.1-5, as permitted and applicable, and dividing by the appropriate *safety factor* (Ω) or multiplying by the appropriate *resistance factor* (ϕ), as follows:

Ω = 2.50 for ASD (seismic)
Ω = 2.00 for ASD (wind or other in-plane lateral loads)
ϕ = 0.60 for LRFD (seismic)
ϕ = 0.65 for LRFD (wind or other in-plane lateral loads)
ϕ = 0.70 for LSD (except as noted below)
ϕ = 0.60 for LSD (gypsum sheathed walls)

Where a height to width aspect ratio (h/w) of a *shear wall* segment is greater than the tabulated value, as permitted in footnotes to Tables C2.1-1, C2.1-3 and C2.1-4, the *available strength* [*factored resistance*] shall be multiplied by 2w/h, but in no case shall the height to width aspect ratio (h/w) exceed 4:1.

The *available strength* [*factored resistance*] for shear panels with different sheathing materials and fastener configurations applied to the same side of a wall is not cumulative. For walls with material of the same type and *nominal strength* [*nominal resistance*] applied to opposite faces of the same wall the *available strength* [*factored resistance*] of material of the same capacity is cumulative. Where the material *nominal strengths* [*nominal resistances*] are not equal the *available strength* [*factored resistance*] shall be either two times the *available strength* [*factored resistance*] of the material with the smaller value or shall be taken as the value of the stronger side, whichever is greater. Summing the *available strengths* [*factored resistance*] of dissimilar material applied to opposite faces or to the same wall line is not allowed unless permitted by Table C2.1-1

C2.1.1 Design Deflection

The deflection of a blocked wood structural panel or sheet steel *shear wall* fastened throughout shall be permitted to be calculated according to the following:

$$\delta = \frac{8vh^3}{E_s A_c b} + \omega_1\omega_2 \frac{vh}{\rho G t_{sheathing}} + \omega_1^{5/4}\omega_2\omega_3\omega_4\left(\frac{v}{\beta}\right)^2 + \frac{h}{b}\delta_v \qquad \text{(Eq. C2.1-1)}$$

$$\text{For SI: } \delta = \frac{2vh^3}{3E_s A_c b} + \omega_1\omega_2 \frac{vh}{\rho G t_{sheathing}} + \omega_1^{5/4}\omega_2\omega_3\omega_4\left(\frac{v}{0.00290\beta}\right)^2 + \frac{h}{b}\delta_v \qquad \text{(Eq. C2.1-2)}$$

where:

A_C = Gross cross-sectional area of *chord* member, in square inches (mm^2)
b = Width of the *shear wall*, in feet (mm)
E_s = Modulus of elasticity of steel = 29,500,000 psi (203,000 MPa)
G = Shear modulus of sheathing material, in pounds per square inch (MPa)
h = Wall height, in feet (mm)
s = Maximum fastener spacing at panel edges, in inches (mm)