

Table 4.3A Nominal Unit Shear Capacities for Wood-Frame Shear Walls^{1,3,6,7}

Wood-based Panels⁴

Sheathing Material	Minimum Nominal Panel Thickness (in.)	Minimum Fastener Penetration in Framing Member or Blocking (in.)	Fastener Type & Size	A SEISMIC												B WIND							
				Panel Edge Fastener Spacing (in.)												Panel Edge Fastener Spacing (in.)							
				6			4			3			2			6		4		3		2	
				V _s (plf)	G _s (kips/in.)	OSB PLY	V _s (plf)	G _s (kips/in.)	OSB PLY	V _s (plf)	G _s (kips/in.)	OSB PLY	V _s (plf)	G _s (kips/in.)	OSB PLY	V _s (plf)	G _s (kips/in.)	OSB PLY	V _w (plf)	G _w (kips/in.)	V _w (plf)	G _w (kips/in.)	
Wood Structural Panels - Structural ^{4,5}	5/16	1-1/4	Nail (common or galvanized box) 6d	400	13	10	600	18	13	780	23	16	1020	35	22	560	840	1090	1430				
	3/8 ²	1-3/8	8d	460	19	14	720	24	17	920	30	20	1220	43	24	645	1010	1290	1710				
	7/16 ²			510	16	13	790	21	16	1010	27	19	1340	40	24	715	1105	1415	1875				
	15/32			560	14	11	860	18	14	1100	24	17	1460	37	23	785	1205	1540	2045				
Wood Structural Panels - Sheathing ^{4,5}	15/32	1-1/2	10d	680	22	16	1020	29	20	1330	36	22	1740	51	28	950	1430	1860	2435				
	5/16	1-1/4	6d	360	13	9.5	540	18	12	700	24	14	900	37	18	505	755	980	1260				
	3/8			400	11	8.5	600	15	11	780	20	13	1020	32	17	560	840	1090	1430				
	3/8 ²	1-3/8	8d	440	17	12	640	25	15	820	31	17	1060	45	20	615	895	1150	1485				
Plywood Siding	7/16 ²		10d	480	15	11	700	22	14	900	28	17	1170	42	21	670	980	1260	1640				
	15/32			520	13	10	760	19	13	980	25	15	1280	39	20	730	1065	1370	1790				
	19/32	1-1/2	Nail (galvanized casing)	620	22	14	920	30	17	1200	37	19	1540	52	23	870	1290	1680	2155				
	5/16	1-1/4	6d	680	19	13	1020	26	16	1330	33	18	1740	48	22	950	1430	1860	2435				
Particleboard Sheathing - (M-S "Exterior Glue" and M-2 "Exterior Glue")	5/16	1-1/4	Nail (common or galvanized box) 6d	280	13	10	420	16	11	550	17	12	720	21	13	390	590	770	1010				
	3/8	1-3/8	8d	320	16	12	480	18	13	620	20	14	820	22	14	450	670	870	1150				
	3/8			240	15	11	360	17	12	460	19	13	600	22	14	335	505	645	840				
	3/8			260	18	13	380	20	14	480	21	14	630	23	15	365	530	670	880				
Structural Fiberboard Sheathing	1/2		10d	280	18	13	420	20	14	540	22	15	700	24	16	390	590	755	980				
	1/2			370	21	15	550	23	16	720	24	16	920	25	17	520	770	1010	1290				
	5/8			400	21	15	610	23	16	790	24	17	1040	26	18	560	855	1105	1455				
	1/2		Nail (galvanized roofing) 11 ga. galv. roofing nail (0.120" x 1-1/2" long x 7/16" head)	340	4.0	4.0	460	5.0	5.0	520	5.5	5.5	520	5.5	5.5	475	645	730	730				
25/32			340	4.0	4.0	460	5.0	5.0	520	5.5	5.5	520	5.5	5.5	475	645	730	730					

1. Nominal unit shear values shall be adjusted in accordance with 4.3.3 to determine ASD allowable unit shear capacity and LRFDF factored unit resistance. For general construction requirements see 4.3.6. For specific requirements, see 4.3.7.1 for wood structural panel shear walls, 4.3.7.2 for particleboard shear walls, and 4.3.7.3 for fiberboard shear walls. See Appendix A for common and box nail dimensions.

2. Shears are permitted to be increased to values shown for 15/32 inch sheathing with same nailing provided (a) studs are spaced a maximum of 16 inches on center, or (b) panels are applied with long dimension across studs.

3. For species and grades of framing other than Douglas-Fir-Larch or Southern Pine, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal unit shear capacity by the Specific Gravity Adjustment Factor = $[1 - (0.5 - G)]$, where G = Specific Gravity of the framing lumber from the MDS (Table 11.3.2A). The Specific Gravity Adjustment Factor shall not be greater than 1.

4. Apparent shear stiffness values G_s, are based on nail slip in framing with moisture content less than or equal to 19% at time of fabrication and panel stiffness values for shear walls constructed with either OSB or 3-ply plywood panels. When 4-ply or 5-ply plywood panels or composite panels are used, G_s values shall be permitted to be increased by 1.2.

5. Where moisture content of the framing is greater than 19% at time of fabrication, G_s values shall be multiplied by 0.5.

6. Where panels are applied on both faces of a shear wall and nail spacing is less than 6" on center on either side, panel joints shall be offset to fall on different framing members. Alternatively, the width of the nailed face of framing members shall be 3" nominal or greater at adjoining panel edges and nails at all panel edges shall be staggered.

7. Galvanized nails shall be hot-dipped or tumbled.

Table 4.3B Nominal Unit Shear Capacities for Wood-Frame Shear Walls^{1,2,5,6}

Wood Structural Panels Applied over 1/2" or 5/8" Gypsum Wallboard or Gypsum Sheathing Board

Sheathing Material	Minimum Nominal Panel Thickness (in.)	Minimum Fastener Penetration in Framing Member or Blocking (in.)	Fastener Type & Size	A SEISMIC						B WIND					
				Panel Edge Fastener Spacing (in.)						Panel Edge Fastener Spacing (in.)					
				6	4	3	2	6	4	3	2				
				V_s (plf)	G_s (kips/in.)	V_s (plf)	G_s (kips/in.)	V_s (plf)	G_s (kips/in.)	V_s (plf)	G_s (kips/in.)	V_w (plf)	G_w (plf)	V_w (plf)	G_w (plf)
Wood Structural Panels - Structural ^{3,4}	5/16 3/8, 7/16, 15/32	1-1/4 1-3/8	Nail (common or galvanized box)	OSB PLY	OSB PLY	OSB PLY	OSB PLY	OSB PLY	OSB PLY	OSB PLY	OSB PLY	560	840	1090	1430
Wood Structural Panels - Sheathing ^{3,4}	5/16 3/8, 7/16, 15/32	1-1/4 1-3/8	Nail (galvanized casing)	OSB PLY	OSB PLY	OSB PLY	OSB PLY	OSB PLY	OSB PLY	OSB PLY	OSB PLY	785	1205	1540	2045
Plywood Siding	5/16 3/8	1-1/4 1-3/8	Nail (galvanized casing)	280 320	13 16	420 480	16 18	550 620	17 20	720 820	21 22	390 450	590 670	770 870	1010 1150

- Nominal unit shear capacities shall be adjusted in accordance with 4.3.3 to determine ASD allowable unit shear capacity and LRFD factored unit resistance. For general construction requirements see 4.3.6. For specific requirements, see 4.3.7.1 for wood structural panel shear walls. See Appendix A for common and box nail dimensions.
- For species and grades of framing other than Douglas-Fir-Larch or Southern Pine, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal unit shear capacity by the Specific Gravity Adjustment Factor = $[1 - (0.5 - G)]$, where G = Specific Gravity of the framing lumber from the *MDS* (Table 11.3.2A). The Specific Gravity Adjustment Factor shall not be greater than 1.
- Apparent shear stiffness values, G_s , are based on nail slip in framing with moisture content less than or equal to 19% at time of fabrication and panel stiffness values for shear walls constructed with either OSB or 3 ply plywood panels. When 4-ply or 5-ply plywood panels or composite panels are used, G_s values for plywood shall be permitted to be increased by 1.2.
- Where moisture content of the framing is greater than 19% at time of fabrication, G_s values shall be multiplied by 0.5.
- Where panels are applied on both faces of a shear wall and nail spacing is less than 6" on center on either side, panel joints shall be offset to fall on different framing members. Alternatively, the width of the nailed face of framing members shall be 3" nominal or greater at adjoining panel edges and nails at all panel edges shall be staggered.
- Galvanized nails shall be hot-dipped or tumbled.

Table 4.3C Nominal Unit Shear Capacities for Wood-Frame Shear Walls¹

Gypsum and Portland Cement Plaster

Sheathing Material	Material Thickness	Fastener Type & Size ²	Max. Fastener Edge Spacing (in.) ³	Max. Stud Spacing (in.)	SEISMIC		WIND	
					V _s (plf)	G _s (kips/in)		
Gypsum wallboard, gypsum base for veneer plaster, or water-resistant gypsum backing board	1/2"	5d cooler (0.086" x 1-5/8" long, 15/64" head) or wallboard nail (0.086" x 1-5/8" long, 9/32" head) or 0.120" nail x 1-1/2" long, min 3/8" head	7	24	unblocked	150	4.0	150
			4	24	unblocked	220	6.0	220
	1/2"	No. 6 Type S or W drywall screws 1-1/4" long	7	16	unblocked	200	5.5	200
			4	16	unblocked	250	6.5	250
	5/8"	6d cooler (0.092" x 1-7/8" long, 1/4" head) or wallboard nail (0.0915" x 1-7/8" long, 19/64" head) or 0.120" nail x 1-3/4" long, min 3/8" head	7	16	blocked	250	6.5	250
			4	16	blocked	300	7.5	300
	5/8"	No. 6 Type S or W drywall screws 1-1/4" long	8/12	16	unblocked	120	3.5	120
			4/16	16	blocked	320	8.0	320
	5/8"	6d cooler (0.092" x 1-7/8" long, 1/4" head) or wallboard nail (0.0915" x 1-7/8" long, 19/64" head) or 0.120" nail x 1-3/4" long, min 3/8" head	4/12	24	blocked	310	8.0	310
			8/12	16	blocked	140	4.0	140
5/8"	No. 6 Type S or W drywall screws 1-1/4" long	6/12	16	blocked	180	5.0	180	
		7	24	unblocked	230	6.0	230	
5/8"	Base ply—6d cooler (0.092" x 1-7/8" long, 1/4" head) or wallboard nail (0.0915" x 1-7/8" long, 19/64" head) or 0.120" nail x 1-3/4" long, min 3/8" head	4	24	unblocked	290	7.5	290	
		7	16	blocked	290	7.5	290	
(Two-Ply)	Face ply—6d cooler (0.113" x 2-3/8" long, 0.281" head) or wallboard nail (0.113" x 2-3/8" long, 3/8" head) or 0.120" nail x 2-3/8" long, min 3/8" head	4	16	blocked	350	8.5	350	
		8/12	16	unblocked	140	4.0	140	
1/2" x 2' x 8'	0.120" nail x 1-3/4" long, 7/16" head, diamond-point, galvanized	8/12	16	blocked	180	5.0	180	
		Base: 9			500	11	500	
Gypsum sheathing board	1/2" x 4'	Face: 7		16	blocked			
			4	16	unblocked	150	4.0	150
Gypsum sheathing board	5/8" x 4'	6d galvanized cooler (0.092" x 1-7/8" long, 1/4" head) or wallboard nail (0.0915" x 1-7/8" long, 19/64" head) or 0.120" nail x 1-3/4" long, min 3/8" head	4	24	blocked	350	8.5	350
			7	16	unblocked	200	5.5	200
Gypsum lath, plain or perforated with vertical joints staggered	3/8" lath and 1/2" plaster	0.092" x 1-1/8" long, 19/64" head, gypsum wallboard blue nail or 0.120" nail x 1-1/4" long, min 3/8" head	4/7	16	blocked	400	9.5	400
			5	16	unblocked	360	9.0	360
Gypsum lath, plain or perforated	3/8" lath and 1/2" plaster	0.092" x 1-1/8" long, 19/64" head, gypsum wallboard blue nail or 0.120" nail x 1-1/4" long, min 3/8" head	5	16	unblocked	200	5.5	200
			6	16	unblocked	360	9.0	360
Expanded metal or woven wire lath and Portland cement plaster	7/8"	0.120" nail x 1-1/2" long, 7/16" head	6	16	unblocked	360	9.0	360

1. Nominal unit shear capacities shall be adjusted in accordance with 4.3.3 to determine ASD allowable unit shear capacity and LRED factored unit resistance. For general construction requirements see 4.3.6. For specific requirements, see 4.3.7.4.
 2. Type S or W drywall screws shall conform to requirements of ASTM C 1002.
 3. Where two numbers are given for maximum fastener edge spacing, the first number denotes fastener spacing at the edges and the second number denotes fastener spacing along intermediate framing members.



LATERAL FORCE-RESISTING SYSTEMS

Table 4.3D Nominal Unit Shear Capacities for Wood-Frame Shear Walls¹

Lumber Shear Walls

Sheathing Material	Sheathing Nominal Dimensions	Type, Size, and Number of Nails per Board		SEISMIC		WIND	
		Nailing at Intermediate Studs (nails/board/support)	Nailing at Shear Wall Boundary Members (nails/board/end)	V _e (plf)	G _s (k/ps/in.)	V _w (plf)	
Horizontal Lumber Sheathing	1x6 & smaller	2-8d common nails (3-8d box nails)	3-8d common nails (5-8d box nails)	100	1.5	140	
	1x8 & larger	3-8d common nails (4-8d box nails)	4-8d common nails (6-8d box nails)	600	6.0	840	
Diagonal Lumber Sheathing	1x6 & smaller	3-8d common nails (4-8d box nails)	4-8d common nails (6-8d box nails)	1200	10	1680	
	1x8 & larger	2-8d common nails (3-8d box nails) 3-8d common nails (4-8d box nails)	3-8d common nails (5-8d box nails) 4-8d common nails (6-8d box nails)	90	1.0	125	

1. Nominal unit shear capacities shall be adjusted in accordance with 4.3.3 to determine ASD allowable unit shear capacity and LRFD factored unit resistance. For general construction requirements see 4.3.6. For specific requirements, see 4.3.7.5 through 4.3.7.8. See Appendix A for common and box nail dimensions.