3.1 Framing

3.1.1 Wall Framing

In addition to gravity loads, wall framing shall be designed to resist induced wind and seismic forces. The framing shall be designed using the methods referenced in 2.1.2.1 for allowable stress design (ASD) and 2.1.2.2 for strength design (LRFD).

3.1.1.1 Wall Stud Bending Design Value Increase: The reference bending design value, F_b, for sawn lumber wood studs resisting out-of-plane wind loads shall be permitted to be increased by the repetitive member factors in Table 3.1.1.1, in lieu of the NDS repetitive member factor, C_r=1.15. The repetitive member factors in Table 3.1.1.1 apply when studs are designed for bending, spaced no more than 16" on center, covered on the inside with a minimum of 1/2" gypsum wallboard, attached in accordance with minimum building code requirements and sheathed on the exterior with a minimum of 3/8" wood structural panel sheathing with all panel joints occurring over studs or blocking and attached using a minimum of 8d common nails spaced a maximum of 6" on center at panel edges and 12" on center at intermediate framing members.

Table 3.1.1.1 Wall Stud Repetitive Member Factors

Stud Size	System Factor
2x4	1.50
2x6	1.35
2x8	1.25
2x10	1.20
2x12	1.15

3.1.2 Floor Framing

In addition to gravity loads, floor framing shall be designed to resist induced wind and seismic forces. The framing shall be designed using the methods referenced in 2.1.2.1 for allowable stress design (ASD) and 2.1.2.2 for strength design (LRFD).

3.1.3 Roof Framing

In addition to gravity loads, roof framing shall be designed to resist induced wind and seismic forces. The framing shall be designed using the methods referenced in 2.1.2.1 for allowable stress design (ASD) and 2.1.2.2 for strength design (LRFD).

3.2 Sheathing

3.2.1 Wall Sheathing

Exterior wall sheathing and its fasteners shall be capable of resisting and transferring wind loads to the wall framing. Maximum spans and nominal uniform load capacities for wall sheathing materials are given in Table 3.2.1. The ASD allowable uniform load capacities to be used for wind design shall be determined by dividing the nominal uniform load capacities in Table 3.2.1 by an ASD reduction factor of 1.6. The LRFD factored uniform load capacities to be used for wind design shall be determined by multiplying the nominal uniform load capacities in Table 3.2.1 by a resistance factor, ϕ_b, of 0.85. Sheathing used in shear wall assemblies to resist lateral forces shall be designed in accordance with 4.3.

Table 3.2.1 Nominal Uniform Load Capacities (psf) for Wall Sheathing Resisting Out-of-Plane Wind Loads[1]

Sheathing Type[3]	Span Rating or Grade	Minimum Thickness (in.)	Strength Axis[5]							
			Perpendicular to Supports				Parallel to Supports			
			Maximum Stud Spacing (in.)	Actual Stud Spacing (in.)			Maximum Stud Spacing (in.)	Actual Stud Spacing (in.)		
				12	16	24		12	16	24
				Nominal Uniform Loads (psf)				Nominal Uniform Loads (psf)		
Wood Structural Panels (Sheathing Grades, C-C, C-D, C-C Plugged, OSB)[4]	24/0	3/8	24	425	240	105	24	90	50	25[2]
	24/16	7/16	24	540	305	135	24	110	60	25[2]
	32/16	15/32	24	625	355	155	24	155	90	40[2]
	40/20	19/32	24	955	595	265	24	255	145	65[2]
	48/24	23/32	24	1160	805	360	24	380	215	95[2]
Particleboard Sheathing (M-S Exterior Glue)		3/8	16	(contact manufacturer)			16	(contact manufacturer)		
		1/2	16				16			
Particleboard Panel Siding (M-S Exterior Glue)		5/8	16	(contact manufacturer)			16	(contact manufacturer)		
		3/4	24				24			
Hardboard Siding (Direct to Studs)	Lap Siding	7/16	16	460	260	-	-	-	-	-
	Shiplap Edge Panel Siding	7/16	24	460	260	115	24	460	260	115
	Square Edge Panel Siding	7/16	24	460	260	115	24	460	260	115
Cellulosic Fiberboard Sheathing	Regular	1/2	16	90	50	-	16	90	50	-
	Structural	1/2	16	135	75	-	16	135	75	-
	Structural	25/32	16	165	90	-	16	165	90	-

1. Nominal capacities shall be adjusted in accordance with Section 3.2.1 to determine ASD uniform load capacity and LRFD uniform resistances.
2. Sheathing shall be plywood with 4 or more plies or OSB.
3. Wood structural panels shall conform to the requirements for its type in DOC PS 1 or PS 2. Particleboard sheathing shall conform to ANSI A208.1. Hardboard panel and siding shall conform to the requirements of ANSI/CPA A135.6. Cellulosic fiberboard sheathing shall conform to ASTM C 208.
4. Tabulated values are for maximum bending loads from wind. Loads are limited by bending or shear stress assuming a 2-span continuous condition. Where panels are continuous over 3 or more spans the tabulated values shall be permitted to be increased in accordance with the *ASD/LRFD Manual for Engineered Wood Construction.*
5. Strength axis is defined as the axis parallel to the face and back orientation of the flakes or the grain (veneer), which is generally the long panel direction, unless otherwise marked.

3.2.2 Floor Sheathing

Floor sheathing shall be capable of resisting and transferring gravity loads to the floor framing. Sheathing used in diaphragm assemblies to resist lateral forces shall be designed in accordance with 4.2.

3.2.3 Roof Sheathing

Roof sheathing and its fasteners shall be capable of resisting and transferring wind and gravity loads to the roof framing. Maximum spans and nominal uniform load capacities for roof sheathing materials are given in Table 3.2.2. The ASD allowable uniform load capacities to be used for wind design shall be determined by dividing the nominal uniform load capacities in Table 3.2.2 by an ASD reduction factor of 1.6. The LRFD factored uniform load capacities to be used for wind design shall be determined by multiplying the nominal uniform load capacities in Table 3.2.2 by a resistance factor, ϕ_b, of 0.85. Sheathing used in diaphragm assemblies to resist lateral forces shall be designed in accordance with 4.2.

Table 3.2.2 Nominal Uniform Load Capacities (psf) for Roof Sheathing Resisting Out-of-Plane Wind Loads[1,3]

Sheathing Type[2]	Span Rating or Grade	Minimum Thickness (in.)	Strength Axis[4] Applied Perpendicular to Supports					
			Rafter/Truss Spacing (in.)					
			12	16	19.2	24	32	48
			Nominal Uniform Loads (psf)					
Wood Structural Panels (Sheathing Grades, C-C, C-D, C-C Plugged, OSB)	24/0	3/8	425	240	165	105	-	-
	24/16	7/16	540	305	210	135	-	-
	32/16	15/32	625	355	245	155	90	-
	40/20	19/32	955	595	415	265	150	-
	48/24	23/32	1160	805	560	360	200	90
Wood Structural Panels (Single Floor Grades, Underlayment, C-C Plugged)	16 o.c.	19/32	705	395	275	175	100	-
	20 o.c.	19/32	815	455	320	205	115	-
	24 o.c.	23/32	1085	610	425	270	150	-
	32 o.c.	7/8	1395	830	575	370	205	90
	48 o.c.	1-1/8	1790	1295	1060	680	380	170

1. Nominal capacities shall be adjusted in accordance with Section 3.2.3 to determine ASD uniform load capacity and LRFD uniform resistances.
2. Wood structural panels shall conform to the requirements for its type in DOC PS 1 or PS 2.
3. Tabulated values are for maximum bending loads from wind. Loads are limited by bending or shear stress assuming a 2-span continuous condition. Where panels are continuous over 3 or more spans, the tabulated values shall be permitted to be increased in accordance with the *ASD/LRFD Manual for Engineered Wood Construction.*
4. Strength axis is defined as the axis parallel to the face and back orientation of the flakes or the grain (veneer), which is generally the long panel direction, unless otherwise marked.

3.3 Connections

Connections resisting induced wind and seismic forces shall be designed in accordance with the methods referenced in 2.1.2.1 for allowable stress design (ASD) and 2.1.2.2 for strength design (LRFD).