

REVISION RECORD FOR THE STATE OF CALIFORNIA

EMERGENCY SUPPLEMENT

Effective January 30, 2017

2016 Title 24, Part 2, Vol. 2
California Building Code

General Information:

1. This supplement provides emergency building standards that were adopted by the Building Standards Commission on January 27, 2017, filed with Secretary of State, and became effective January 30, 2017. The Building Standards Commission issued Information Bulletin 17-01 announcing the emergency regulations.

Clarification: Emergency building standards become effective upon filing with Secretary of State after commission adoption. They remain in place and enforceable for only 180 days, pursuant to *Government Code*, Sections 11346.2 to 11347.3. For the emergency building standards to become a permanent adoption, the state agency initiating the emergency adoption must complete the required rulemaking process before the 180-day expiration date. The required process includes an opportunity for the public to review and comment on the initially adopted regulatory language of the building standard.

2. This Emergency Supplement provides new or replacement blue supplement pages with building standards approved by the California Building Standards Commission on an emergency basis for insertion in the *California Code of Regulations*, Title 24, Part 2, Vol. 2, of the 2016 *California Building Standards Code*. Existing Part 2 pages should be replaced by pages provided with this supplement. Instructions are provided below.
3. *Health and Safety Code*, Section 18938.5, establishes that only building standards in effect at the time of the application for a building permit may be applied to the project plans and construction. This rule applies to both adoptions of building standards for Title 24 by the California Building Standards Commission, and local adoptions and ordinances imposing building standards.
4. Not all code text on the enclosed blue Emergency Supplement pages is a new or amended building standard. New, amended, or repealed building standards are identified by margin symbols. An explanation of margin symbols is provided in the front of the code.
5. You may wish to retain the superseded material with this revision record so that the prior wording of any section can be easily ascertained.

Remove Existing Pages

1 and 2
9 and 10
47 and 48
63 and 64
267 and 268
285 and 286
655 and 656

Insert Blue-Colored Pages

1 and 2
9 and 10
47 and 48
63 and 64
267 and 268
285 and 286
655 and 656

CALIFORNIA BUILDING CODE – MATRIX ADOPTION TABLE

CHAPTER 16 – STRUCTURAL DESIGN

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.

See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	BSC-CG	SFM	HCD			DSA			OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1/AC	AC	SS	SS/CC	1	2	3	4								
Adopt entire chapter												X									
Adopt entire chapter as amended (amended sections listed below)	X			X	X				X		X										
Adopt only those sections that are listed below						X	X												X		
Chapter / Section																					
1601.1.1									X												
1601.1.2									X												
1601.1.3									X												
1601.1.4									X												
1601.2									X		X										
1603.1											X										
1607.1, Table 1607.1											X										
Table 1607.1	X			X	X																
1607.8						X															
1607.8.2						X	X														
1612.3, <i>Exception</i>											X										
1613.1											X										
1613.1.1																			X		
1613.1.2	X																				
1613.1.3	X																				
1613.3.1, <i>Exception</i>											X										
1613.3.5, <i>Exception</i>											X										
1613.3.5.1, <i>Exception</i>											X										
1613.3.5.2, <i>Exception</i>											X										
1613.5	X										X										
1613.5.1, <i>Exception</i>											X										
1616									X												

The state agency does not adopt sections identified with the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

$$0.6D + 0.6W + H \quad \text{(Equation 16-15)}$$

$$0.6(D + F) + 0.7E + H \quad \text{(Equation 16-16)}$$

Exceptions:

1. Crane hook loads need not be combined with roof live load or with more than three-fourths of the snow load or one-half of the wind load.
2. Flat roof snow loads of 30 psf (1.44 kN/m²) or less and roof live loads of 30 psf (1.44 kN/m²) or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 psf (1.44 kN/m²), 20 percent shall be combined with seismic loads.
3. Where the effect of H resists the primary variable load effect, a load factor of 0.6 shall be included with H where H is permanent and H shall be set to zero for all other conditions.
4. In Equation 16-15, the wind load, W , is permitted to be reduced in accordance with Exception 2 of Section 2.4.1 of ASCE 7.
5. In Equation 16-16, $0.6 D$ is permitted to be increased to $0.9 D$ for the design of special reinforced masonry shear walls complying with Chapter 21.

1605.3.1.1 Stress increases. Increases in allowable stresses specified in the appropriate material chapter or the referenced standards shall not be used with the load combinations of Section 1605.3.1, except that increases shall be permitted in accordance with Chapter 23.

1605.3.1.2 Other loads. Where flood loads, F_o , are to be considered in design, the load combinations of Section 2.4.2 of ASCE 7 shall be used. Where self-straining loads, T , are considered in design, their structural effects in combination with other loads shall be determined in accordance with Section 2.4.4 of ASCE 7. Where an ice-sensitive structure is subjected to loads due to atmospheric icing, the load combinations of Section 2.4.3 of ASCE 7 shall be considered.

1605.3.2 Alternative basic load combinations. In lieu of the basic load combinations specified in Section 1605.3.1, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following combinations. When using these alternative basic load combinations that include wind or seismic loads, allowable stresses are permitted to be increased or load combinations reduced where permitted by the material chapter of this code or the referenced standards. For load combinations that include the counteracting effects of dead and wind loads, only two-thirds of the minimum dead load likely to be in place during a design wind event shall be used. When using allowable stresses that have been increased or load combinations that have been reduced as permitted by the material chapter of this code or the referenced standards, where wind loads are calculated in accordance with Chapters 26 through 31 of ASCE 7, the coefficient (ω) in the following equations shall be taken as 1.3. For other wind loads, (ω) shall be taken as 1. When allowable stresses have not been increased or load

combinations have not been reduced as permitted by the material chapter of this code or the referenced standards, (ω) shall be taken as 1. When using these alternative load combinations to evaluate sliding, overturning and soil bearing at the soil-structure interface, the reduction of foundation overturning from Section 12.13.4 in ASCE 7 shall not be used. When using these alternative basic load combinations for proportioning foundations for loadings, which include seismic loads, the vertical seismic load effect, E_v , in Equation 12.4-4 of ASCE 7 is permitted to be taken equal to zero.

$$D + L + (L_r \text{ or } S \text{ or } R) \quad \text{(Equation 16-17)}$$

$$D + L + 0.6 \omega W \quad \text{(Equation 16-18)}$$

$$D + L + 0.6 \omega W + S/2 \quad \text{(Equation 16-19)}$$

$$D + L + S + 0.6 \omega W/2 \quad \text{(Equation 16-20)}$$

$$D + L + S + E/1.4 \quad \text{(Equation 16-21)}$$

$$0.9D + E/1.4 \quad \text{(Equation 16-22)}$$

Exceptions:

1. Crane hook loads need not be combined with roof live loads or with more than three-fourths of the snow load or one-half of the wind load.
2. Flat roof snow loads of 30 psf (1.44 kN/m²) or less and roof live loads of 30 psf (1.44 kN/m²) or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 psf (1.44 kN/m²), 20 percent shall be combined with seismic loads.

1605.3.2.1 Other loads. Where F , H or T are to be considered in the design, each applicable load shall be added to the combinations specified in Section 1605.3.2. Where self-straining loads, T , are considered in design, their structural effects in combination with other loads shall be determined in accordance with Section 2.4.4 of ASCE 7.

SECTION 1606 DEAD LOADS

1606.1 General. Dead loads are those loads defined in Section 1602.1. Dead loads shall be considered permanent loads.

1606.2 Design dead load. For purposes of design, the actual weights of materials of construction and fixed service equipment shall be used. In the absence of definite information, values used shall be subject to the approval of the building official.

SECTION 1607 LIVE LOADS

1607.1 General. Live loads are those loads defined in Section 1602.1.

1607.2 Loads not specified. For occupancies or uses not designated in Table 1607.1, the live load shall be determined in accordance with a method approved by the building official.

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o ,
AND MINIMUM CONCENTRATED LIVE LOADS^g

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
1. Apartments (see residential)	—	—
2. Access floor systems		
Office use	50	2,000
Computer use	100	2,000
3. Armories and drill rooms	150 ^m	—
4. Assembly areas		
Fixed seats (fastened to floor)	60 ^m	—
Follow spot, projections and control rooms	50	
Lobbies	100 ^m	
Movable seats	100 ^m	
Stage floors	150 ^m	
Platforms (assembly)	100 ^m	
Other assembly areas	100 ^m	
5. Balconies and decks ^h	[BSC, HCD 1, HCD 2] 1.5 times the live load for the area served. Not required to exceed 100 psf.	—
6. Catwalks	40	300
7. Cornices	60	—
8. Corridors		
First floor	100	—
Other floors	Same as occupancy served except as indicated	
9. Dining rooms and restaurants	100 ^m	—
10. Dwellings (see residential)	—	—
11. Elevator machine room and control room grating (on area of 2 inches by 2 inches)	—	300
12. Finish light floor plate construction (on area of 1 inch by 1 inch)	—	200
13. Fire escapes	100	—
On single-family dwellings only	40	
14. Garages (passenger vehicles only)	40 ^m	Note a
Trucks and buses	See Section 1607.7	
15. Handrails, guards and grab bars	See Section 1607.8	
16. Helipads	See Section 1607.6	
17. Hospitals		
Corridors above first floor	80	1,000
Operating rooms, laboratories	60	1,000
Patient rooms	40	1,000
18. Hotels (see residential)	—	—
19. Libraries		
Corridors above first floor	80	1,000
Reading rooms	60	1,000
Stack rooms	150 ^{b, m}	1,000
20. Manufacturing		
Heavy	250 ^m	3,000
Light	125 ^m	2,000
21. Marquees, except one- and two-family dwellings	75	—

(continued)

TABLE 1607.1—continued
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o ,
AND MINIMUM CONCENTRATED LIVE LOADS^g

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
22. Office buildings		
Corridors above first floor	80	2,000
File and computer rooms shall be designed for heavier loads based on anticipated occupancy	—	—
Lobbies and first-floor corridors	100	2,000
Offices	50	2,000
23. Penal institutions		
Cell blocks	40	—
Corridors	100	—
24. Recreational uses:		
Bowling alleys, poolrooms and similar uses	75 ^m	—
Dance halls and ballrooms	100 ^m	
Gymnasiums	100 ^m	
Ice skating rink	250 ^m	
Reviewing stands, grandstands and bleachers	100 ^{c, m}	
Roller skating rink	100 ^m	
Stadiums and arenas with fixed seats (fastened to floor)	60 ^{c, m}	
25. Residential		
One- and two-family dwellings		—
Uninhabitable attics without storage ⁱ	10	
Uninhabitable attics with storage ^{i, j, k}	20	
Habitable attics and sleeping areas ^k	30	
Canopies, including marquees	20	
All other areas	40	
Hotels and multifamily dwellings		
Private rooms and corridors serving them	40	
Public rooms ^m and corridors serving them	100	
26. Roofs		
All roof surfaces subject to maintenance workers		300
Awnings and canopies:		
Fabric construction supported by a skeleton structure	5	
All other construction, except one- and two-family dwellings	20	
Ordinary flat, pitched, and curved roofs (that are not occupiable)	20	
Primary roof members exposed to a work floor:		2,000 300
Single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs over manufacturing, storage warehouses, and repair garages		
All other primary roof members		
Occupiable roofs:		
Roof gardens	100	
Assembly areas	100 ^m	
All other similar areas	Note 1	
27. Schools		
Classrooms	40	1,000
Corridors above first floor	80	1,000
First-floor corridors	100	1,000
28. Scuttles, skylight ribs and accessible ceilings	—	200
29. Sidewalks, vehicular driveways and yards, subject to trucking	250 ^{d, m}	8,000 ^e

(continued)

1615.4.2.1 Longitudinal ties. Longitudinal ties shall consist of continuous reinforcement in slabs; continuous or spliced decks or sheathing; continuous or spliced members framing to, within or across walls; or connections of continuous framing members to walls. Longitudinal ties shall extend across interior load-bearing walls and shall connect to exterior load-bearing walls and shall be spaced at not greater than 10 feet (3038 mm) on center. Ties shall have a minimum nominal tensile strength, T_T , given by Equation 16-41. For ASD the minimum nominal tensile strength shall be permitted to be taken as 1.5 times the allowable tensile stress times the area of the tie.

$$T_T = wLS \leq \alpha_T S \quad (\text{Equation 16-41})$$

where:

L = The span of the horizontal element in the direction of the tie, between bearing walls, feet (m).

w = The weight per unit area of the floor or roof in the span being tied to or across the wall, psf (N/m²).

S = The spacing between ties, feet (m).

α_T = A coefficient with a value of 1,500 pounds per foot (2.25 kN/m) for masonry bearing wall structures and a value of 375 pounds per foot (0.6 kN/m) for structures with bearing walls of cold-formed steel light-frame construction.

1615.4.2.2 Transverse ties. Transverse ties shall consist of continuous reinforcement in slabs; continuous or spliced decks or sheathing; continuous or spliced mem-

bers framing to, within or across walls; or connections of continuous framing members to walls. Transverse ties shall be placed no farther apart than the spacing of load-bearing walls. Transverse ties shall have minimum nominal tensile strength T_T , given by Equation 16-41. For ASD the minimum nominal tensile strength shall be permitted to be taken as 1.5 times the allowable tensile stress times the area of the tie.

1615.4.2.3 Perimeter ties. Perimeter ties shall consist of continuous reinforcement in slabs; continuous or spliced decks or sheathing; continuous or spliced members framing to, within or across walls; or connections of continuous framing members to walls. Ties around the perimeter of each floor and roof shall be located within 4 feet (1219 mm) of the edge and shall provide a nominal strength in tension not less than T_p , given by Equation 16-42. For ASD the minimum nominal tensile strength shall be permitted to be taken as 1.5 times the allowable tensile stress times the area of the tie.

$$T_p = 200w \leq \beta_T \quad (\text{Equation 16-42})$$

$$\text{For SI: } T_p = 90.7w \leq \beta_T$$

where:

w = As defined in Section 1615.4.2.1.

β_T = A coefficient with a value of 16,000 pounds (7200 kN) for structures with masonry bearing walls and a value of 4,000 pounds (1300 kN) for structures with bearing walls of cold-formed steel light-frame construction.

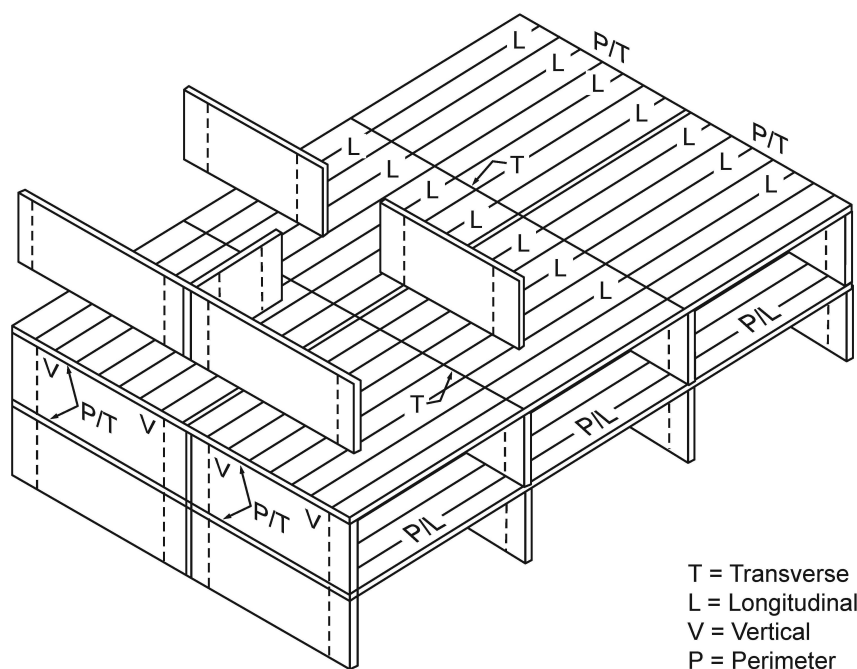


FIGURE 1615.4
LONGITUDINAL, PERIMETER, TRANSVERSE AND VERTICAL TIES

1615.4.2.4 Vertical ties. Vertical ties shall consist of continuous or spliced reinforcing, continuous or spliced members, wall sheathing or other engineered systems. Vertical tension ties shall be provided in bearing walls and shall be continuous over the height of the building. The minimum nominal tensile strength for vertical ties within a bearing wall shall be equal to the weight of the wall within that story plus the weight of the diaphragm tributary to the wall in the story below. No fewer than two ties shall be provided for each wall. The strength of each tie need not exceed 3,000 pounds per foot (450 kN/m) of wall tributary to the tie for walls of masonry construction or 750 pounds per foot (140 kN/m) of wall tributary to the tie for walls of cold-formed steel light-frame construction.

SECTION 1616 ADDITIONAL REQUIREMENTS FOR COMMUNITY COLLEGES [DSA-SS/CC]

1616.1 Construction documents.

1616.1.1 Additional requirements for construction documents are included in Sections 4-210 and 4-317 of the California Administrative Code (Part 1, Title 24, C.C.R).

1616.1.2 Connections. Connections that resist design seismic forces shall be designed and detailed on the design drawings.

1616.1.3 Construction procedures. Where unusual erection or construction procedures are considered essential by the project structural engineer or architect in order to accomplish the intent of the design or influence the construction, such procedure shall be indicated on the plans or in the specifications.

1616.2 General design requirements.

1616.2.1 Lateral load deflections.

1616.2.1.1 Horizontal diaphragms. The maximum span-depth ratio for any roof or floor diaphragm consisting of steel and composite steel slab decking or concrete shall be based on test data and design calculations acceptable to the enforcement agency.

1616.2.1.2 Veneers. The deflection shall not exceed $l/600$ for veneered walls, anchored veneers and adhered veneers over 1 inch (25 mm) thick, including the mortar backing.

1616.2.1.3 Risk Category of buildings and other structures. Risk Category IV includes structures as defined in the California Administrative Code, Section 4-207 and all structures required for their continuous operation or access/egress.

1616.2.1.4 Analysis. Structural analysis shall explicitly include consideration of stiffness of diaphragm in accordance with ASCE 7 Section 12.3.1. A diaphragm is rigid for the purpose of distribution of story shear and torsional moment where so indicated in Section 12.3.1 of ASCE 7.

1616.2.2 Structural walls. For anchorage of concrete or masonry walls to roof and floor diaphragms, the out-of-

plane strength design force shall not be less than 280 lb/linear ft (4.09 kN/m) of wall.

1616.3 Load combinations.

1616.3.1 Stability. When checking stability under the provisions of Section 1605.1.1 using allowable stress design, the factor of safety for soil bearing values shall not be less than the overstrength factor of the structures supported.

1616.4 Roof dead loads. The design dead load shall provide for the weight of at least one additional roof covering in addition to other applicable loadings if the new roof covering is permitted to be applied over the original roofing without its removal, in accordance with Section 1511.

1616.5 Live loads.

1616.5.1 Modifications to Table 1607.1.

1616.5.1.1 Item 4. Assembly areas. The following minimum loads for stage accessories apply:

1. Gridirons and fly galleries: 75 pounds per square foot uniform live load.
2. Loft block wells: 250 pounds per lineal foot vertical load and lateral load.
3. Head block wells and sheave beams: 250 pounds per lineal foot vertical load and lateral load. Head block wells and sheave beams shall be designed for all tributary loft block well loads. Sheave blocks shall be designed with a safety factor of five.
4. Scenery beams where there is no gridiron: 300 pounds per lineal foot vertical load and lateral load.
5. Ceiling framing over stages shall be designed for a uniform live load of 20 pounds per square foot. For members supporting a tributary area of 200 square feet or more, this additional load may be reduced to 15 pounds per square foot (0.72 kN/m²).

1616.5.1.2 Item 5. Balconies and decks. The minimum uniform live load for balconies and decks is 1.5 times the live load for the area served. Not required to exceed 100 psf.

1616.5.1.3 Item 24. Reviewing stands, grandstands and bleachers. The minimum uniform live load for a press box floor or accessible roof with railing is 100 psf.

1616.5.1.4 Item 35. Yards and terraces, pedestrians. Item 35 applies to pedestrian bridges and walkways that are not subjected to uncontrolled vehicle access.

1616.5.1.5 Item 36. Storage racks and wall-hung cabinets. The minimum vertical design live load shall be as follows:

Paper media:

12-inch-deep (305 mm) shelf - 33 pounds per lineal foot (482 N/m)

15-inch-deep (381 mm) shelf - 41 pounds per lineal foot (598 N/m), or 33 pounds per cubic foot

1605A.3.1.2 Other loads. Where flood loads, F_a , are to be considered in design, the load combinations of Section 2.4.2 of ASCE 7 shall be used. Where self-straining loads, T , are considered in design, their structural effects in combination with other loads shall be determined in accordance with Section 2.4.4 of ASCE 7. Where an ice-sensitive structure is subjected to loads due to atmospheric icing, the load combinations of Section 2.4.3 of ASCE 7 shall be considered.

1605A.3.2 Alternative basic load combinations. In lieu of the basic load combinations specified in Section 1605A.3.1, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following combinations. When using these alternative basic load combinations that include wind or seismic loads, allowable stresses are permitted to be increased or load combinations reduced where permitted by the material chapter of this code or the referenced standards. For load combinations that include the counteracting effects of dead and wind loads, only two-thirds of the minimum dead load likely to be in place during a design wind event shall be used. When using allowable stresses that have been increased or load combinations that have been reduced as permitted by the material chapter of this code or the referenced standards, where wind loads are calculated in accordance with Chapters 26 through 31 of ASCE 7, the coefficient (ω) in the following equations shall be taken as 1.3. For other wind loads, (ω) shall be taken as 1. When allowable stresses have not been increased or load combinations have not been reduced as permitted by the material chapter of this code or the referenced standards, (ω) shall be taken as 1. When using these alternative load combinations to evaluate sliding, overturning and soil bearing at the soil-structure interface, the reduction of foundation overturning from Section 12.13.4 in ASCE 7 shall not be used. When using these alternative basic load combinations for proportioning foundations for loadings, which include seismic loads, the vertical seismic load effect, E_v , in Equation 12.4-4 of ASCE 7 is permitted to be taken equal to zero.

$$D + L + (L_r \text{ or } S \text{ or } R) \quad (\text{Equation 16A-17})$$

$$D + L + 0.6 \omega W \quad (\text{Equation 16A-18})$$

$$D + L + 0.6 \omega W + S/2 \quad (\text{Equation 16A-19})$$

$$D + L + S + 0.6 \omega W/2 \quad (\text{Equation 16A-20})$$

$$D + L + S + E/1.4 \quad (\text{Equation 16A-21})$$

$$0.9D + E/1.4 \quad (\text{Equation 16A-22})$$

Exceptions:

1. Crane hook loads need not be combined with roof live loads or with more than three-fourths of the snow load or one-half of the wind load.
2. Flat roof snow loads of 30 psf (1.44 kN/m²) or less and roof live loads of 30 psf (1.44 kN/m²) or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 psf (1.44

kN/m²), 20 percent shall be combined with seismic loads.

1605A.3.2.1 Other loads. Where F , H or T are to be considered in the design, each applicable load shall be added to the combinations specified in Section 1605A.3.2. Where self-straining loads, T , are considered in design, their structural effects in combination with other loads shall be determined in accordance with Section 2.4.4 of ASCE 7.

SECTION 1606A DEAD LOADS

1606A.1 General. Dead loads are those loads defined in Chapter 2 of this code. Dead loads shall be considered permanent loads.

1606A.2 Design dead load. For purposes of design, the actual weights of materials of construction and fixed service equipment shall be used. In the absence of definite information, values used shall be subject to the approval of the building official.

1606A.3 Roof dead loads. *The design dead load shall provide for the weight of at least one additional roof covering in addition to other applicable loadings if the new roof covering is permitted to be applied over the original roofing without its removal, in accordance with Section 1511.*

SECTION 1607A LIVE LOADS

1607A.1 General. Live loads are those loads defined in Chapter 2 and Section 1602A.1 of this code.

1607A.2 Loads not specified. For occupancies or uses not designated in Table 1607A.1, the live load shall be determined in accordance with a method approved by the building official.

1607A.3 Uniform live loads. The live loads used in the design of buildings and other structures shall be the maximum loads expected by the intended use or occupancy but shall in no case be less than the minimum uniformly distributed live loads given in Table 1607A.1.

1607A.4 Concentrated live loads. Floors and other similar surfaces shall be designed to support the uniformly distributed live loads prescribed in Section 1607A.3 or the concentrated live loads, given in Table 1607A.1, whichever produces the greater load effects. Unless otherwise specified, the indicated concentration shall be assumed to be uniformly distributed over an area of 2½ feet by 2½ feet (762 mm by 762 mm) and shall be located so as to produce the maximum load effects in the structural members.

1607A.5 Partition loads. In office buildings and in other buildings where partition locations are subject to change, provisions for partition weight shall be made, whether or not partitions are shown on the construction documents, unless the specified live load is 80 psf (3.83 kN/m²) or greater. The partition load shall be not less than a uniformly distributed live load of 15 psf (0.72 kN/m²).

TABLE 1607A.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o ,
AND MINIMUM CONCENTRATED LIVE LOADS^g

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
1. Apartments (see residential)	—	—
2. Access floor systems		
Office use	50	2,000
Computer use	100	2,000
3. Armories and drill rooms	150 ^m	—
4. Assembly areas ^{a, q}		
Fixed seats (fastened to floor)	60 ^m	
Follow spot, projections and control rooms	50	
Lobbies	100 ^m	—
Movable seats	100 ^m	
Stage floors	150 ^m	
Platforms (assembly)	100 ^m	
Other assembly areas	100 ^m	
5. Balconies and decks ^h	<i>[DSA-SS] 1.5 times the live load for the area served. Not required to exceed 100 psf.</i>	—
6. Catwalks	40	300
7. Cornices	60	—
8. Corridors		
First floor	100	
Other floors	Same as occupancy served except as indicated	—
9. Dining rooms and restaurants	100 ^m	—
10. Dwellings (see residential)	—	—
11. Elevator machine room and control room grating (on area of 2 inches by 2 inches)	—	300
12. Finish light floor plate construction (on area of 1 inch by 1 inch)	—	200
13. Fire escapes	100	
On single-family dwellings only	40	—
14. Garages (passenger vehicles only)	40 ^m	Note a
Trucks and buses	See Section 1607.7	
15. Handrails, guards and grab bars	See Section 1607.8	
16. Helipads	See Section 1607.6	
17. Hospitals [OSHPD 1 & 4]		
Corridors above first floor	80	1,000
Operating rooms, laboratories	60	1,000
Patient rooms	40	1,000
Mechanical and electrical equipment areas including open areas around equipment	50	
Storage		
Light	125	
Heavy	250	
Dining Area (not used for assembly)	100	1,000
Kitchen and serving areas	50	1,000
18. Hotels (see residential)	—	—
19. Libraries ^r		
Corridors above first floor	80	1,000
Reading rooms	60 ^m	1,000
Stack rooms	150 ^{b, m}	1,000
20. Manufacturing		
Heavy	250 ^m	3,000
Light	125 ^m	2,000
21. Marquees, except one- and two-family dwellings	75	—

(continued)

TABLE 1607A.1—continued
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o ,
AND MINIMUM CONCENTRATED LIVE LOADS^g

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
22. Office buildings ^r		
Corridors above first floor	80	2,000
File and computer rooms shall be designed for heavier loads based on anticipated occupancy	—	—
Lobbies and first-floor corridors	100	2,000
Offices	50	2,000
23. Penal institutions		
Cell blocks	40	—
Corridors	100	
24. Recreational uses:		
Bowling alleys, poolrooms and similar uses	75 ^m	
Dance halls and ballrooms	100 ^m	
Gymnasiums	100 ^m	
Ice skating rink	250 ^m	—
Reviewing stands, grandstands and bleachers ^q	100 ^{c, m}	
Roller skating rink	100 ^m	
Stadiums and arenas with fixed seats (fastened to floor)	60 ^{c, m}	
25. Residential		
One- and two-family dwellings		
Uninhabitable attics without storage ⁱ	10	
Uninhabitable attics with storage ^{i, j, k}	20	
Habitable attics and sleeping areas ^k	30	
Canopies, including marquees	20	—
All other areas	40	
Hotels and multifamily dwellings		
Private rooms and corridors serving them	40	
Public rooms ^m and corridors serving them	100	
26. Roofs		
All roof surfaces subject to maintenance workers		300
Awnings and canopies:		
Fabric construction supported by a skeleton structure	5	
All other construction, except one- and two-family dwellings	20	
Ordinary flat, pitched, and curved roofs (that are not occupiable)	20	
Primary roof members exposed to a work floor		
Single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs over manufacturing, storage warehouses, and repair garages		2,000
All other primary roof members		300
Occupiable roofs:		
Roof gardens	100	
Assembly areas	100 ^m	
All other similar areas	Note 1	Note 1
27. Schools ⁿ		
Classrooms	40 ^p	1,000
Corridors above first floor	80	1,000
First-floor corridors	100	1,000
28. Scuttles, skylight ribs and accessible ceilings	—	200
29. Sidewalks, vehicular drive ways and yards, subject to trucking	250 ^{d, m}	8,000 ^e

(continued)

CALIFORNIA BUILDING CODE – MATRIX ADOPTION TABLE

CHAPTER 23 – WOOD

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	BSC- CG	SFM	HCD			DSA			OSHDP				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1/AC	AC	SS	SS/CC	1	2	3	4								
Adopt entire chapter	X																				
Adopt entire chapter as amended (amended sections listed below)				X	X			X	X	X	X		X								
Adopt only those sections that are listed below			X																X		
Chapter / Section																					
2301.1				X																	
2301.1.1								X	X	X	X		X								
2301.1.2								X	X	X	X		X								
2301.1.3								X	X	X	X		X								
2301.1.3.1								X		X	X		X								
2301.1.3.2									X												
2301.1.4								X	X	X	X		X								
2301.2, Item 4, Exception										X	X		X								
2303.1.3.1								X	X	X	X		X								
2303.1.4.1								X	X	X	X		X								
2303.2 – 2303.2.9			X																		
2303.4.1.4.1, Exception 3								X	X	X	X		X								
2303.4.3.1								X	X	X	X		X								
2304.3.1.1				X																	
2304.3.4								X	X	X	X		X								
2304.4.1								X	X												
2304.5																					
2304.6.1										X			X								
2304.10.1.1								X		X	X		X								
2304.12.1.1.1																			X		
2304.12.1.2, Exception								X		X	X		X								
2304.12.1.4.1								X		X	X		X								
2304.12.2.5	X			X	X			X	X												
2304.12.2.6	X			X	X			X	X												
2304.12.8																			X		
2304.12.9																			X		
2305.1.2								X	X	X	X		X								
2308.1				X	X																
2308.2.7								X	X		X										
2309.1.1								X	X		X										

The state agency does not adopt sections identified with the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

CHAPTER 23

WOOD

SECTION 2301 GENERAL

2301.1 Scope. The provisions of this chapter shall govern the materials, design, construction and quality of wood members and their fasteners.

[HCD 1] For limited-density owner-built rural dwellings, owner-produced or used materials and appliances may be

utilized unless found not to be of sufficient strength or durability to perform the intended function; owner-produced or used lumber, or shakes and shingles may be utilized unless found to contain dry rot, excessive splitting or other defects obviously rendering the material unfit in strength or durability for the intended purpose.

2301.1.1 Application. [DSA-SS, DSA-SS/CC & OSHPD 1, 2 & 4] The scope of application of Chapter 23 is as follows:

1. Applications listed in Sections 1.9.2.1 and 1.9.2.2, regulated by the Division of the State Architect-Structural Safety (DSA-SS, and DSA-SS/CC). These applications include public elementary and secondary schools, community colleges and state-owned or state-leased essential services buildings.
2. Applications listed in Section 1.10, regulated by the Office of Statewide Health Planning and Development (OSHPD). These applications include hospitals, skilled nursing facilities, intermediate care facilities and correctional treatment centers.

Exception: For applications listed in Section 1.10.3 (Licensed Clinics), the provisions of this chapter without OSHPD amendments identified in accordance with Section 2301.1.2 shall apply.

2301.1.2 Identification of amendments. [DSA-SS, DSA-SS/CC & OSHPD 1, 2 & 4] Amendments appear in this chapter preceded with the appropriate acronym, as follows:

1. Division of the State Architect - Structural Safety:
[DSA-SS] - For applications listed in Section 1.9.2.1.
[DSA-SS/CC] - For applications listed in Section 1.9.2.2
2. Office of Statewide Health Planning and Development:
[OSHPD 1] - For applications listed in Section 1.10.1.
[OSHPD 2] - For applications listed in Section 1.10.2.
[OSHPD 4] - For applications listed in Section 1.10.4.

2301.1.3 Reference to other chapters.

2301.1.3.1 [DSA-SS and OSHPD 1 & 4] Where reference within this chapter is made to sections in Chapters 16, 17, 18, 19, 21, and 22, the provisions in Chapters 16A, 17A, 18A, 19A, 21A, and 22A, respectively shall apply instead.

2301.1.3.2 [DSA-SS/CC] Where reference within this chapter is made to sections in Chapters 17 and 18, the provisions in Chapters 17A and 18A respectively shall apply instead.

2301.1.4 Prohibition. [DSA-SS & DSA-SS/CC & OSHPD 1, 2 & 4] The following design methods, systems, and materials are not permitted by DSA and OSHPD:

1. Straight-sheathed horizontal lumber diaphragms.
2. Gypsum-based sheathing shear walls and portland cement plaster shear walls.
3. Shear wall foundation anchor bolt washers in accordance with exception to AWC SDPWS Section 4.3.6.4.3.
4. Wood structural panel shear walls and diaphragms using staples as fasteners.
5. Unblocked shear walls.

6. Any wood structural panel sheathing used for diaphragms and shear walls that are part of the seismic force-resisting system, not applied directly to framing members.
7. Single and double diagonally sheathed lumber walls used to resist seismic forces.
8. Log structures in accordance with ICC 400.
9. Cross-laminated timber used as part of the seismic force-resisting system, unless approved as an alternative system in accordance with Section 104.11.

2301.2 General design requirements. The design of structural elements or systems, constructed partially or wholly of wood or wood-based products, shall be in accordance with one of the following methods:

1. Allowable stress design in accordance with Sections 2304, 2305 and 2306.
2. Load and resistance factor design in accordance with Sections 2304, 2305 and 2307.
3. Conventional light-frame construction in accordance with Sections 2304 and 2308.
4. AWC WFCM in accordance with Section 2309.
5. The design and construction of log structures in accordance with the provisions of ICC 400.

2301.3 Nominal sizes. For the purposes of this chapter, where dimensions of lumber are specified, they shall be deemed to be nominal dimensions unless specifically designated as actual dimensions (see Section 2304.2).

SECTION 2302 DEFINITIONS

2302.1 Definitions. The following terms are defined in Chapter 2:

ACCREDITATION BODY.

BRACED WALL LINE.

BRACED WALL PANEL.

COLLECTOR.

CONVENTIONAL LIGHT-FRAME CONSTRUCTION.

CRIPPLE WALL.

CROSS-LAMINATED TIMBER.

DIAPHRAGM, UNBLOCKED.

DRAG STRUT.

ENGINEERED WOOD RIM BOARD.

FIBERBOARD.

GABLE.

GRADE (LUMBER).

HARDBOARD.

NAILING, BOUNDARY.

NAILING, EDGE.

NAILING, FIELD.

2304.12.2.4 Laminated timbers. The portions of glued-laminated timbers that form the structural supports of a building or other structure and are exposed to weather and not fully protected from moisture by a roof, eave or similar covering shall be pressure treated with preservative or be manufactured from naturally durable or preservative-treated wood.

2304.12.2.5 Supporting members for permeable floors and roofs. Wood structural members that support moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, shall be of naturally durable or preservative-treated wood unless separated from such floors or roofs by an impervious moisture barrier. *[BSC, DSA-SS, DSA-SS/CC, HCD 1, HCD 2] The impervious moisture barrier system protecting the structure supporting floors shall provide positive drainage of water that infiltrates the moisture-permeable floor topping.*

2304.12.2.6 Ventilation required beneath balcony or elevated walking surfaces. *[BSC, DSA-SS, DSA-SS/CC, HCD 1, HCD 2] Enclosed framing in exterior balconies and elevated walking surfaces that are exposed to rain, snow, or drainage from irrigation, shall be provided with openings that provide a net free cross ventilation area not less than $1/150$ of the area of each separate space.*

2304.12.3 Wood in contact with the ground or fresh water. Wood used in contact with exposed earth shall be naturally durable for both decay and termite resistance or preservative treated in accordance with AWP A U1 for soil or fresh water use.

Exception: Untreated wood is permitted where such wood is continuously and entirely below the ground-water level or submerged in fresh water.

2304.12.3.1 Posts or columns. Posts and columns that are supporting permanent structures and embedded in concrete that is exposed to the weather or in direct contact with the earth shall be of preservative-treated wood.

2304.12.4 Termite protection. In geographical areas where hazard of termite damage is known to be very heavy, wood floor framing in the locations specified in Section 2304.12.2.1 and exposed framing of exterior decks or balconies shall be of naturally durable species (termite resistant) or preservative treated in accordance with AWP A U1 for the species, product preservative and end use or provided with approved methods of termite protection.

2304.12.5 Wood used in retaining walls and cribs. Wood installed in retaining or crib walls shall be preservative treated in accordance with AWP A U1 for soil and fresh water use.

2304.12.6 Attic ventilation. For attic ventilation, see Section 1203.2.

2304.12.7 Under-floor ventilation (crawl space). For under-floor ventilation (crawl space), see Section 1203.4.

2304.12.8 Separate wood framing. *[SPCB] Correct the conditions in frame and stucco walls and similar appurtenant construction so that the wood framing is separate from the main structure by a complete concrete or masonry plug with no voids that will allow infestations to enter the structure from the wall. If there is no plug, the foundation shall be 2 inches (51 mm) or more above the grade levels and at least as high as the adjoining slabs or 4-inch (102 mm) concrete barrier seat off installed.*

2304.12.9 Earth fills. *[SPCB] Separate the earth fills such as under porches or paving from all woodwork by concrete, masonry, good quality cement plaster or other material approved by local building codes. Chemical treatment of earth fills is considered adequate if the foundation adjoining the fill meets standards of the current building codes.*

2304.13 Long-term loading. Wood members supporting concrete, masonry or similar materials shall be checked for the effects of long-term loading using the provisions of the AWC NDS. The total deflection, including the effects of long-term loading, shall be limited in accordance with Section 1604.3.1 for these supported materials.

Exception: Horizontal wood members supporting masonry or concrete nonstructural floor or roof surfacing not more than 4 inches (102 mm) thick need not be checked for long-term loading.

SECTION 2305 GENERAL DESIGN REQUIREMENTS FOR LATERAL FORCE-RESISTING SYSTEMS

2305.1 General. Structures using wood-frame shear walls or wood-frame diaphragms to resist wind, seismic or other lateral loads shall be designed and constructed in accordance with AF&PA SDPWS and the applicable provisions of Sections 2305, 2306 and 2307.

2305.1.1 Openings in shear panels. Openings in shear panels that materially affect their strength shall be detailed on the plans and shall have their edges adequately reinforced to transfer all shearing stresses.

2305.1.2 Additional requirements. *[DSA-SS, DSA-SS/CC and OSHPD 1, 2 & 4] See Section 2301.1.4 for modifications to AWC SDPWS.*

2305.2 Diaphragm deflection. The deflection of wood-frame diaphragms shall be determined in accordance with AF&PA SDPWS. The deflection (Δ) of a blocked wood structural panel diaphragm uniformly fastened throughout with staples is permitted to be calculated in accordance with Equation 23-1. If not uniformly fastened, the constant 0.188 (For SI: $1/1627$) in the third term shall be modified by an approved method.

$$\Delta = \frac{5vL^3}{8EAb} + \frac{vL}{4Gt} + 0.188Le_n + \frac{\Sigma(\Delta_c X)}{2b} \quad \text{(Equation 23-1)}$$

$$\text{For SI: } \Delta = \frac{0.052vL^3}{EAb} + \frac{vL}{4Gt} + \frac{Le_n}{1627} + \frac{\Sigma(\Delta_c X)}{2b}$$

where:

A = Area of chord cross section, in square inches (mm²).

WOOD

- b = Diaphragm width, in feet (mm).
- E = Elastic modulus of chords, in pounds per square inch (N/mm²).
- e_n = Staple deformation, in inches (mm) [see Table 2305.2(1)].
- Gt = Panel rigidity through the thickness, in pounds per inch (N/mm) of panel width or depth [see Table 2305.2(2)].
- L = Diaphragm length, in feet (mm).
- v = Maximum shear due to design loads in the direction under consideration, in pounds per linear foot (plf) (N/mm).
- Δ = The calculated deflection, in inches (mm).
- $\Sigma(\Delta_c X)$ = Sum of individual chord-splice slip values on both sides of the diaphragm, each multiplied by its distance to the nearest support.

TABLE 2305.2(1)
 e_n VALUES (inches) FOR USE IN CALCULATING DIAPHRAGM AND SHEAR WALL DEFLECTION DUE TO FASTENER SLIP (Structural I)^{a, c}

LOAD PER FASTENER ^b (pounds)	FASTENER DESIGNATIONS
	14-Ga staple x 2 inches long
60	0.011
80	0.018
100	0.028
120	0.04
140	0.053
160	0.068

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.448 N.

a. Increase e_n values 20 percent for plywood grades other than Structural I.

b. Load per fastener = maximum shear per foot divided by the number of fasteners per foot at interior panel edges.

c. Decrease e_n values 50 percent for seasoned lumber (moisture content < 19 percent).

TABLE 2305.2(2)
VALUES OF Gt FOR USE IN CALCULATING DEFLECTION OF WOOD STRUCTURAL PANEL SHEAR WALLS AND DIAPHRAGMS

PANEL TYPE	SPAN RATING	VALUES OF Gt (lb/in. panel depth or width)							
		Other				Structural I			
		3-ply plywood	4-ply plywood	5-ply plywood ^a	OSB	3-ply plywood	4-ply plywood	5-ply plywood ^a	OSB
Sheathing	24/0	25,000	32,500	37,500	77,500	32,500	42,500	41,500	77,500
	24/16	27,000	35,000	40,500	83,500	35,000	45,500	44,500	83,500
	32/16	27,000	35,000	40,500	83,500	35,000	45,500	44,500	83,500
	40/20	28,500	37,000	43,000	88,500	37,000	48,000	47,500	88,500
	48/24	31,000	40,500	46,500	96,000	40,500	52,500	51,000	96,000
Single Floor	16 o.c.	27,000	35,000	40,500	83,500	35,000	45,500	44,500	83,500
	20 o.c.	28,000	36,500	42,000	87,000	36,500	47,500	46,000	87,000
	24 o.c.	30,000	39,000	45,000	93,000	39,000	50,500	49,500	93,000
	32 o.c.	36,000	47,000	54,000	110,000	47,000	61,000	59,500	110,000
	48 o.c.	50,500	65,500	76,000	155,000	65,500	85,000	83,500	155,000

		Other			Structural I		
	Thickness (in.)	A-A, A-C	Marine	All Other Grades	A-A, A-C	Marine	All Other Grades
Sanded Plywood	$\frac{1}{4}$	24,000	31,000	24,000	31,000	31,000	31,000
	$\frac{11}{32}$	25,500	33,000	25,500	33,000	33,000	33,000
	$\frac{3}{8}$	26,000	34,000	26,000	34,000	34,000	34,000
	$\frac{15}{32}$	38,000	49,500	38,000	49,500	49,500	49,500
	$\frac{1}{2}$	38,500	50,000	38,500	50,000	50,000	50,000
	$\frac{19}{32}$	49,000	63,500	49,000	63,500	63,500	63,500
	$\frac{5}{8}$	49,500	64,500	49,500	64,500	64,500	64,500
	$\frac{23}{32}$	50,500	65,500	50,500	65,500	65,500	65,500
	$\frac{3}{4}$	51,000	66,500	51,000	66,500	66,500	66,500
	$\frac{7}{8}$	52,500	68,500	52,500	68,500	68,500	68,500
	1	73,500	95,500	73,500	95,500	95,500	95,500
	$1\frac{1}{8}$	75,000	97,500	75,000	97,500	97,500	97,500

For SI: 1 inch = 25.4 mm, 1 pound/inch = 0.1751 N/mm.

a. Applies to plywood with five or more layers; for five-ply/three-layer plywood, use values for four ply.

HISTORY NOTE APPENDIX

California Building Code Title 24, Part 2, California Code of Regulations (CCR)

HISTORY:

For prior code history, see the History Note Appendix to the *California Building Code* 2013 Triennial Edition, effective January 1, 2014.

1. (BSC 05/15, SFM 06/15, DSA-AC 01/15, DSA-SS 02/15, HCD 03/15, OSHPD 02/15 & 04/15, SLC 01/15) - Adopt the 2015 edition of the *International Building Code* published by the International Code Council, for incorporation into the 2016 *California Building Code*, CCR Title 24, Part 2 with amendments for State regulated occupancies, effective on January 1, 2017.
2. Rulemaking file numbers BSC EF 01-17, HCD EF 01-17: Emergency regulations amend Sections 107.2.7, 110.3.8.1, Table 1607.1, 2304.12.2.5, and 2304.12.2.6. Approved as an emergency on January 27, 2017, effective upon filing with Secretary of State on January 30, 2017.
3. Rulemaking file number DSA-SS/CC EF 01-17: Emergency regulations amend Sections 1.9.2.1, 1.9.2.2, 107.2.7, 110.3.8.1, 1616.5.1.2 – 1616.5.1.5, Table 1607A.1, 2304.12.2.5, and 2304.12.2.6 approved as an emergency on January 27, 2017, effective upon filing with Secretary of State on January 30, 2017.



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