

# UNIFORM BUILDING CODE

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by

**INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS**

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loads greater than 100 pounds per square foot, the design live load on any member supporting one hundred and fifty square feet (150 sq. ft.) or more may be reduced at the rate of 0.08 per cent per square foot of area supported by the member. The reduction shall not exceed 60 per cent nor "R" as determined by the following formula:

**Reduction  
of Live Loads  
(Continued)**

$$R = 23.1 \left( 1 + \frac{D}{L} \right)$$

WHERE:

*R* = Reduction in per cent

*D* = Dead load per square foot of area supported by the member

*L* = Unit live load per square foot of area supported by the member

For storage live loads exceeding 100 pounds per square foot, no reduction shall be made except that design live loads on columns may be reduced 20 per cent.

The live load reduction shall not exceed 40 per cent in garages for the storage of private pleasure cars having a capacity of not more than nine passengers per vehicle.

**Sec. 2307.** The deflection of any structural member shall not exceed the values set forth in Table No. 23-C, based upon the factors set forth in Table No. 23-D. The deflection criteria representing the most restrictive condition shall apply. Deflection criteria for materials not specified shall be developed in a manner consistent with the provisions of this Section. See Section 2305 (f) for camber requirements.

**Deflection**

**Sec. 2308. (a) General.** Buildings or structures shall be designed to withstand the minimum horizontal and uplift pressures set forth in Table No. 23-E and this Section allowing for wind from any direction. The wind pressures set forth in Table No. 23-E are minimum values and shall be adjusted by the Building Officials for areas subjected to higher wind pressures. When the form factor, as determined by wind tunnel tests or other recognized methods, indicates vertical or horizontal loads of lesser or greater severity than those produced by the loads herein specified, the structure may be designed accordingly.

**Wind  
Pressure**

(b) **Horizontal Wind Pressure.** For purposes of design, the wind pressure shall be taken upon the gross area of the vertical projection of that portion of the building or structure measured above the average level of the adjoining ground.

(c) **Uplift Wind Pressure.** Roofs of all enclosed buildings or structures shall be designed and constructed to withstand

**Wind Pressure  
(Continued)**

pressures acting upward normal to the surface equal to three-fourths of the values set forth in Table No. 23-E for the height zone under consideration. An enclosed building shall be defined as a building enclosed at the perimeter with solid exterior walls. Openings are permitted in the solid exterior wall provided they are glazed or protected with door assemblies.

Roofs of unenclosed buildings, roof overhangs, architectural projections, eaves, canopies, cornices, marquees, or similar structures unenclosed on one or more sides shall be designed and constructed to withstand upward pressures equal to one and one-fourth times those values set forth in Table No. 23-E.

The upward pressures shall be assumed to act over the entire roof area.

(d) **Roofs with Slopes Greater than 30 Degrees.** Roofs or sections of roofs with slopes greater than 30 degrees shall be designed and constructed to withstand pressures, acting inward normal to the surface, equal to those specified for the height zone in which the roof is located, and applied to the windward slope only.

(e) **Anchorage Requirements.** Adequate anchorage of the roof to walls and columns, and of walls and columns to the foundations to resist overturning, uplift, and sliding, shall be provided in all cases.

(f) **Solid Towers.** Chimneys, tanks, and solid towers shall be designed and constructed to withstand the pressures as specified by this Section, multiplied by the factors set forth in Table No. 23-F.

(g) **Open Frame Towers.** Radio towers and other towers of trussed construction shall be designed and constructed to withstand wind pressures specified in this Section, multiplied by the shape factors set forth in Table No. 23-G.

Wind pressures shall be applied to the total normal projected area of all the elements of one face (excluding ladders, conduits, lights, elevators, etc., which shall be accounted for separately by using the indicated factor for these individual members).

(h) **Miscellaneous Structures.** Greenhouses, lath houses, agricultural buildings and residential patio structures shall be designed for the horizontal wind pressures as set forth in Table No. 23-E, except that, if the height zone is ten feet (10') or less, two-thirds of the first line of listed values may be used. The structures shall be designed to withstand an uplift wind pressure equal to three-fourths of the horizontal pressure.

(i) **Moment of Stability.** The overturning moment calculated from the wind pressure shall in no case exceed two-thirds of the dead load resisting moment.

The weight of earth superimposed over footings may be used to calculate the dead load resisting moment.

**TABLE NO. 23-C—MAXIMUM ALLOWABLE DEFLECTION  
FOR STRUCTURAL MEMBERS<sup>1</sup>**

TYPE OF MEMBER	MEMBER LOADED WITH LIVE LOAD ONLY (L.L.)	MEMBER LOADED WITH LIVE LOAD PLUS DEAD LOAD (L.L. + K D.L.)
Roof Member Supporting Plaster or Floor Member	$L/360$	$L/240$

<sup>1</sup>Sufficient slope or camber shall be provided for flat roofs in accordance with Section 2305 (f).

L.L. = Live load

D.L. = Dead load

K = Factor as determined by Table No. 23-D

L = Length of member in same units as deflection

**TABLE NO. 23-D—VALUE OF "K"**

WOOD		REINFORCED CONCRETE			STEEL
Unseasoned	Seasoned <sup>1</sup>	A's = 0	A's = 0.5 A <sub>s</sub>	A's = A <sub>s</sub>	
1.0	0.5	2.0	1.2	0.8	0

<sup>1</sup>Seasoned lumber is lumber having a moisture content of less than 16 per cent at the time of installation and used under dry conditions of use such as in most covered structures.

A's = Area of compressive reinforcing steel in flexural members.

A<sub>s</sub> = Area of tensile reinforcing steel in flexural members.

**TABLE NO. 23-E—WIND PRESSURES FOR VARIOUS HEIGHT ZONES  
ABOVE GROUND<sup>1</sup>**

HEIGHT ZONES (in feet)	WIND-PRESSURE-MAP AREAS (pounds per square foot)						
	20	25	30	35	40	45	50
Less than 30	15	20	25	25	30	35	40
30 to 49	20	25	30	35	40	45	50
50 to 99	25	30	40	45	50	55	60
100 to 499	30	40	45	55	60	70	75
500 to 1199	35	45	55	60	70	80	90
1200 and over	40	50	60	70	80	90	100

<sup>1</sup>See Figure No. 1. Wind pressure column in the table should be selected which is headed by a value corresponding to the minimum permissible, resultant wind pressure indicated for the particular locality.

The figures given are recommended as minimum. These requirements do not provide for tornadoes.

**TABLE NO. 23-F—MULTIPLYING FACTORS FOR WIND PRESSURES—  
CHIMNEYS, TANKS, AND SOLID TOWERS**

HORIZONTAL CROSS SECTION	FACTOR
Square or rectangular	1.00
Hexagonal or octagonal	0.80
Round or elliptical	0.60

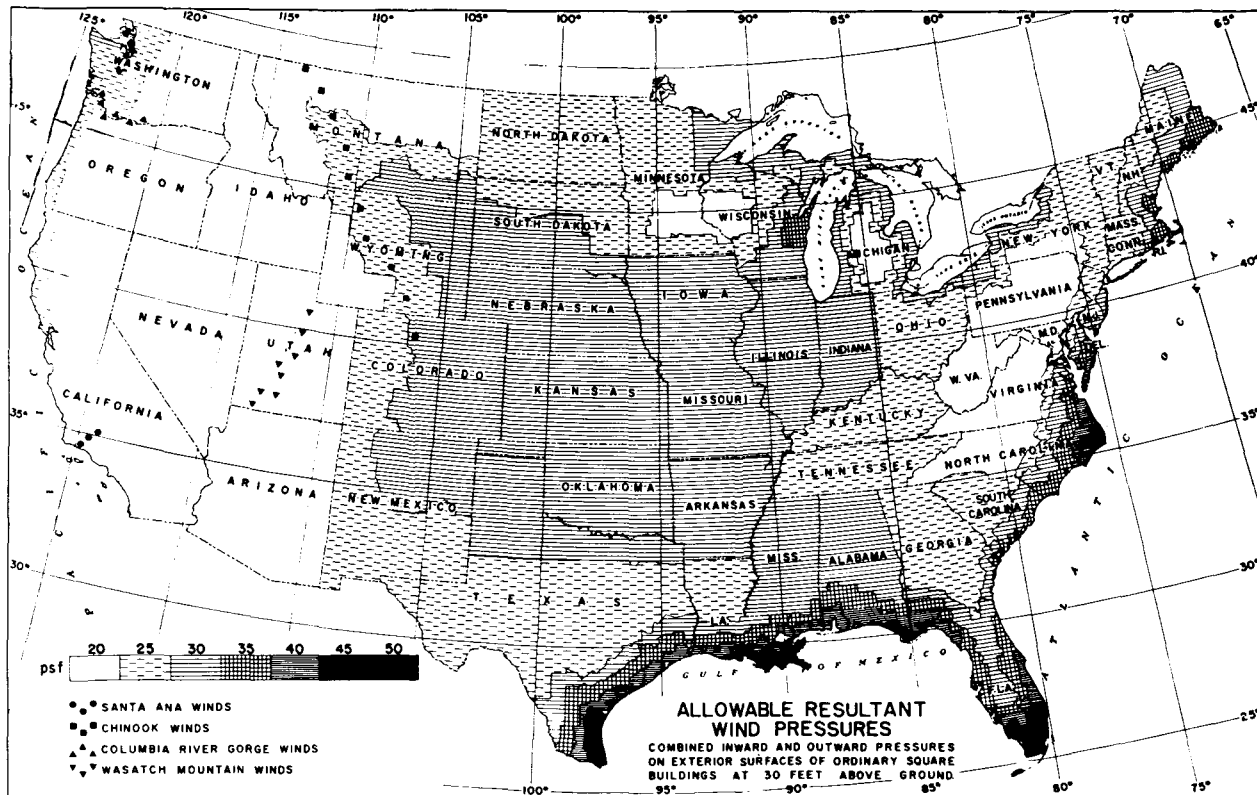


FIGURE NO. 1

(j) **Combined Wind and Live Loads.** For the purpose of determining stresses all vertical design loads except the roof live load and crane loads shall be considered as acting simultaneously with the wind pressure. **Wind Pressure (Continued)**

**Sec. 2309.** The live loads for which each floor or part thereof of a commercial or industrial building is or has been designed shall have such designed live loads conspicuously posted by the owner in that part of each story in which they apply, using durable metal signs, and it shall be unlawful to remove or deface such notices. The occupant of the building shall be responsible for keeping the actual load below the allowable limits. **Live Loads Posted**

**Sec. 2310.** Retaining walls shall be designed to resist the lateral pressure of the retained material in accordance with accepted engineering practice. Walls retaining drained earth may be designed for pressure equivalent to that exerted by a fluid weighing not less than 30 pounds per cubic foot and having a depth equal to that of the retained earth. Any surcharge shall be in addition to the equivalent fluid pressure. **Retaining Walls**

**Sec. 2311.** See Chapter 28. **Footing Design**

**Sec. 2312.** (a) **General.** Walls and structural framing shall be erected true and plumb in accordance with the design. Bracing shall be placed during erection wherever necessary to take care of all loads to which the structure may be subjected. **Walls and Structural Framing**

**TABLE NO. 23-G—SHAPE FACTORS FOR RADIO TOWERS AND TRUSSED TOWERS**

TYPE OF EXPOSURE	FACTOR
Wind normal to one face of tower	
Four-cornered, flat or angular sections, steel or wood	2.20
Three-cornered, flat or angular sections, steel or wood	2.00
Wind on corner, four-cornered tower, flat or angular sections	2.40
Wind parallel to one face of three-cornered tower, flat or angular sections	1.50
Factors for towers with cylindrical elements are approximately two-thirds of those for similar towers with flat or angular sections	
Wind on individual members	
Cylindrical members	
Two inches or less in diameter	1.00
Over two inches in diameter	0.80
Flat or angular sections	1.30