

**ALLOWABLE UNIT STRESSES AND LOADS
IN ACCORDANCE WITH
THE BUILDING LAWS OF VARIOUS CITIES.**

Allowable Unit Stresses for Steel and Iron.	REVISED TO 1906.			
	New York.	Chicago.	Philadelphia.	Boston.
	Pounds per Square Inch.			
COMPRESSION: Rolled Steel	16 000		14 500†	
Rolled Steel	"		16 250‡	
Cast "	16 000			8 000
Wrought Iron	12 000		12 500	
Cast " (in Short Blocks)	16 000		17 500	
Steel Pins and Rivets (Bearing)	20 000	20 000		18 000
Wrought Iron Pins and Rivets (Bearing)	15 000	15 000		15 000
TENSION: Rolled Steel	16 000	15 000	14 500†	15 000
Rolled Steel	"	"	16 250‡	
Cast "	16 000			
Wrought Iron	12 000	12 000	12 500	12 000
Cast "	3 000			
EXTREME FIBER STRESS—BENDING				
Rolled Steel Beams	16 000	16 000		16 000
" " Pins, Rivets and Bolts	20 000	22 500		22 500
Riveted " Beams (Net Flange Section)	14 000	15 000		
Rolled Wrought Iron Beams	12 000	12 000		12 000
" " " Pins, Rivets & Bolts	15 000	18 000		18 000
Riveted " " Beams (Net Flange Section)	12 000	10 000		
Cast Iron—Compression Side	16 000			8 000
" " Tension "	3 000	2 500	3 750	2 500
Compression in Flanges of Built Beams, Steel				12 000
Compression in Flanges of Built Beams, Wrought Iron				10 000
SHEAR: Steel Web Plates	9 000		8 750†	10 000
Steel Web Plates	"		10 000‡	"
" Shop Rivets and Pins	10 000	10 000	8 750†	"
" " " "	"	"	10 000‡	"
" Field " " "	8 000	"	8 750†	"
" " " "	"	"	10 000‡	"
" " Bolts	7 000		8 750†	"
" " " "	"		10 000‡	"
Wrought Iron Web Plates	6 000		7 500	9 000
" " Shop Rivets and Pins	7 500	7 500	"	"
" " Field "	6 000	"	"	"
" " " Bolts	5 500		"	"
Cast Iron	3 000			
			14 500	
COLUMNS: Mild Steel	15 200—58 $\frac{L}{R}$	15 000*	$1 + \frac{L^2}{13 500R^2}$	12 000*
			16 250	
Medium Steel	"	"	$1 + \frac{L^2}{11 000R^2}$	"
			12 500	
Wrought Iron	14 000—80 $\frac{L}{R}$	12 000*	$1 + \frac{L^2}{15 000D^2}$	10 000*
			11 700	
Cast Iron	11 300—30 $\frac{L}{R}$	10 000†	$1 + \frac{L^2}{400D^2}$	See Section 19 of Boston Building Laws

* Reduced by approved modern formulæ. † Mild. ‡ Medium.
 † Reduced by Gordon's formula. Reduced for eccentric loads.

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**Live Loads for Floors in Different
Classes of Buildings, Exclusive
of the Weight of the Materials
of Construction.**

Dwellings, Apartment Houses, Hotels, Tenement Houses or Lodging Houses . . .	60	50	70	50
Office Buildings—First Floor	150	100	100	100
“ “ above First Floor	75	100	100	100
Schools or Places of Instruction	75	75	80	80
Stables or Carriage Houses	75	{ 40*	100†	100
Buildings for Public Assembly	90	{ 100†	120	150
“ “ Ordinary Stores, Light Manu- facturing and Light Storage	120	100	120	150
Stores for Heavy Materials, Warehouses and Factories	150	150	250	250
Roofs—Pitch less than 20°	50	25	30	25†
“ “ more “ 20°	30	25	30	25†
Sidewalks	300	300	300	300
Public Buildings, except Schools	300	300	300	150

REVISED TO 1906.

New York. | Chicago. | Philadelphia. | Boston.

Pounds per Square Foot.

**Allowable Unit Stresses for Ma-
sonry and Building Materials.**

COMPRESSION.

Concrete (Portland) Cement, 1; Sand, 2; Stone, 4	230	55	208	208
Concrete (Portland) Cement, 1; Sand, 2; Stone, 5	208	“	“	“
Concrete (Rosendale or equal) Cement, 1; Sand, 2; Stone, 4	125	“	“	“
Concrete (Rosendale or equal) Cement, 1; Sand, 2; Stone, 5	111	“	“	“
Rubble Stonework, Portland Cement Mortar	140	“	139	139
“ “ Rosendale “ “	111	“	“	“
“ “ Lime and “ “	97	“	111	111
“ “ Lime Mortar	70	“	69½	69½
Brickwork in Portland Cement Mortar; Cement, 1; Sand, 3	250	“	208	208
Brickwork in Rosendale, or equal, Cement Mortar; Cement, 1; Sand, 3	208	“	“	“
Brickwork in Lime and Cement Mortar; Cement, 1; Lime, 1; Sand, 6	160	“	167	167
Brickwork in Lime Mortar; Lime, 1; Sand, 4	111	“	111	111
Dimension Stones in Cement Mortar	“	70	“	“
“ “ “ “ “ “, Dressed	“	“	“	“
Beds	“	97	“	“
Granites (according to Test)	1000 to 2400	“	“	“
Greenwich Stone	1200	“	“	“
Gneiss (New York City)	1300	“	“	“
Limestone (according to Test)	700 to 2300	“	“	“
Marble { “ “ “ }	600 to 1200	“	“	“
Sandstone { “ “ “ }	400 to 1600	“	“	“
Bluestone (North River)	2000	“	“	“
Brick (Haverstraw, Flatwise)	300	“	“	“
Slate	1000	“	“	“

Pounds per Square Inch.

* Stables less than 500 Square Feet in Area.

† “ over 500 “ “ “ “

‡ Make proper allowance for Wind at 30 lbs. per Square Foot Horizontal.

**ALLOWABLE UNIT STRESSES AND LOADS
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Allowable Unit Stresses for Masonry.	REVISED TO 1906.			
	New York. Chicago. Philadelphia. Boston.			
EXTREME FIBRE STRESS—BENDING	Pounds per Square Inch.			
Granite	180	.. .	.. .	.. .
Greenwich Stone	150	.. .	.. .	.. .
Gneiss (New York City)	150	.. .	.. .	.. .
Limestone	150	.. .	.. .	.. .
Slate	400	.. .	.. .	.. .
Marble	120	.. .	.. .	.. .
Sandstone	100	.. .	.. .	.. .
Bluestone—North River	300	.. .	.. .	.. .
Concrete (Portland) Cement, 1; Sand, 2; Stone, 4	30	.. .	.. .	.. .
Concrete (Portland) Cement, 1; Sand, 2; Stone, 5	20	.. .	.. .	.. .
Concrete (Rosendale or equal) Cement, 1; Sand, 2; Stone, 4	16	.. .	.. .	.. .
Concrete (Rosendale or equal) Cement, 1; Sand, 2; Stone, 5	10	.. .	.. .	.. .
Brick (Common)	50	.. .	.. .	.. .
Brickwork (in Cement)	30	.. .	.. .	.. .
Allowable Unit Stresses for Timber.				
COMPRESSION :				
Oak, with Grain	900	.. .	.. .	.. .
“ across “	800	.. .	.. .	250
Yellow Pine, with Grain	1000	.. .	750	.. .
“ across “	600	.. .	550	250
White “ with “	800	.. .	.. .	.. .
“ across “	400	.. .	.. .	150
Spruce, with Grain	800	.. .	500	.. .
“ across “	400	.. .	300	150
Locust, with “	1200	.. .	.. .	.. .
“ across “	1000	.. .	.. .	.. .
Hemlock, with “	500	.. .	350	.. .
“ across “	500	.. .	250	.. .
Chestnut, with “	500	.. .	.. .	.. .
“ across “	1000	.. .	.. .	.. .
TENSION :				
Yellow Pine	1200	.. .	1800	.. .
White “	800
Spruce	800	.. .	1250	.. .
Oak	1000
Hemlock	600	.. .	1000	.. .

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Allowable Unit Stresses for Timber.	REVISED TO 1906.			
	New York.	Chicago	Philadelphia.	Boston.
EXTREME FIBER STRESS—BENDING:	Pounds Per Square Inch.			
Yellow Pine	1200	1250	1600	1250
White "	800	750	. . . .	750
Spruce	800	750	1100	750
Oak	1000	1000	. . . .	1000
Locust	1200	. . . .	. . . .	. . . .
Hemlock	600	. . . .	900	. . . .
Chestnut	800	. . . .	. . . .	. . . .
Wooden Columns or Posts with Flat Ends.				
Yellow Pine (Long Leaf)	$1000-18\frac{L}{D}$	. . . .	$U - \frac{UL}{100D}$	. . . .
White Pine, Norway Pine and Spruce	$800-15\frac{L}{D}$	. . . .	"	. . . .
Oak	$900-17\frac{L}{D}$	. . . .	"	. . . .
Chestnut and Hemlock	$\frac{5}{8}(800-15\frac{L}{D})$	. . . .	"	. . . .
Locust	$1\frac{1}{2}(\text{"})$	. . . .	"	. . . .
SHEAR: Yellow Pine, with Fiber	70	100	$66\frac{2}{3}\%$	100
Yellow Pine, across fiber	500	250	75%	
White " with "	40	80	. . . .	80
" " across "	250	150	. . . .
Spruce, with Fiber	50	80	50	80
" across "	320	150	500	
Oak, with "	100	150	. . . .	150
" across "	600	250	. . . .
Locust, with "	100	. . . .	. . . .	. . . .
" across "	720	. . . .	. . . .	. . . .
Hemlock, with "	40	. . . .	$41\frac{2}{3}\%$	. . . .
" across "	275	. . . .	$416\frac{2}{3}\%$	. . . .
Chestnut, " "	150	. . . .	. . . .	. . . .

* $\frac{U}{6}$ = Allowable Compression in Lbs. per Sq. Inch and $\frac{L}{D}$ = Ratio of Length to Diameter in Inches.

Allowable Unit Stresses for Timber Columns in Accordance with the Building Laws of Boston and Chicago.

For Posts with Flat Ends.

The Stresses given in the following table, in which L = Length of Post, D = Least Diameter of Post, and S = Stress per Square Inch.

White Pine and Spruce.		Long-leaf Yellow Pine		White Oak.
$\frac{L}{D}$	S	$\frac{L}{D}$	S	S
0 to 10	625	0 to 15	1000	750
10 " 35	500	15 " 30	875	650
35 " 45	375	30 " 40	750	560
45 " 50	250	40 " 45	625	470
		45 " 50	500	375

For information not given in these tables, see Complete Building Laws of the Various Cities.