

**TABLE XII**

**ENGINEERING CONSTANTS AND MEASURING EQUIVALENTS**

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32 deg. F. (0 deg. C) = Freezing point of water  
 212 deg. F. (100 deg. C) = Boiling point of water under pressure of one atmosphere  
 1 cu. ft. of water at 60° F. = 62.37 lbs.  
 1 gal. of water at 60° F. = 8.3377 lbs.  
 33,000 ft. lbs. per min. = 1 horsepower (hp)  
 1.3410 hp = 1 kilowatt (kw)  
 $\pi = 3.14159265$  = number of diameters in circumference of a circle

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**LINEAR MEASURE EQUIVALENTS**

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Inches	Feet	Yards	Rods	Miles
1	0.0833	0.0278	0.00505	0.0000158
12	1	0.3333	0.06061	0.0001894
36	3	1	0.18182	0.0005682
198	16.5	5.5	1	0.0031250
63,360	5,280	1,760	320	1

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1 kilometer (km) = 1,000 meters (m) = 10,000 decimeters (dm)  
 = 100,000 centimeters (cm) = 1,000,000 millimeters (mm)  
 1 kilometer = 3,280.83 ft. = 0.621369 mile  
 1 meter = 3.280833 ft. = 39.37 in.

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**SQUARE MEASURE EQUIVALENTS**

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Square Inches	Square Feet	Square Yards	Square Rods	Acres	Square Miles
1	0.00694	0.00077			
144	1	0.11111			
1,296	9	1	0.03306	0.0002066	
39,204	272.25	30.25	1	0.0062500	0.00000977
	43,560	4,840	160	1	0.00156250
				640	1

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**CUBIC MEASURE EQUIVALENTS**

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Cubic Inches	Gallons	Cubic Feet	Cubic Yards
1	0.004329	0.0005787	0.000021433
231	1	0.1336806	0.004951132
1,728	7.480519	1	0.037037037
46,656	201.974026	27	1

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**TABLE XII**  
ENGINEERING CONSTANTS AND MEASURING  
EQUIVALENTS

STANDARD RAILROAD CONSTANTS

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Dist. between inside edges of rails = 4 ft. 8½ in. at ⅝" below top of rail	
Height of 90 lb. Rail = 5.63"	Width of 90 lb. Rail = 2.56"
Height of 100 lb. Rail = 6.0"	Width of 100 lb. Rail = 2.69"
Height of 115 lb. Rail = 6.63"	Width of 115 lb. Rail = 2.72"
Height of 132 lb. Rail = 7.13"	Width of 132 lb. Rail = 3.00"

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CEMENT CONSTANTS

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1 Sack Cement = 94 lbs.
1 Sack Cement = 1.0 cu. ft. (approx.)
1 Gal. Water = 8.3453 lbs. at 39.2° F.
4 Sacks Cement = 1 Barrel
1 Barrel Cement = 376 lbs.
1 Barrel Cement = 4.0 cu. ft. (approx.)

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**TABLE XIII**

DEFORMED STEEL BARS FOR REINFORCED CONCRETE  
NOMINAL DIMENSIONS

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Bar Designation Number <sup>a</sup>	Unit Weight, lb. per ft.	Diameter, in.	Cross Sectional Area, sq. in.	Perimeter, in.
3 .....	0.376	0.375	0.11	1.178
4 .....	0.668	0.500	0.20	1.571
5 .....	1.043	0.625	0.31	1.963
6 .....	1.502	0.750	0.44	2.356
7 .....	2.044	0.875	0.60	2.749
8 .....	2.670	1.000	0.79	3.142
9 <sup>b</sup> .....	3.400	1.128	1.00	3.544
10 <sup>b</sup> .....	4.303	1.270	1.27	3.990
11 <sup>b</sup> .....	5.313	1.410	1.56	4.430
14s .....	7.65	1.693	2.25	5.32
18s .....	13.60	2.257	4.00	7.09

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(<sup>a</sup>) Bar numbers are based on the number of eighths of an inch included in the nominal diameter of the bars. The nominal diameter of a deformed bar is equivalent to the diameter of a plain bar having the same weight per foot as the deformed bar.

(<sup>b</sup>) Bars of designation Nos. 9, 10, and 11 correspond to the former 1-in. square, 1⅛-in. square, and 1¼-in. square sizes and are equivalent to those former standard bar sizes in weight and nominal cross-sectional areas.

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