



Method to Estimate Approximate Weight of Steel Bars

ROUNDS

Multiply diameter of bar by 4. Square the result, and divide by 6. For example:

$$\begin{aligned} \text{Size 3" Round} & - 3 \times 4 = 12 \\ & 12 \times 12 = 144 \\ & 144 \div 6 = 24 \text{ lbs. per foot.} \end{aligned}$$

SQUARES

Square the section and add a cipher. This gives the weight per yard. Divide by 3 to get weight per foot. For example:

$$\begin{aligned} \text{Size 4" Square} & - 4 \times 4 = 16 \\ & \text{Add a cipher} = 160 \text{ lbs. per yd.} \\ & 160 \div 3 = 53.33 \text{ lbs. per foot.} \end{aligned}$$

FLATS

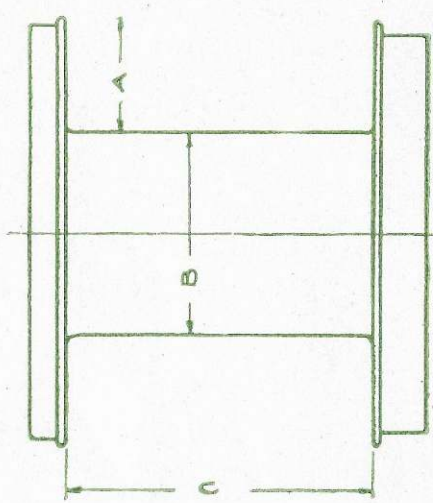
Multiply the width by thickness. Add a cipher and divide by 3. For example:

$$\begin{aligned} \text{Size 4" x 1"} & - 4 \times 1 = 4 \\ & \text{Add a cipher} = 40 \\ & 40 \div 3 = 13.33 \text{ lbs. per foot.} \end{aligned}$$

(105)



Formula for Computing Cable Capacities of Drums



RULE—Add the diameter of the drum (B) to the depth of the flange (A). Multiply the sum by the depth of flange (A). Multiply the result by the length between flanges (C), all in inches. Multiply the product by the figures in the right hand column opposite the size cable required. The result will be the amount of cable, in feet, that the drum will hold.

FORMULA— $(B + A) \times A \times C \times$ Number opposite required size of cable.

Size Cable	Size Cable	Size Cable
1/4" diameter 4.16	3/8" diameter465	1 1/8" diameter099
5/16" diameter 2.67	1/2" diameter342	1 1/4" diameter085
3/8" diameter 1.86	5/8" diameter262	1 3/8" diameter074
7/16" diameter 1.37	3/4" diameter207	1 1/2" diameter066
1/2" diameter 1.05	7/8" diameter167	1 5/8" diameter058
5/8" diameter828	1" diameter138	1 3/4" diameter052
3/4" diameter672	1 1/8" diameter116	1 7/8" diameter046
7/8" diameter554		2" diameter042

(106)



Wire Rope

Sizes and Strength Plow Steel Wire Rope composed of six strands and a hemp center 19 wires to the strand.

Diameter of Line in Inches	Circumference in Inches	Approximate Weight per Foot	Ultimate Strength tons of 2000 lbs.
1/4	3/4	.10	2.65
5/16	1	.15	3.8
3/8	1 1/8	.22	5.75
7/16	1 1/4	.30	8
1/2	1 1/2	.39	10
5/8	1 3/4	.50	12.3
3/4	2	.62	15.5
7/8	2 1/4	.89	23
1	2 3/4	1.20	29
1 1/8	3	1.58	38
1 1/4	3 1/2	2.	47
1 3/8	4	2.45	58
1 1/2	4 1/4	3.	72
1 5/8	4 3/4	3.55	82
1 3/4	5	4.15	94
1 7/8	5 1/2	4.85	112
2	5 3/4	5.55	127
2 1/4	6 1/4	6.3	140
2 1/2	7 1/8	8.	188
2 3/4	7 3/4	9.85	229
3	8 3/8	11.95	275

Formula for Finding Pulling Power of Drums

The mean or average pulling power of any drum can be obtained by the following formula:

$$W = \frac{r \times G \times P \times A}{R}$$

- W = Weight or pull on cable in pounds.
- P = Mean effective pressure = about 175 pounds where 200 pounds boiler pressure is used.
- A = Area of one cylinder in square inches.
- r = Radius of crank or one-half stroke of engine in inches.
- R = One-half spool diameter of drum when spool is half full of cable.
- G = Gear ratio = drum gear diameter divided by pinion diameter.

(107)



Useful Information

- To find circumference of a circle multiply diameter by 3.1416.
- To find diameter of a circle multiply circumference by .31831.
- To find area of a circle multiply square of diameter by .7854.
- To find area of a triangle multiply base by half perpendicular height.
- To find surface of a ball multiply square of diameter by 3.1416.
- To find solidity of a sphere multiply cube of diameter by .5236.
- Diameter of circle times .8862 equals side of a square with same area.
- To find cubic inches in a ball multiply cube of diameter by .5236.
- Doubling the diameter of a pipe increases its capacity four times.
- A gallon of water (U. S. Standard) weighs 8 1/3 lbs. and contains 231 cubic inches.
- A cubic foot of water contains 7 1/2 gallons, 1728 cubic inches, and weighs 62 1/2 lbs.
- To find the pressure in pounds per square inch of a column of water multiply the height of the column in feet by .434.
- Steam rising from water at its boiling point (212 degrees) has a pressure equal to the atmosphere (14.7 lbs. to the square inch).
- A standard horse power: The evaporation of 30 lbs. of water per hour from a feed water temperature of 100 degrees F. into steam at 70 lbs. gauge pressure.
- To find capacity of tanks any size: given dimensions of a cylinder in inches to find its capacity in U. S. Gallons: Square the diameter, multiply by the length and by .0034.

(108)