

Steel Wire Rope Manual

Drum Capacity (Feet of rope) =
 $(B + A) \times A \times C \times F$
 where A,B and C are in inches.

For example, if the diameter of the drum is 18 inches, the depth of the flange is 2 inches and the distance between drum flange is 24 inches, the drum's capacity for a 3/4 inch rope is:
 Capacity = $(18 + 2) \times 2 \times 24 \times .465 = 446$ feet.

TABLE 1.1

DRUM OR REEL CAPACITY FACTOR	
Nominal Rope Diameter (Inches)	F
1/4	4.160
5/16	2.670
3/8	1.860
7/16	1.370
1/2	1.050
9/16	0.828
5/8	0.672
3/4	0.465
1/4	0.342
7/8	0.262
1	0.207
1 1/8	0.167
1 1/4	0.138
1 3/8	0.116
1 1/2	0.099
1 5/8	0.085
1 3/4	0.074
1 7/8	0.066
2	0.058
2 1/8	0.052
2 1/4	0.046
2 1/2	0.042

The factor (F) applies to nominal rope size and level winding. Since new ropes are usually oversized by 1/32" per 7/32" of rope diameter, the result obtained by the formula must be decreased to account for oversized rope and/or random or uneven winding, as follows:

For oversized ropes decrease the calculated length by from 0 - 6%.

For random wound ropes decrease the calculated length by from 0 - 8%.

Whenever possible use grooved drums rather than smooth drums as the grooves furnish better support for the rope than do flat surfaces, and more uniform winding results in less abrasive wear on the rope. The groove surfaces on grooved drums and the complete surface on smooth drums should be perfectly

smooth, those which have taken the imprint of the outer wires of previous ropes will exert a grinding action on new ropes.

This imprinting and scoring is caused by high contact pressures between the rope and drum surface. If this condition is evident then the drum must be resurfaced and the contact pressure reduced by:

- (a) decreasing the load on the rope, or
- (b) increasing the drum diameter, or
- (c) replacing the drum with one having harder metal.

The radial contact pressure can be calculated as follows:

$$P = \frac{2L}{Dd}$$

Where P = radial pressure in psi (Fig.4.8)
 L = rope load in pounds
 D = tread diameter of drum or sheaves (inches)
 d = rope diameter (inches)

Example: 7/8 x 19 Round Strand rope maximum working load = 11,800 lbs.
 drum diameter = 18"

$$P = \frac{2L}{Dd} = \frac{2(11,800)}{18 \times 7/8} = 1498 \text{ psi}$$

This contact pressure means, from the table, that the drum must be manganese steel.

It is suggested the limit given in table 1.2 be observed for all drums and sheaves.

TABLE 1.2

Rope Construction	Contact Pressure (PSI) Limits For Sheave & Drum Materials		
	Cast Iron	Cast Steel	Manganese Steel
6 x 7 Reg. Lay	300	550	1,500
6 x 7 Lang Lay	350	625	1,700
6 x 19 Reg. Lay	500	900	2,500
6 x 19 Lang Lay	575	1,025	2,850
6 x 37 Reg. Lay	600	1,075	3,000
6 x 37 Lang Lay	700	1,250	3,500
8 x 19 Reg. Lay	600	1,075	3,000
6 x 8 Flat Strand	500	900	2,500
6 x 25 Flat Strand	800	1,450	4,000
6 x 33 Flat Strand	975	1,800	4,900

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Fig. A Determination of Drum Capacity

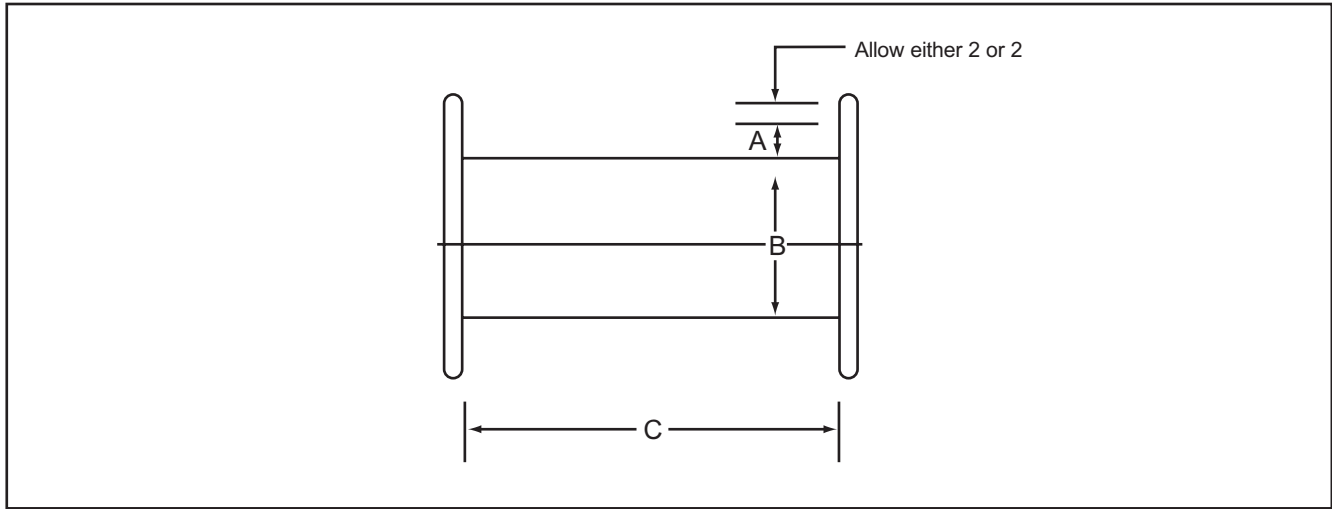


Fig. B Check For Drum Scoring During Inspections

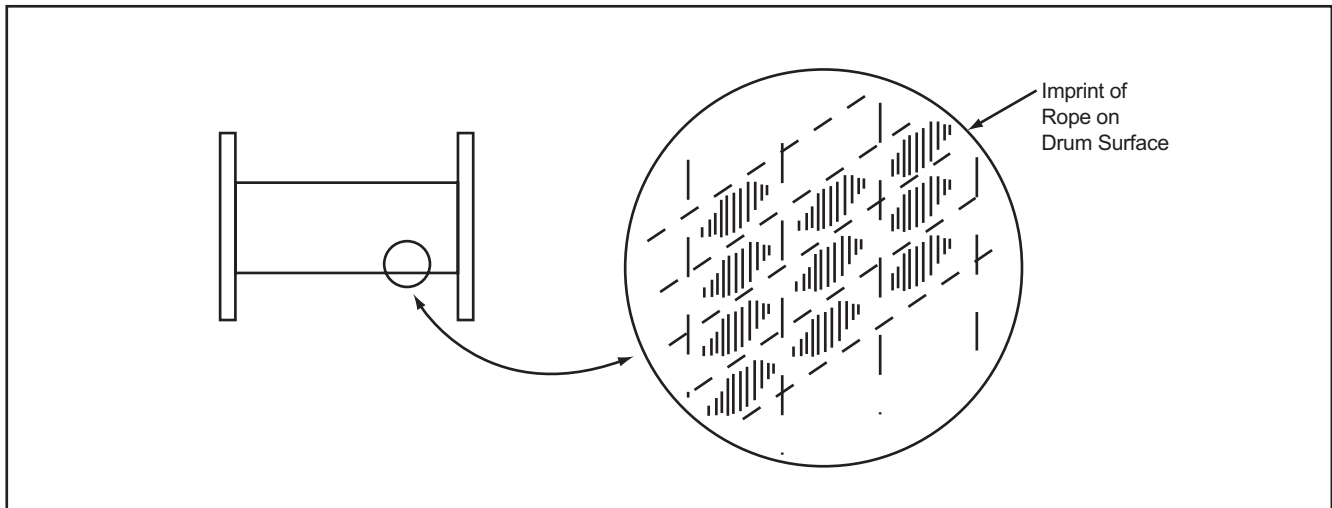


Fig. C Determination of Drum Contact Pressures

