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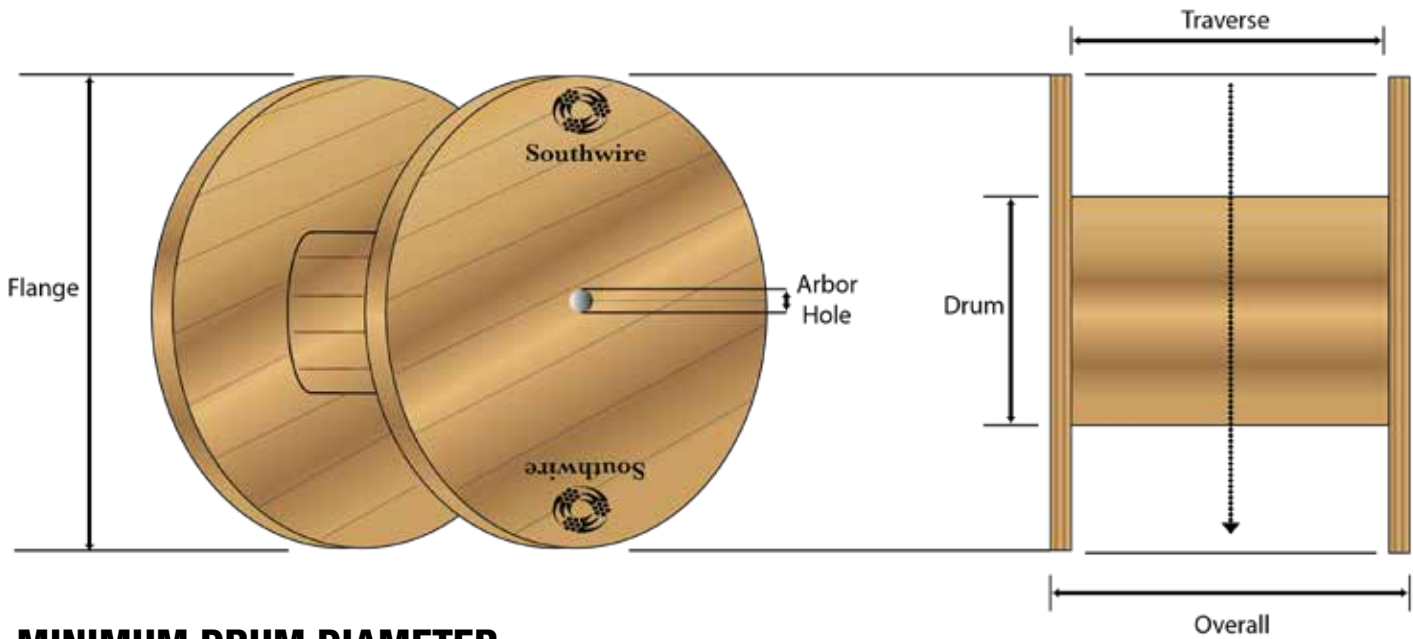
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**CABLETECH
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Services

WIRE AND CABLE PACKAGING

Wire and Cable Products are packed on reels for shipping and storage. Cable manufacturers follow NEMA (National Electrical Manufacturers Association) WC 26, Binational Wire and Cable Packaging Standard for minimum drum diameters on cable reels.



MINIMUM DRUM DIAMETER

The minimum drum diameter is the smallest acceptable diameter of the shipping reel drum. This requirement is specified in NEMA WC 26 and is based upon the cable construction. Excessive or extreme bending can damage the cable. Limitations on cable bending can best be expressed by identifying cable type and expressing the bending limit in terms of a multiplier of cable diameter. Reels must have a drum diameter of not less than:

$$B = D \times F$$

Where: **B** = minimum drum diameter in inches.

D = diameter of cable in inches.

F = the factor for specific cable constructions taken from NEMA WC 26 and included in the next table.



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MINIMUM DRUM DIAMETERS OF REELS FOR CABLES

These Diameters Are Not To Be Used For Installation

Figure 1: NEMA WC 26 Table 3-1

TYPE OF CABLE	MINIMUM DRUM DIAMETER AS A MULTIPLE OF OUTSIDE DIAMETER OF CABLE
	EXTRUDED INSULATION
A. Single and multiple conductor nonmetallic covered cable	
1. Non-shielded and wire shielded, including cables with concentric wires:	
a) 0–2000 volts	10
b) Over 2000 volts	
1) Non-jacketed with concentric wires	14
2) All others	12
2. Tape shielded	14
a) Helically applied	14
b) Longitudinally applied flat tape (Laminated Foil)	20
c) Longitudinally applied corrugated tape (LCT)	14
B. Single and multiple-conductor metallic-covered cable:	
1. Tubular metallic sheathed;	
a) Lead	14
b) Aluminum	
1) Outside diameter—1.75" and less	25
2) Outside diameter—1.751" and larger	30
2. Wire armored	16
3. Flat tape armored	16
4. Corrugated metallic sheathed	14
5. Interlocked armor	14
C. Multiple single conductors cabled together without common covering, including self-supporting cables. The circumscribing overall diameter shall be multiplied by the factor given in item A or B and then by the reduction factor:	
	0.75
D. For combinations of the types described in items A, B, C, the highest factor for any component types shall be used.	
E. Single and multiple-conductor cable in coilable nonmetallic duct. Outside diameter of duct, inches.	
0.0–0.50	26
0.51–1.00	24
1.01–1.25	22
1.26–1.50	21
Over 1.50	19
F. Fiber Optic	20 x Fiber Optic Cable OD but in no case less than 12 inches.
G. Bare Conductor	20 x Conductor OD



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REEL DRUM DIAMETER VS MINIMUM BENDING RADIUS

The bend diameter or radius for cables packaged on reels is different than that observed when training cables into their final position or pulling cables through conduits and cable trays. These bend radii can be smaller on reels since packaging is in a controlled environment and the cable is wound on the drum slowly and supported by the drum.

Example:

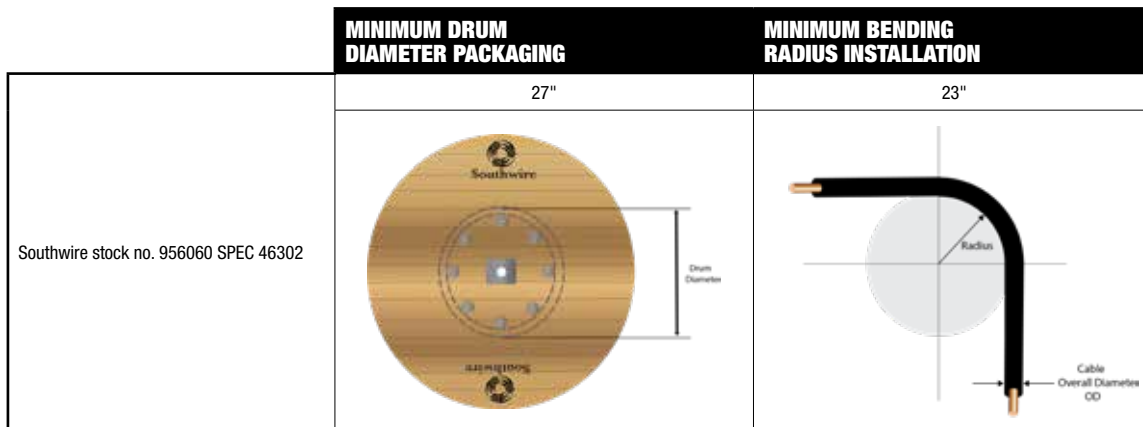
For medium voltage tape shielded single conductor cable, the minimum drum diameter is fourteen (14) times the cable diameter. For Southwire stock no. 956060 SPEC 46302 with overall cable diameter of 1.913", applying the formula **$B = D \times \text{Factor}$** , we have $1.913" \times 14 = 26.78$ inches, therefore the **minimum reel drum diameter is 27"**.

MINIMUM BENDING RADIUS

The minimum bend radius is the smallest acceptable radius that a cable is allowed to be bent for permanent training and is based on the requirements of the National Electrical Code (NEC®) and product standards such as ICEA or AEIC. When cables are bent, both compressional and tensional forces are exerted on the cable components. For medium voltage MV-105 shielded single conductor cable, the minimum bending radius is twelve (12) times the cable overall diameter. Larger bend radii should be considered for conduit bends, sheaves, or other curved surfaces around which the cable may be pulled under tension while being installed, due to sidewall bearing pressure limits of the cable (1,000 lbs/ft).

For Southwire stock no. 956060 SPEC 46302 with overall cable diameter of 1.913", applying the formula 12D, we have $12 \times 1.913" = 22.95$ inches, hence the **minimum acceptable bending radius is 23"**.

Figure 2: Minimum Drum Diameter vs Minimum Bending Radius



To access Southwire's document, "Training and Minimum Bending Radius," scan the QR code.

COIL PACKAGING

Coiled cable packaging would be subject to the static minimum bend radius of that cable. With coiled packaging, the cable coil is not fixed and can be moved or jarred during handling which could affect the bend radius.