



WEBINAR

REEL Talk – All You Need to Know

September 28, 2022

By: Wissam Geahchan, Applications Engineer



ATTENTION

AUDIENCE PARTICIPATION

- Questions can be asked at any time using the chat function on the webinar screen
- Any unanswered questions will be followed up through email
- This presentation, a recording of the webinar and a brief survey will be emailed to all registrants

ABOUT ME

Wissam Geahchan



Applications Engineer, Nexans Canada

- Active member on several CSA, ICEA, UL standards committees
- Experience applying the Canadian Electrical Code in a variety of applications
- Licensed soccer coach

Agenda

- Introduction
- Standard, Types and Design
- Marking and Identification
- Capacity and Handling
- Transportation
- Storage
- Q&A



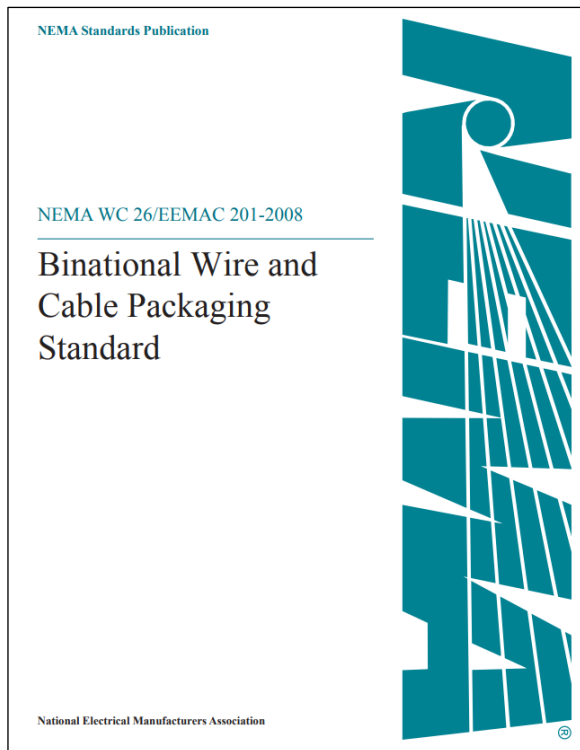


Introduction

- Wire and cable, and the reels that carry them, must be protected and properly maintained for safe and efficient use, installation, and operation
- This webinar is intended for anyone involved in the wire and cable supply chain including electrical distributors, manufacturers, contractors, and end users who handle and install wire and cable on site

Note: This presentation should not be taken as a standard or rule, instead, as a reference guide.

Standard



NEMA WC 26/EEMAC 201 Bi-National Wire and Cable Packaging Standard

- Packaging of wire and cable for the North American wire and cable industry
- Construction of different package types, minimum drum diameters, reel coverings, marking/identification, handling, storage, and capacities

Types

- Steel
- Metal-framed wood
- Wood
- Plywood
- Plastic

Hold a given range of weights and length of cable and can be for reuse or single-use.

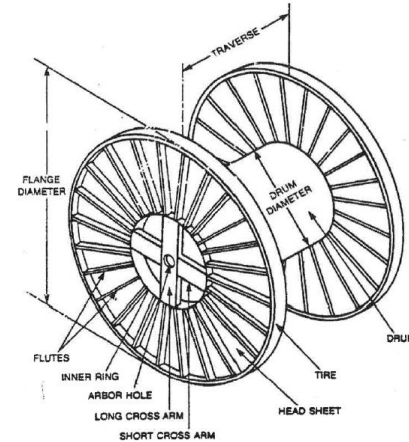
Three categories defined in NEMA WC 26:

1. Returnable Reels
2. Reusable Reels
3. Nonreturnable Reels



Types

1. **Returnable Reels** – defined as steel, plastic, or extra-heavy duty wood reels (Class 3), intended to be returned to the cable manufacturer or their designated agent and used for multiple shipments of the product.
 - a. **Gas-Tight Steel Shipping Reels**
 - For pipe-type cable
 - b. **Steel Fluted Reels**
 - Fluted or corrugated flange design to develop strong/durable package.
 - c. **Engineered Plastic Reels**
 - Specified by the wire and cable manufacturer
 - d. **Extra Heavy-Duty Wood Reels**
 - Class 3 reels are designed for multiple use or extra heavy-duty applications for heavy cable



Types

2. Reusable Wood Reels – package for the delivery, storage, and dispensing of the product and not intended to be returned to a cable manufacturer.

- a. Wood Reels
 - i. Varying sizes
 - ii. Class 1 reels for general purpose applications
 - iii. Class 2 reels for heavy duty applications



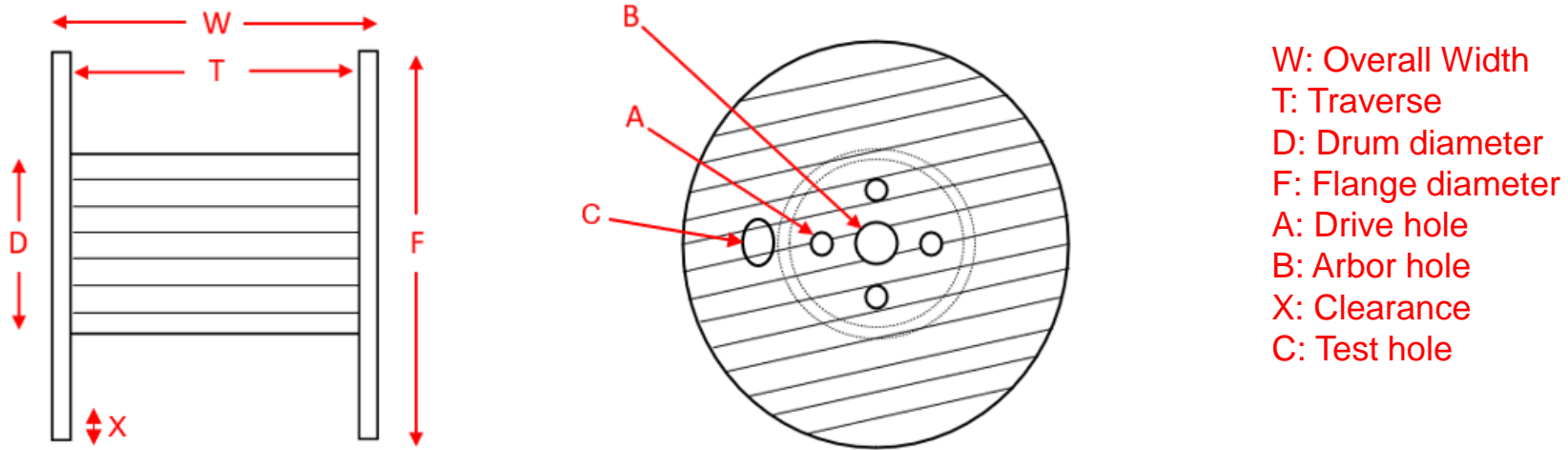
Types

3. **Nonreturnable Reels** - Any reel can be designated by the cable manufacturer as nonreturnable. Small nonreturnable packages are generally referred to as spools and can be made of a variety of materials.
- a. Steel Reels
 - b. Wood Reels
 - c. Engineered Plastic Reels
 - d. Plywood Reels and Spools



Design

The following diagram shows the essential parameters of a reel.



Reel dimensions are typically shown as **Flange diameter** x **Traverse** x **Drum diameter** along with the reel's carrying capacity in pounds (lbs) or kilograms (kg).

Design – Specs

The following are three (3) tables containing specifications, sizes, and capacities for wooden reels that are typically used.

Table 2-4
GENERAL PURPOSE REUSABLE WOOD REELS—CLASS 1

| REEL DIMENSIONS | | | MIN FL THICK | MAX O'ALL WIDTH | ARBOR HOLE DIA | MIN. STAVE THICK | DRIVE PIN | | | TEST HOLE | BUSH OR PLATE | TIE RODS No. & Size | ASSEMBLY WASHERS | MIN. # OF NAIL RINGS | APPROX. TARE WT. | | CAPACITY | |
|-----------------|------|------|--------------------|-----------------------|----------------------|------------------------|-----------|------|--------|--------------|---------------------|------------------------------|---------------------|----------------------------|---------------------|-----|----------|------|
| FL | TRAV | DRUM | | | | | QTY | DIA | RADIUS | | | | | | LBS | KGS | LBS | KGS |
| 20 | 12 | 10 | 1.250 | 15.0 | 3.06 | 0.625 | 1 | 1.00 | 3.5 | 1.5 | | 3 x 5/16 | 2.0 | 2 | 22 | 10 | 550 | 250 |
| 24 | 12 | 10 | 1.250 | 15.0 | 3.06 | 0.625 | 1 | 1.00 | 3.5 | 1.5 | | 3 x 5/16 | 2.0 | 2 | 28 | 13 | 550 | 250 |
| 24 | 18 | 10 | 1.250 | 21.0 | 3.06 | 0.625 | 1 | 1.00 | 3.5 | 1.5 | | 3 x 5/16 | 2.0 | 2 | 31 | 14 | 550 | 250 |
| 27 | 18 | 12 | 1.250 | 21.5 | 3.06 | 0.750 | 1 | 1.00 | 4.5 | 1.5 | | 3 x 5/16 | 2.0 | 2 | 38 | 17 | 550 | 250 |
| 30 | 18 | 12 | 1.250 | 21.5 | 3.06 | 0.750 | 1 | 1.00 | 4.5 | 1.5 | | 4 x 3/8 | 2.0 | 3 | 45 | 21 | 750 | 340 |
| 32 | 24 | 14 | 1.500 | 28.5 | 3.06 | 0.750 | 1 | 1.00 | 4.5 | 2.0 | | 4 x 3/8 | 2.0 | 3 | 66 | 29 | 950 | 430 |
| 36 | 24 | 17 | 1.500 | 28.5 | 3.06 | 0.750 | 1 | 1.25 | 6.0 | 2.0 | | 4 x 3/8 | 2.5 | 3 | 68 | 30 | 1500 | 680 |
| 40 | 24 | 17 | 1.500 | 28.5 | 3.06 | 0.875 | 1 | 1.25 | 6.0 | 2.0 | | 4 x 3/8 | 2.5 | 4 | 80 | 36 | 1500 | 680 |
| 42 | 26 | 18 | 1.500 | 30.5 | 3.06 | 0.875 | 1 | 1.25 | 6.0 | 2.0 | | 4 x 3/8 | 2.5 | 4 | 90 | 41 | 1500 | 680 |
| 45 | 28 | 21 | 1.500 | 32.5 | 3.06 | 0.875 | 1 | 1.50 | 8.5 | 2.5 | | 4 x 3/8 | 2.5 | 4 | 106 | 48 | 1500 | 680 |
| 50 | 32 | 24 | 1.750 | 37.0 | 3.06 | 1.062 | 2 | 1.50 | 10.0 | 2.5 | * | 6 x 3/8 | 2.5 | 4 | 143 | 65 | 3000 | 1360 |
| 54 | 32 | 26 | 1.750 | 37.0 | 3.06 | 1.062 | 2 | 1.50 | 10.0 | 3.0 | * | 6 x 3/8 | 2.5 | 5 | 164 | 74 | 3000 | 1360 |
| 58 | 32 | 28 | 1.750 | 37.0 | 3.06 | 1.062 | 2 | 1.50 | 10.0 | 3.0 | * | 6 x 3/8 | 2.5 | 5 | 187 | 85 | 3000 | 1360 |
| 66 | 32 | 36 | 2.250 | 38.0 | 3.06 | 1.125 | 2 | 3.00 | 11.5 | 4.0 | YES | 6 x 3/8 | 3.0 | 5 | 285 | 129 | 4500 | 2040 |
| 66 | 36 | 36 | 2.250 | 42.0 | 3.06 | 1.125 | 2 | 3.00 | 11.5 | 4.0 | YES | 6 x 3/8 | 3.0 | 5 | 292 | 132 | 4500 | 2040 |
| 72 | 36 | 36 | 2.250 | 42.0 | 3.06 | 1.125 | 2 | 3.00 | 11.5 | 4.0 | YES | 6 x 1/2 | 3.0 | 5 | 335 | 152 | 4500 | 2040 |
| 72 | 48 | 36 | 2.250 | 54.0 | 3.06 | 1.312 | 2 | 3.00 | 11.5 | 4.0 | YES | 6 x 1/2 | 3.0 | 5 | 397 | 180 | 4500 | 2040 |
| 78 | 48 | 42 | 2.250 | 54.0 | 3.06 | 1.312 | 2 | 3.00 | 11.5 | 4.5 | YES | 6 x 1/2 | 3.0 | 6 | 471 | 214 | 4500 | 2040 |
| 84 | 54 | 48 | 2.750 | 61.0 | 3.06 | 1.312 | 2 | 3.00 | 11.5 | 4.5 | YES | 8 x 1/2 | 3.0 | 6 | 639 | 290 | 6000 | 2720 |
| 90 | 54 | 48 | 2.750 | 61.0 | 3.06 | 1.312 | 2 | 3.00 | 11.5 | 4.5 | YES | 8 x 1/2 | 3.0 | 6 | 704 | 319 | 6000 | 2720 |
| 96 | 54 | 56 | 2.750 | 61.0 | 3.06 | 1.312 | 2 | 3.00 | 11.5 | 5.0 | YES | 8 x 1/2 | 3.0 | 6 | 816 | 370 | 6000 | 2720 |

*See Note 6.

NOTES

- Washers are required on all bolts. Cup washers are permitted where gross weight is not in excess of 6000 pounds and overall width is at a premium. Use of cup washers will reduce overall width by approximately 1 inch. Flat washers to be a minimum diameter of 3" with a minimum thickness of .125".
- Tapered cable test holes are required. Elongated test holes can be provided upon request.
- Center supports required on all reels with an inside traverse greater than 40" when 80% of the maximum reel capacity listed in Table 2-4 is exceeded.
- Construction dimensions may be varied for cable weight and/or the volumetric capacity of the reel.
- Headed nails are to be used, spaced 3 inches apart with a minimum countersink of 1/16" on the cable side and a 1/8" cinch on the opposite side.
- Metal bushings are required when gross weight is in excess of 2500 lbs.
- The tare weight is an approximation. The weight of wood reels can vary significantly based on wood species, moisture content, age, etc.

Design – Specs (cont'd)

Table 2-5
HEAVY DUTY REUSEABLE WOOD REELS—CLASS 2

| REEL DIMENSIONS | | | MIN FL THICK | MAX O'ALL WIDTH | ARBOR HOLE DIA | MIN STAVE THICK | DRIVE PIN | | | TEST HOLE | BUSH OR PLATE | TIE RODS No. & Size | ASSEMBLY WASHERS INCHES | MIN. # OF NAIL RINGS | APPROX. TARE WT. | | MAXIMUM CAPACITY | |
|-----------------|------|--------|--------------------|-----------------------|----------------------|-----------------------|-----------|------|--------|--------------|---------------------|---------------------------|-------------------------------|----------------------------|---------------------|-----|---------------------|------|
| TRAV | DRUM | INCHES | INCHES | INCHES | INCHES | INCHES | QTY | DIA | RADIUS | | | | | | LBS | KGS | LBS | KGS |
| 30 | 22 | 16 | 1.500 | 26.25 | 3.06 | 0.750 | 1 | 1.00 | 4.5 | 1.5 | | 4 x 3/8 | 2.0 | 3 | 80 | 36 | 1000 | 455 |
| 36 | 24 | 17 | 1.750 | 28.50 | 3.06 | 1.062 | 1 | 1.25 | 6.0 | 2.0 | | 4 x 3/8 | 2.5 | 3 | 81 | 37 | 2500 | 680 |
| 36 | 22 | 18 | 1.750 | 26.50 | 3.06 | 1.062 | 1 | 1.25 | 6.0 | 2.0 | | 4 x 3/8 | 2.5 | 3 | 85 | 39 | 2500 | 1135 |
| 38 | 22 | 20 | 1.750 | 26.50 | 3.06 | 1.062 | 1 | 1.25 | 6.0 | 2.0 | | 4 x 3/8 | 2.5 | 4 | 90 | 41 | 2500 | 1135 |
| 40 | 24 | 17 | 1.750 | 28.50 | 3.06 | 1.062 | 1 | 1.25 | 6.0 | 2.0 | | 4 x 3/8 | 2.5 | 4 | 94 | 43 | 2500 | 1135 |
| 42 | 26 | 18 | 1.750 | 30.50 | 3.06 | 1.062 | 1 | 1.25 | 6.0 | 2.0 | * | 4 x 3/8 | 2.5 | 4 | 110 | 50 | 3000 | 1360 |
| 42 | 28 | 21 | 1.750 | 32.50 | 3.06 | 1.062 | 1 | 1.25 | 6.0 | 2.0 | * | 4 x 3/8 | 2.5 | 4 | 120 | 55 | 3000 | 1360 |
| 45 | 28 | 21 | 1.750 | 32.50 | 3.06 | 1.062 | 1 | 1.50 | 8.5 | 2.5 | * | 5 x 3/8 | 2.5 | 4 | 125 | 57 | 3500 | 1590 |
| 48 | 28 | 24 | 2.125 | 34.25 | 3.06 | 1.250 | 2 | 1.50 | 10.0 | 2.5 | * | 6 x 3/8 | 2.5 | 4 | 160 | 73 | 3500 | 1590 |
| 50 | 32 | 24 | 2.125 | 38.00 | 3.06 | 1.250 | 2 | 1.50 | 10.0 | 2.5 | * | 6 x 3/8 | 2.5 | 4 | 180 | 82 | 4800 | 2180 |
| 54 | 32 | 26 | 2.125 | 39.50 | 3.06 | 1.250 | 2 | 1.50 | 10.0 | 3.0 | * | 6 x 3/8 | 2.5 | 5 | 235 | 107 | 6500 | 2950 |
| 58 | 32 | 28 | 2.125 | 39.50 | 3.06 | 1.250 | 2 | 1.50 | 10.0 | 3.0 | * | 6 x 3/8 | 2.5 | 5 | 265 | 120 | 6500 | 2950 |
| 60 | 28 | 28 | 2.750 | 35.50 | 3.06 | 1.375 | 2 | 3.00 | 11.5 | 3.0 | YES | 6 x 1/2 | 3.0 | 5 | 300 | 136 | 6500 | 2950 |
| 66 | 28 | 30 | 2.750 | 35.50 | 3.06 | 1.375 | 2 | 3.00 | 11.5 | 4.0 | YES | 6 x 1/2 | 3.0 | 5 | 325 | 148 | 7000 | 3175 |
| 66 | 32 | 36 | 2.750 | 39.50 | 3.06 | 1.375 | 2 | 3.00 | 11.5 | 4.0 | YES | 6 x 1/2 | 3.0 | 5 | 375 | 170 | 7000 | 3175 |
| 66 | 36 | 36 | 2.750 | 43.50 | 3.06 | 1.375 | 2 | 3.00 | 11.5 | 4.0 | YES | 6 x 1/2 | 3.0 | 5 | 431 | 196 | 8000 | 3630 |
| 72 | 36 | 36 | 3.000 | 43.50 | 3.06 | 1.375 | 2 | 3.00 | 11.5 | 4.0 | YES | 8 x 1/2 | 3.0 | 5 | 540 | 245 | 8000 | 3630 |
| 72 | 48 | 36 | 3.000 | 56.00 | 3.06 | 1.375 | 2 | 3.00 | 11.5 | 4.0 | YES | 8 x 1/2 | 3.0 | 5 | 565 | 255 | 8000 | 3630 |
| 78 | 48 | 42 | 3.000 | 56.00 | 3.06 | 1.375 | 2 | 3.00 | 11.5 | 4.5 | YES | 8 x 5/8 | 3.0 | 6 | 660 | 300 | 9000 | 4080 |
| 84 | 54 | 48 | 3.250 | 62.00 | 3.06 | 1.500 | 2 | 3.00 | 11.5 | 4.5 | YES | 8 x 5/8 | 3.0 | 6 | 940 | 425 | 10000 | 4535 |
| 90 | 54 | 48 | 3.250 | 62.00 | 3.06 | 1.500 | 2 | 3.00 | 11.5 | 4.5 | YES | 8 x 5/8 | 3.0 | 6 | 990 | 450 | 12000 | 5445 |
| 96 | 54 | 56 | 3.250 | 62.00 | 3.06 | 1.500 | 2 | 3.00 | 11.5 | 4.5 | YES | 8 x 5/8 | 3.0 | 6 | 1150 | 525 | 12000 | 5445 |

*See Note 6.

NOTES

- Washers are required on all bolts. Cup washers are permitted where gross weight is not in excess of 6000 pounds and overall width is at a premium. Use of cup washers will reduce overall width by approximately 1 inch. Flat washers to be a minimum diameter of 3" with a minimum thickness of .125".
- Tapered cable test holes are required. Elongated test holes can be provided upon request.
- Center supports required on all reels with an inside traverse greater than 40" when 80% of the maximum reel capacity listed in Table 2-5 is exceeded.
- Construction dimensions may be varied for cable weight and/or the volumetric capacity of the reel.
- Headed nails are to be used, spaced 3 inches apart with a minimum countersink of 1/16" on the cable side and a 1/8" clinch on the opposite side.
- Metal bushings are required when gross weight is in excess of 2500 lbs.
- The tare weight is an approximation. The weight of wood reels can vary significantly based on wood species, moisture content, age, etc

Design – Specs (cont'd)

Table 2-6
EXTRA HEAVY DUTY RETURNABLE WOOD REELS—CLASS 3

| REEL DIMENSIONS | | | MIN FLANGE | MAX O'ALL WIDTH | ARBOR HOLE DIA | MIN STAVE THICK | DRIVE PIN | | | TEST | HUB PLATE | | TIE RODS | MIN. DIA. ASSEMBLY | MIN. # | APPROX | CAPACITY | | |
|-----------------|------|------|------------|-----------------|----------------|-----------------|-----------|------|--------|----------|---------------|---------|------------|--------------------|---------------|----------|----------|-------|------|
| FL | TRAV | DRUM | PLY | INCHES | INCHES | INCHES | QTY | DIA | RADIUS | HOLE | SIZE | BOLTS | No. & Size | WASHERS | OF NAIL RINGS | TARE WT. | LBS | KGS | |
| 36 | 18 | 16 | 2 x 1.125 | 22.5 | 3.06 | 1.250 | 2 | 1.25 | 6.0 | 1.5 x 4 | 8 x 8 x 1/8 | 4 x 3/8 | 4 x 3/8 | 2.5 | 3 | 110 | 50 | 2500 | 1135 |
| 40 | 18 | 18 | 2 x 1.375 | 24.0 | 3.06 | 1.250 | 2 | 2.00 | 7.0 | 2.0 x 6 | 8 x 8 x 1/8 | 4 x 3/8 | 5 x 1/2 | 2.5 | 4 | 145 | 65 | 3500 | 1600 |
| 40 | 24 | 17 | 2 x 1.375 | 30.0 | 3.06 | 1.250 | 2 | 2.00 | 7.0 | 2.0 x 6 | 8 x 8 x 1/8 | 4 x 3/8 | 5 x 1/2 | 2.5 | 4 | 150 | 68 | 3500 | 1600 |
| 42 | 24 | 24 | 2 x 1.375 | 30.0 | 3.06 | 1.250 | 2 | 2.00 | 7.0 | 2.0 x 6 | 8 x 8 x 1/8 | 4 x 3/8 | 5 x 1/2 | 2.5 | 4 | 165 | 75 | 4000 | 1800 |
| 45 | 28 | 21 | 2 x 1.375 | 34.0 | 3.06 | 1.250 | 2 | 2.00 | 7.0 | 2.0 x 6 | 8 x 8 x 1/8 | 4 x 3/8 | 5 x 1/2 | 2.5 | 4 | 200 | 90 | 4000 | 1800 |
| 48 | 24 | 24 | 2 x 1.375 | 30.0 | 3.06 | 1.250 | 2 | 2.00 | 7.0 | 2.0 x 6 | 8 x 8 x 1/8 | 4 x 3/8 | 5 x 1/2 | 2.5 | 4 | 210 | 95 | 4000 | 1800 |
| 50 | 32 | 23 | 2 x 1.375 | 38.0 | 3.06 | 1.625 | 2 | 2.00 | 7.0 | 2.0 x 6 | 8 x 8 x 1/8 | 4 x 3/8 | 5 x 1/2 | 2.5 | 4 | 230 | 105 | 5000 | 2270 |
| 54 | 32 | 26 | 2 x 1.375 | 38.0 | 3.06 | 1.625 | 2 | 2.00 | 7.0 | 2.0 x 8 | 8 x 8 x 1/8 | 4 x 3/8 | 6 x 1/2 | 2.5 | 5 | 310 | 140 | 5000 | 2270 |
| 58 | 32 | 28 | 2 x 1.375 | 38.0 | 3.06 | 1.625 | 2 | 2.00 | 7.0 | 2.0 x 8 | 8 x 8 x 1/8 | 4 x 3/8 | 6 x 1/2 | 2.5 | 5 | 330 | 150 | 5000 | 2270 |
| 60 | 32 | 32 | 2 x 1.375 | 38.0 | 3.06 | 1.625 | 2 | 2.00 | 7.0 | 2.0 x 8 | 8 x 8 x 1/8 | 4 x 3/8 | 6 x 1/2 | 2.5 | 5 | 375 | 170 | 5000 | 2720 |
| 66 | 36 | 36 | 2 x 1.375 | 42.0 | 3.06 | 1.625 | 2 | 2.00 | 7.0 | 2.0 x 8 | 8 x 8 x 1/8 | 4 x 1/2 | 6 x 5/8 | 3.5 | 5 | 540 | 245 | 8000 | 3630 |
| 68 | 38 | 28 | 2 x 1.500 | 45.0 | 3.06 | 1.625 | 2 | 2.00 | 7.0 | 3.5 x 12 | 8 x 8 x 1/8 | 4 x 1/2 | 6 x 5/8 | 3.5 | 5 | 550 | 250 | 8000 | 3630 |
| 72 | 36 | 48 | 2 x 1.500 | 43.0 | 4.12 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 12 | 7 x 24 x 1/4 | 4 x 1/2 | 8 x 5/8 | 3.5 | 5 | 750 | 340 | 10000 | 4535 |
| 72 | 36 | 36 | 2 x 1.500 | 43.0 | 4.12 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 12 | 7 x 24 x 1/4 | 4 x 1/2 | 8 x 5/8 | 3.5 | 5 | 705 | 320 | 10000 | 4535 |
| 72 | 48 | 36 | 2 x 1.500 | 55.0 | 4.12 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 12 | 7 x 24 x 1/4 | 4 x 1/2 | 8 x 5/8 | 3.5 | 5 | 750 | 340 | 9000 | 4080 |
| 78 | 36 | 48 | 2 x 1.500 | 43.0 | 4.12 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 12 | 7 x 24 x 1/4 | 4 x 1/2 | 8 x 5/8 | 3.5 | 6 | 850 | 385 | 10000 | 4535 |
| 78 | 36 | 40 | 2 x 1.500 | 43.0 | 4.12 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 12 | 7 x 24 x 1/4 | 4 x 1/2 | 8 x 5/8 | 3.5 | 6 | 805 | 365 | 10000 | 4535 |
| 78 | 48 | 42 | 2 x 1.500 | 55.0 | 4.12 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 12 | 7 x 24 x 1/4 | 4 x 1/2 | 8 x 5/8 | 3.5 | 6 | 880 | 400 | 10000 | 4535 |
| 84 | 42 | 48 | 2 x 1.500 | 49.0 | 4.12 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 12 | 7 x 24 x 1/4 | 4 x 1/2 | 8 x 3/4 | 5.0 | 6 | 990 | 450 | 12000 | 5445 |
| 84 | 54 | 48 | 2 x 1.500 | 61.0 | 4.12 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 12 | 7 x 24 x 1/4 | 4 x 1/2 | 8 x 3/4 | 5.0 | 6 | 1080 | 490 | 12000 | 5445 |
| 90 | 46 | 56 | 3 x 1.375 | 55.0 | 5.25 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 18 | 12 x 28 x 1/4 | 6 x 1/2 | 10 x 3/4 | 5.0 | 6 | 1410 | 640 | 15000 | 6800 |
| 90 | 54 | 48 | 3 x 1.375 | 63.0 | 5.25 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 18 | 12 x 28 x 1/4 | 6 x 1/2 | 10 x 3/4 | 5.0 | 6 | 1455 | 660 | 15000 | 6800 |
| 96 | 46 | 56 | 3 x 1.375 | 55.0 | 5.25 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 18 | 12 x 28 x 1/4 | 6 x 1/2 | 10 x 3/4 | 5.0 | 6 | 1545 | 700 | 15000 | 6800 |
| 96 | 46 | 44 | 3 x 1.375 | 55.0 | 5.25 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 18 | 12 x 28 x 1/4 | 6 x 1/2 | 10 x 3/4 | 5.0 | 6 | 1500 | 680 | 15000 | 6800 |
| 96 | 54 | 56 | 3 x 1.375 | 63.0 | 5.25 | 1.625 | 2 | 2.50 | 10.0 | 4.0 x 18 | 12 x 28 x 1/4 | 6 x 1/2 | 10 x 3/4 | 5.0 | 6 | 1610 | 730 | 15000 | 6800 |
| 102 | 45 | 50 | 3 x 1.375 | 54.0 | 5.25 | 1.625 | 2 | 2.50 | 10.0 | 5.5 x 20 | 12 x 28 x 1/4 | 6 x 1/2 | 10 x 3/4 | 5.0 | 6 | 1640 | 745 | 15000 | 6800 |
| 108 | 46 | 60 | 3 x 1.375 | 55.0 | 5.25 | 1.625 | 2 | 2.50 | 10.0 | 5.5 x 20 | 12 x 28 x 1/4 | 6 x 1/2 | 10 x 3/4 | 5.0 | 6 | 1895 | 860 | 15000 | 6800 |

NOTES

- 1.50" drum head support plus groove in flange for reels 72" and larger are required.
- 1.50" wide center support for reels 72" and larger are required.
- Steel pipe through the reel from hub plate to hub plate on reel sizes 90" through 108" are required.
- Cup washers required.
- Washers are required on all bolts.
- Tapered cable test holes are required. Elongated test holes can be provided upon request.
- Construction dimensions may be varied for cable weight and/or the volumetric capacity of the reel.
- Headed nails are to be used, spaced 3" apart with a minimum countersink of 1/16" on the cable side and a 1/8" on the opposite side.
- The tare weight is an approximation. The weight of wood reels can vary significantly based on wood species, moisture content, age, etc.

Minimum Drum Diameters

Table 3-1
MINIMUM DRUM DIAMETERS OF REELS FOR CABLES
These Diameters are Not To Be Used for Installation

| Type of Cable | Minimum Drum Diameter as a Multiple of Outside Diameter of Cable | | | |
|--|--|------------------|---------------|----------|
| | Type of Insulation | | | |
| | Paper Solid and Gas | Paper Oil Filled | Varnish Cloth | Extruded |
| A. Single and multiple conductor nonmetallic covered cable | | | | |
| 1. Non-shielded and wire shielded, including cables with concentric wires: | | | | |
| a) 0–2000 volts | 14 | ... | 14* | 10 |
| b) Over 2000 volts | | | | |
| 1) Non-jacketed with concentric wires | ... | ... | ... | 14 |
| 2) All others | 14 | ... | 14* | 12 |
| 2. Tape shielded | 14 | ... | 14* | 14 |
| a) Helically applied | 14 | ... | 14* | 14 |
| b) Longitudinally applied flat tape | ... | ... | ... | 20 |
| c) Longitudinally applied corrugated tape | ... | ... | ... | 14 |
| B. Single and multiple-conductor metallic-covered cable: | | | | |
| 1. Tubular metallic sheathed; | | | | |
| a) Lead | 14 | 14** | 14* | 14 |
| b) Aluminum | | | | |
| 1) Outside diameter—1.75" and less | 25 | 25 | 25 | 25 |
| 2) Outside diameter—1.751" and larger | 30 | 30 | 30 | 30 |
| 2. Wire armored | 15 | 18 | 16* | 16 |
| 3. Flat tape armored | 16 | 18 | 16* | 16 |
| 4. Corrugated metallic sheathed | 16 | 18 | 14* | 14 |
| 5. Interlocked armor | 14 | 18 | 14* | 14 |

Excessive bending of the cable can be detrimental. Here are some limits for minimum drum diameters of reels for cables.

Note - these should not be used for installation.

Minimum Drum Diameters (cont'd)

| | | | | |
|--|---|-----|------|------|
| 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: | | | | |
| | 0.85 | ... | 0.85 | 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 | | | |

* For 1000 kcmil and larger, no less than 25 x bare conductor OD

** For single conductor cables with more than 500 mils of insulation, this factor is 18

NOTES

- 1 When metallic-sheathed cables are covered only by a thermosetting or thermoplastic jacket, the "outside diameter" is the diameter over the metallic sheath itself. In all other cases, the outside diameter is the diameter outside of all the material on the cable in the state in which it is to be wound upon the reel.
- 2 For "flat-twin" cables (where the cable is placed upon the reel with its flat side against the drum), the minor outside diameter shall be multiplied by the appropriate factor to determine the minimum drum diameter.
- 3 The multiplying factors given for item E refer to the outside diameter of the duct.

Minimum Drum Diameters (cont'd)

| Cable Type | Minimum Reel Drum Diameter |
|--------------------------------------|-----------------------------------|
| | |
| CANADEx® or HEATEX® NMD90 | 10x |
| SUPERVEX® NMWU | 10x |
| INSTAGLIDE® T90 Nylon / TWN75 | 10x |
| RW90 and RWU90 | 10x |
| RPV90 and RPVU90 | 10x |
| AC90 and ISO-BX | 14x |
| FIREX-II TECK90 | 14x |
| DRIVERX® VFD RA90 | 17x |
| | |

Note: The minimum reel drum diameter factor is applied to the overall cable diameter unless otherwise stated. These values are based on EEMA 201 / NEMA WC26 data.

These should not be confused with minimum bend radius when pulling or final training of cable!

Marking and Identification



Reel marking and labelling serves to differentiate returnable reels from non-returnable reels, as well as to indicate size and supplier.

Here are some common practices:

1. NEMA/EEMAC Class X, where X = 1, 2 or 3 for the applicable reel class
2. Identification of Flange, Traverse, and Drum dimensions to identify the volumetric capacity of the reel and determine if it is a standard reel for reuse or recycling.
3. Additional reel marking should be at the customer's request or at the cable manufacturer's option.

CSA and UL also have standards for labelling that may apply and should be checked.

Capacity

A reel's capacity depends on the **size, weight, and shape of the cable** (or **volume** of the reel) AND the **weight capacity of the reel**.

NEMA offers a simple formula to determine the length of a round cable that will fit on the onto a specific reel size.

$$F = 0.2617 \left[\left[B + \left(\frac{A - 2X - B}{1.9D} \right) 0.95D \right] \left[\frac{A - 2X - B}{1.9D} \right] \left[\frac{0.95C}{D} \right] \right]$$

$$M = 0.3048 \times F$$

F = Feet of cable on reel

M = Meters of cable on reel

A = Flange diameter, in inches

B = Drum diameter, in inches

C = Traverse, in inches

D = Diameter of cable, in inches

X = Defined as the clearance between the cable and the outer edge of the reel flange and is equal to 1" or one cable diameter, whichever is larger.

Capacity - Example

Let's take a 3C12 AWG TECK90 600 V product as an example.



Ex: 3C12 AWG TECK90 600 V
Diameter = 0.75" or 18.9 mm
Weight = 280 lb/kft or 417 kg/km

| REEL DIMENSIONS | | | MIN FL THICK | MAX O'ALL WIDTH | ARBOR HOLE DIA | MIN. STAVE THICK | DRIVE PIN | | TEST HOLE | BUSH OR PLATE | TIE RODS No. & Size | ASSEMBLY WASHERS | MIN. # OF NAIL RINGS | APPROX. TARE WT. | | CAPACITY | |
|-----------------|--------|--------|--------------------|-----------------------|----------------------|------------------------|-----------|------|--------------|---------------------|------------------------------|---------------------|----------------------------|---------------------|-----|----------|-----|
| FL | TRAV | DRUM | | | | | QTY | DIA | RADIUS | | | | | LBS | KGS | LBS | KGS |
| 20 | 12 | 10 | 1.250 | 15.0 | 3.06 | 0.625 | 1 | 1.00 | 3.5 | 1.5 | 3 x 5/16 | 2.0 | 2 | 22 | 10 | 550 | 250 |
| ↑ A | ↑ C | ↑ B | | | | | | | | | | | | | | | |

Looks like this reel can handle up to 250 kg

OR...

250 kg / 416 kg/km = 0.6 km

Let's check if 600m of this product would fit, volume-wise, on this reel.

$$F = 0.2617 \left[\left[B + \left(\frac{A - 2X - B}{1.9D} \right) 0.95D \right] \left[\frac{A - 2X - B}{1.9D} \right] \left[\frac{0.95C}{D} \right] \right]$$

Capacity - Example



Ex: 3C12 AWG TECK90 600 V
Diameter = 0.75" or 18.9 mm
Weight = 280 lb/kft or 417 kg/km

$$F = 0.2617 \left[\left[B + \left(\frac{A - 2X - B}{1.9D} \right) 0.95D \right] \left[\frac{A - 2X - B}{1.9D} \right] \left[\frac{0.95C}{D} \right] \right]$$

$$F = 0.2617 \left[\left[10 + \left(\frac{20 - 2(1) - 10}{1.9(0.75)} \right) 0.95(0.75) \right] \left[\frac{20 - 2(1) - 10}{1.9(0.75)} \right] \left[\frac{0.95(12)}{(0.75)} \right] \right]$$

$$F = 312 \text{ ft}$$

$$M = 95 \text{ m}$$

So, although the reel we chose can handle 600 m of this product in terms of weight capacity, it can only handle a length of 95 m in terms of length capacity (or volume)!

Well, what if I want 300m of product on a reel? What size reel should I use??

F = Feet of cable on reel

M = Meters of cable on reel

A = Flange diameter, in inches

B = Drum diameter, in inches

C = Traverse, in inches

D = Diameter of cable, in inches

X = Defined as the clearance between the cable and the outer edge of the reel flange and is equal to 1" or one cable diameter, whichever is larger.

BUT FIRST...

Did anyone catch the mistake?

Minimum drum diameter = ?

What would the minimum drum diameter be for this "interlocked armoured" TECK90 cable?



BUT FIRST...

| Cable Type | Minimum Reel Drum Diameter |
|--------------------------------------|----------------------------|
| | |
| CANADEx® or HEATEX® NMD90 | 10x |
| SUPERVEX® NMWU | 10x |
| INSTAGLIDE® T90 Nylon / TWN75 | 10x |
| RW90 and RWU90 | 10x |
| RPV90 and RPVU90 | 10x |
| AC90 and ISO-BX | 14x |
| FIREX-II TECK90 | 14x |
| DRIVERX® VFD RA90 | 17x |
| | |

Note: The minimum reel drum diameter factor is applied to the overall cable diameter unless otherwise stated. These values are based on EEMA 201 / NEMA WC26 data.

These should not be confused with minimum bend radius when pulling or final training of cable!

BUT FIRST...



Ex: 3C12 AWG TECK90
600 V
Diameter = 0.75" or 18.9
mm
Weight = 280 lb/kft or
417 kg/km

Minimum drum diameter = $0.75" \times 14 = \underline{10.5}"$

Therefore, we cannot use the reel we chose!

We must use, at a minimum, a 27 x 18 x 12 reel.

Let's check to see if this reel works....

| REEL DIMENSIONS | | | MIN FL THICK | MAX O'ALL WIDTH | ARBOR HOLE DIA | MIN. STAVE THICK | DRIVE PIN | | | TEST HOLE | BUSH OR PLATE | TIE RODS No. & Size | ASSEMBLY WASHERS | MIN. # OF NAIL RINGS | APPROX. TARE WT. | | CAPACITY | |
|-----------------|------|------|--------------------|-----------------------|----------------------|------------------------|-----------|------|--------|--------------|---------------------|------------------------------|---------------------|----------------------------|---------------------|-----|----------|-----|
| FL | TRAV | DRUM | | | | | QTY | DIA | RADIUS | | | | | | LBS | KGS | LBS | KGS |
| 20 | 12 | 10 | 1.250 | 15.0 | 3.06 | 0.625 | 1 | 1.00 | 3.5 | 1.5 | | 3 x 5/16 | 2.0 | 2 | 22 | 10 | 550 | 250 |
| 24 | 12 | 10 | 1.250 | 15.0 | 3.06 | 0.625 | 1 | 1.00 | 3.5 | 1.5 | | 3 x 5/16 | 2.0 | 2 | 28 | 13 | 550 | 250 |
| 24 | 18 | 10 | 1.250 | 21.0 | 3.06 | 0.625 | 1 | 1.00 | 3.5 | 1.5 | | 3 x 5/16 | 2.0 | 2 | 31 | 14 | 550 | 250 |
| 27 | 18 | 12 | 1.250 | 21.5 | 3.06 | 0.750 | 1 | 1.00 | 4.5 | 1.5 | | 3 x 5/16 | 2.0 | 2 | 38 | 17 | 550 | 250 |
| 30 | 18 | 12 | 1.250 | 21.5 | 3.06 | 0.750 | 1 | 1.00 | 4.5 | 1.5 | | 4 x 3/8 | 2.0 | 3 | 45 | 21 | 750 | 340 |
| 32 | 24 | 14 | 1.500 | 28.5 | 3.06 | 0.750 | 1 | 1.00 | 4.5 | 2.0 | | 4 x 3/8 | 2.0 | 3 | 66 | 29 | 950 | 430 |

BUT FIRST...



Ex: 3C12 AWG
TECK90 600 V
Diameter = 0.75" or
18.9 mm
Weight = 280 lb/kft
or 417 kg/km

$$F = 0.2617 \left[\left[B + \left(\frac{A - 2X - B}{1.9D} \right) 0.95D \right] \left[\frac{A - 2X - B}{1.9D} \right] \left[\frac{0.95C}{D} \right] \right]$$

$$F = 1007 \text{ ft}$$

$$M = 306 \text{ m}$$

This
works!

F = Feet of cable on reel
M = Meters of cable on reel
A = Flange diameter, in inches
B = Drum diameter, in inches
C = Traverse, in inches
D = Diameter of cable, in inches
X = Defined as the clearance between the cable and the outer edge of the reel flange and is equal to 1" or one cable diameter, whichever is larger.

Capacity - Example



Ex: 3C12 AWG
TECK90 600 V
Diameter = 0.75" or
18.9 mm
Weight = 280 lb/kft
or 417 kg/km

$$F = 0.2617 \left[\left[B + \left(\frac{A - 2X - B}{1.9D} \right) 0.95D \right] \left[\frac{A - 2X - B}{1.9D} \right] \left[\frac{0.95C}{D} \right] \right]$$

Alternatively, you can set this formula up in a reel capacity calculator or similar program.

Using the Nexans Reel Capacity Calculator...

Capacity - Example



Known length = 300m

Ex: 3C12 AWG
TECK90 600 V
Diameter = 0.75" or
18.9 mm
Weight = 280 lb/kft
or 417 kg/km

Instructions

CALCULATE BY KNOWN REEL

- Pick the reel from the Nema or Domestic reel drop down list.
- Enter the cable OD (inches)
- Adjust the Clearance if needed
- Enter the cable weight if known in Kg/M (Lbs/1000Ft x .001488)
- Choose a Cable Type. Calculates the Min DrumOD
- Adjust the percent good wind if you need. (1..9..8..7, etc.)
- For cables 1.5" OD and larger .9 wind is recommended
- Hit the calculate for know reel button.

CALCULATE BY KNOWN LENGTH

- Enter the length of cable you want in Feet or Meters
- Enter the Cable OD (inches)
- Adjust the percent good wind if you need. (1..9..8..7, etc.)
- For cables 1.5" OD and larger .9 wind is recommended
- Hit the calculate for know length button.
- This picks the closest reel from the Nema and Domestic lists.

Close

NEXANS Reel Capacity Calculator

CABLE LENGTH THIS REEL

| | |
|----------------------|--------|
| <input type="text"/> | Feet |
| <input type="text"/> | Meters |

CABLE WEIGHT THIS REEL

| | |
|----------------------|----------------------|
| Kgs | Lbs |
| <input type="text"/> | <input type="text"/> |

TOTAL WEIGHT THIS REEL

| | |
|----------------------|----------------------|
| Kgs | Lbs |
| <input type="text"/> | <input type="text"/> |

MIN DRUM DIAMETER

| | |
|----------------------|--------|
| <input type="text"/> | Inches |
|----------------------|--------|

Instructions

EXIT

ENTER REEL DATA

| | inches | mm | |
|---------------------|----------------------|----------------------|-----|
| FLANGE Diameter | <input type="text"/> | <input type="text"/> | |
| TRAVERSE Length | <input type="text"/> | <input type="text"/> | |
| DRUM Diameter | <input type="text"/> | <input type="text"/> | |
| Reel Tare Wgt (Kgs) | <input type="text"/> | <input type="text"/> | Lbs |
| Max Weight (Kgs) | <input type="text"/> | <input type="text"/> | Lbs |

ENTER CABLE DATA

| | |
|---|----------------------|
| Clearance from Top | <input type="text"/> |
| Cable Diameter (inches) | <input type="text"/> |
| Cable Weight (Kg/M) Lbs/1000Ft x .001488 | OPTIONAL |
| Cable Type (choose) | 3. NonArmoured |
| % Perfect Wind(1..9..75) | 1 |

000654

INCWIRE Pkg Code

NEMA Reel List

DOMESTIC Reel List

Save Result

Calculate for
Known Length

Calculate for
Known Reel

Clear Fields

Capacity - Example



Ex: 3C12 AWG
TECK90 600 V
Diameter = 0.75" or
18.9 mm
Weight = 280 lb/kft
or 417 kg/km

This confirms that a 27x18x12
Class 1 Wooden Reel will
work!

NEXANS Reel Capacity Calculator

CABLE LENGTH THIS REEL

984.24 Feet

300 Meters

CABLE WEIGHT THIS REEL

Kgs Lbs

125100 275798.27

TOTAL WEIGHT THIS REEL

Kgs Lbs

125119 275840.16

MIN DRUM DIAMETER

10.5 Inches

Instructions

EXIT

18

12

27

000654

INCWIRE Pkg Code

NEMA Reel List

DOMESTIC Reel List

Save Result

Calculate for Known Length

Calculate for Known Reel

Clear Fields

ENTER REEL DATA

| | inches | mm |
|----------------------|--------|------------|
| NEMA FLANGE Diameter | 27 | 686 |
| TRAVERSE Length | 18 | 457 |
| DRUM Diameter | 12 | 305 |
| Reel Tare Wgt (Kgs) | 19 | 41.887 Lbs |
| Max Weight (Kgs) | 0 | 0 Lbs |

ENTER CABLE DATA

Clearance from Top 1

Cable Diameter (inches) 0.75

Cable Weight (Kg/M) 417
Lbs/1000Ft x .001488

Cable Type (choose) 1. Interlocked Armour

% Perfect Wind(1..9..75) 1

Coverings

There are 6 levels of covering protection defined in the NEMA WC 26 standard:

Level 1: No covering normally required

Level 2: Weather Protector

- Protection against weathering during storage

Level 3: Heavy Duty Physical Protector

- Provides increased physical protection



Coverings

Level 4: Extra Heavy Duty Physical Protector

- Provides substantial amount of physical protection

Level 5: Export

- Provides substantial amount of physical protection during prolonged transit

Level 6: Special Packaging

NEMA WC 26 standard provides a recommended product level protection and recommended packaging materials.



Handling

Some packaging methods include cradling, chocking, strapping, or even palletizing.



Cradling

A wooden or metal structure placed under the reel to avoid it rolling or moving sideways, often during transport.

Chocking/Blocking

Wooden stops are placed in front and behind the flanges to stop the reel from rolling, for example while on a truck, or when un-reeling cable



Strapping

This is used to hold reels in place, for example when large reels are placed on a flatbed truck for transport.

Palletizing

Smaller reels may be placed or stacked on pallets for transport or storage



Handling



Use Caution! It is important when loading, unloading, or transporting reels over short distances.

Lifting using Cranes

Lift one reel at a time



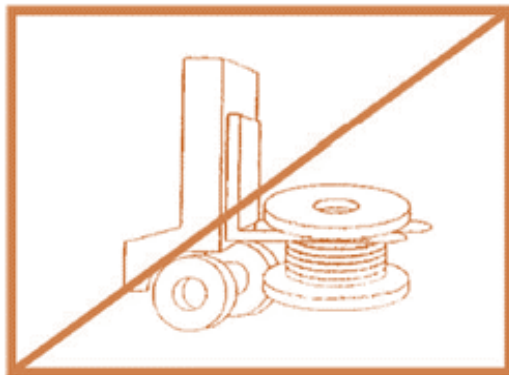
The lifting of the reels must be performed with care and attention. Slowly lower the reel and remove any obstacles.

A support bar is placed above the reel or through the arbor hole to separate the rope/chain

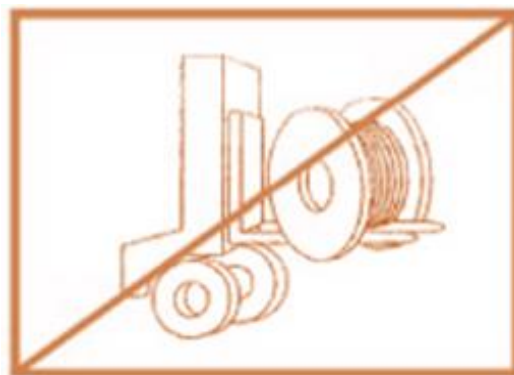
The rope must be installed so that the hook is centralized to avoid oscillation of the reel

Handling

Lifting using a Forklift



Do not lift by the top of the reel flange. Fork under bottom flange is acceptable.



Never allow fork tines to touch the cable surface or reel wrap.

Be careful not to damage the end of the cable when it is exposed.



When using a forklift, keep the core of the reel in the same direction of motion as the forklift.

Handling

Rolling Reels

Rolling reels containing wire and cable is not recommended. If rolling is necessary, always roll in the opposite direction to which the cable is wrapped to avoid the release of the wrap and cable.



Reel Flipping

Reels should not be flipped.



Nexans' Un-Reel



Note – Products that are tension-wound on the reel, should never be flipped for shipment or storage and remain upright during the complete shipping and storage process to prevent "birdcages".

Transportation

Loading



The reel core must be arranged perpendicularly to the direction of travel



The reels should not exceed the useful width of the transport platform



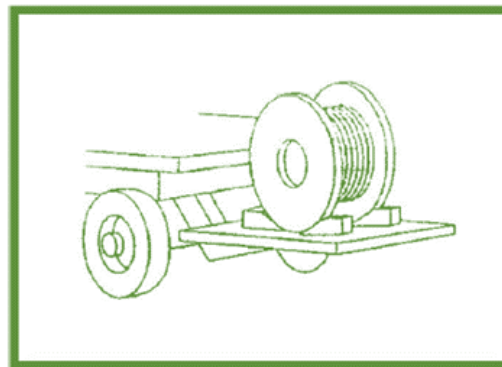
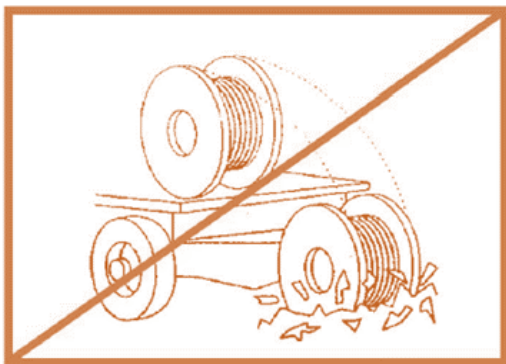
To handle or move reels onto a truck or flatbed, always use a forklift, crane or winch.

Transportation

Unloading



Never unload by rolling/dropping off the platform to the ground



Lowering reels from a truck using a hydraulic gate, hoist, or forklift. Lower carefully.

Storage

When selecting a storage site, consideration should be given to the following:

- Traffic patterns during off-loading
- Grade and condition of the soil or pavement
- Protection from vehicle damage during the time in storage
- Environmental conditions such as exposure to heat, corrosive chemicals, etc.

Only sunlight resistant cables should be stored outdoors.



Storage – Long Term

Long term wire and cable reel storage is considered **longer than 3 months.**

Instructions to assist in the case of any of the following:

- a) Reels and the timber used in reels deteriorates with time and weather
- b) Cable end caps deteriorate with time and weather
- c) Exposed cable surfaces can deteriorate or colours fade
- d) Cable can be damaged by the environment
- e) Cable may be damaged during movements or transport

Reels should be stored on a dry, level and firm surface and on the flange edges



Storage – Long Term

Inspection and maintenance becomes paramount.

Involves tightening the transverse bolts and bolts holding the steel plate at the spindle hole.

This prevents the collapse of the reel during movement and during cable installation.

If reels are required to be stored for periods longer than two years, it is recommended that they are stored in an enclosed area sheltered from the environment.



End of Life

If you have any questions about the end of life of your reel, reach out to your cable manufacturer for guidance!

Many manufacturers, including **Nexans**, have reel recycling/returning programs.

Reach out to find out more!



Key Takeaways

- Presented the different reel **types** and **features**.
- Learned about common practices for **marking and identification**
- Discussed reel **capacity** in terms of weight and length (or volume) along with an example.
- Learned about reel **handling, transportation, and storage** guidelines.



Q & A



▼ Chat

[type question here]


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