



WEBINAR

REEL Talk – All You Need to Know

September 28, 2022

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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**

Wissam Geahchan



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- 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



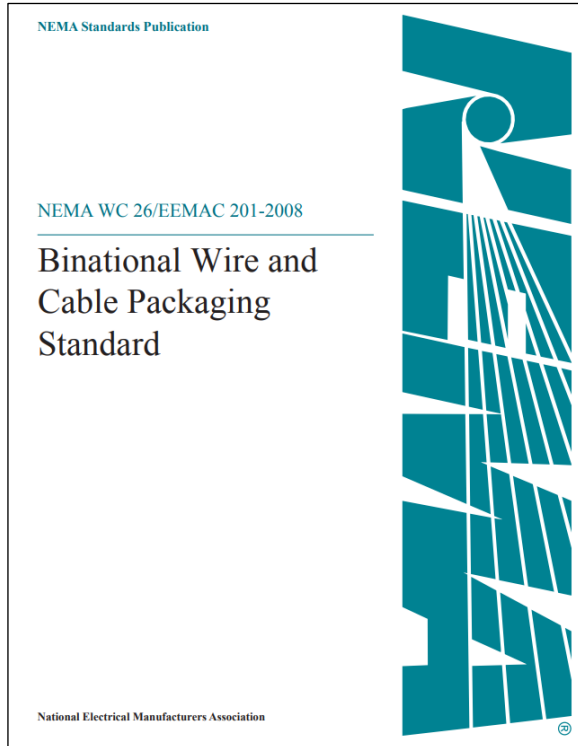


Introduction

- 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.

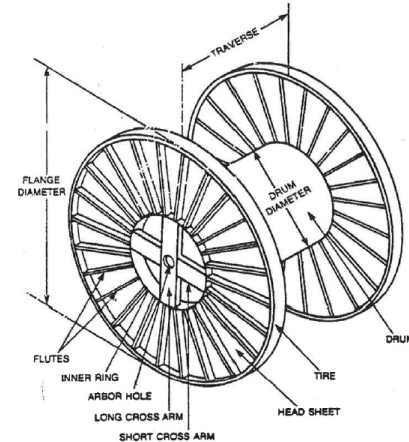
Three categories defined in NEMA WC 26:

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



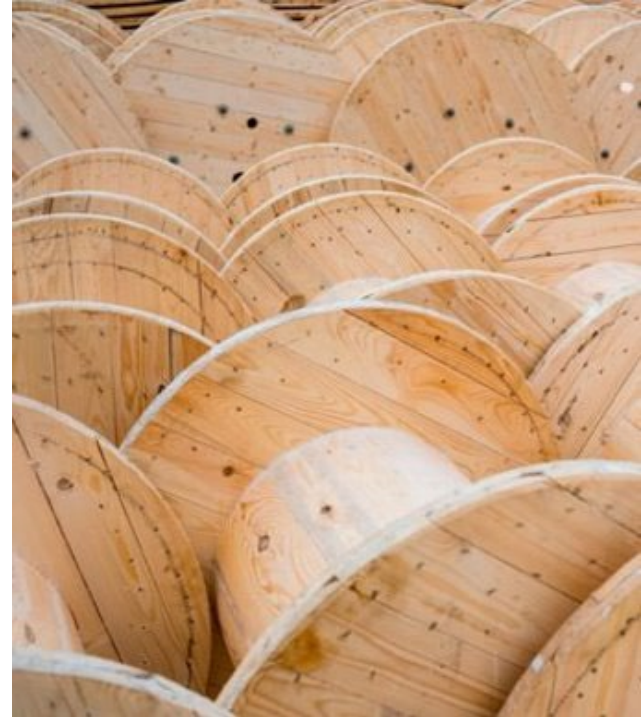
Types

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



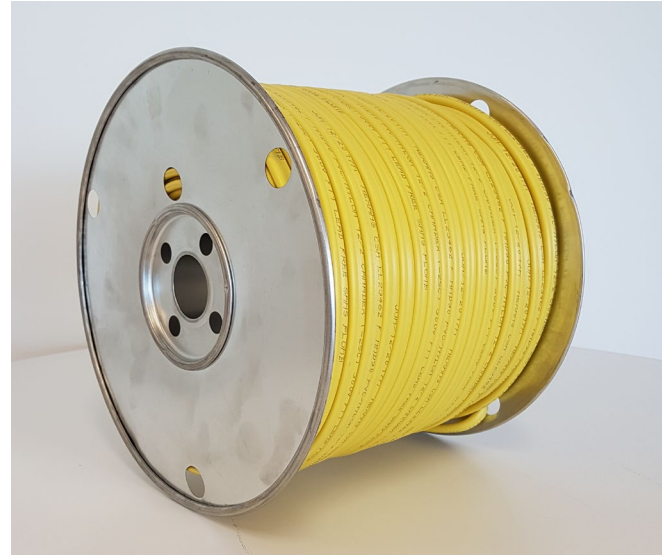
Types

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



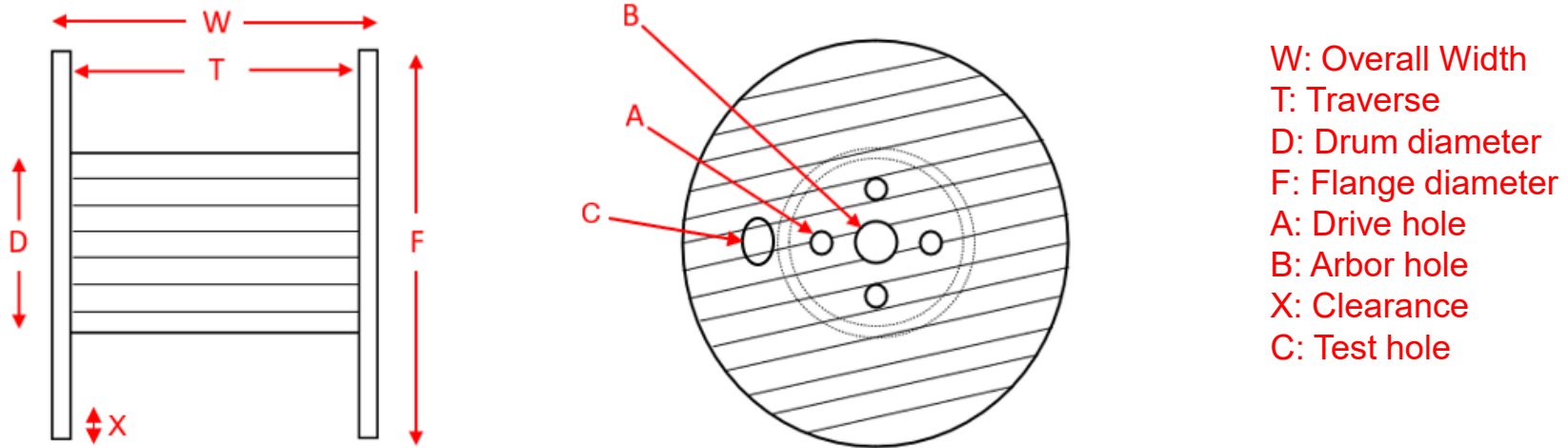
Types

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 OF WASHERS	MIN. # OF 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 INCHES	MAX O'ALL WIDTH INCHES	ARBOR HOLE DIA INCHES	MIN STAVE THICK INCHES	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						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 PLY	MAX O'ALL WIDTH INCHES	ARBOR DIA INCHES	MIN STAVE THICK INCHES	TEST HOLE	DRIVE PIN			TEST HOLE	HUB PLATE		TIE RODS No. & Size	MIN. DIA. ASSEMBLY WASHERS INCHES	MIN. # OF NAIL RINGS	APPROX TARE WT.		CAPACITY		
						QTY	DIA	RADIUS		SIZE	BOLTS				LBS	KGS	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 1.50" drum head support plus groove in flange for reels 72" and larger are required.
- 2 1.50" wide center support for reels 72" and larger are required.
- 3 Steel pipe through the reel from hub plate to hub plate on reel sizes 90" through 108" are required.
- 4 Cup washers required.
- 5 Washers are required on all bolts.
- 6 Tapered cable test holes are required. Elongated test holes can be provided upon request.
- 7 Construction dimensions may be varied for cable weight and/or the volumetric capacity of the reel.
- 8 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.
- 9 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.

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

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...



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....

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 OF 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...

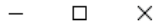
Capacity - Example



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



Close

NEXANS Reel Capacity Calculator



CABLE LENGTH THIS REEL

Feet
 Meters

CABLE WEIGHT THIS REEL

Kgs Lbs

TOTAL WEIGHT THIS REEL

Kgs Lbs

MIN DRUM DIAMETER

Inches

Instructions

EXIT

ENTER REEL DATA

FLANGE Diameter	<input type="text"/>	inches	<input type="text"/>	mm
TRAVERSE Length	<input type="text"/>			
DRUM Diameter	<input type="text"/>			
Reel Tare Wgt (Kgs)	<input type="text"/>	0	<input type="text"/>	0 Lbs
Max Weight (Kgs)	<input type="text"/>	0	<input type="text"/>	0 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)	<input type="text"/>

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

18
12
27

000654
INCWIRE Pkg Code

NEMA Reel List
DOMESTIC Reel List

Instructions
EXIT

ENTER REEL DATA
NEMA
FLANGE Diameter inches mm 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

Save Result Calculate for Known Length Calculate for Known Reel Clear Fields

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



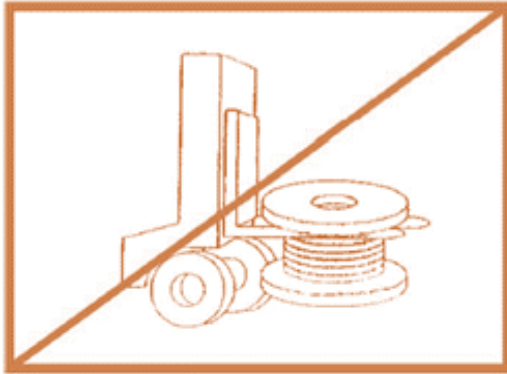
The lifting of the reels must be performed with care and attention. Slowly lower the reel and remove any obstacles.

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

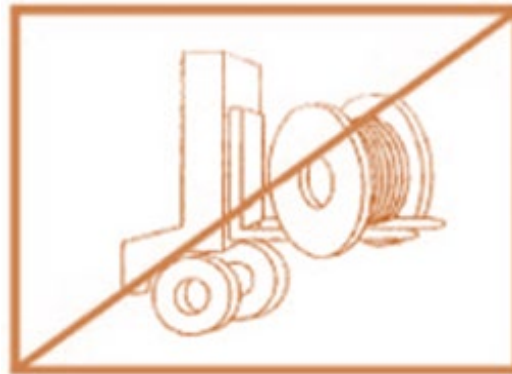
The rope must be installed so that the hook is centralized to avoid oscillation of the reel

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

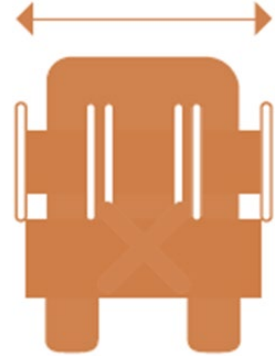
Loading



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



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



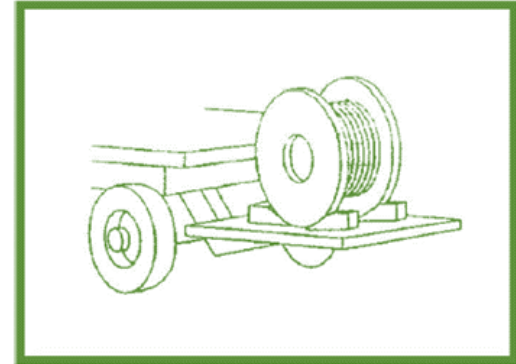
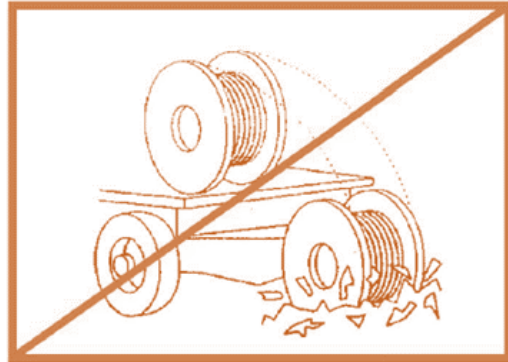
To handle or move reels onto a truck or flatbed, always use a forklift, crane or winch.

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!

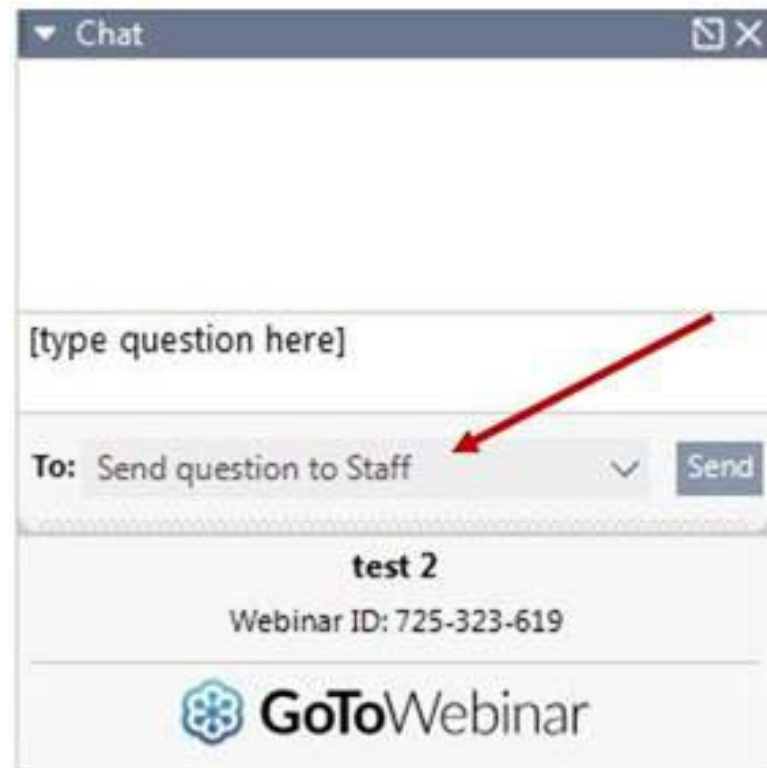


Key Takeaways

- 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





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