

ELECTRO
FEDERATION
CANADA **EFC**

WIRE & CABLE REELS

Programs, Best Practices
& Technology Innovations



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ECS Electrical Cable Supply	Priority Wire & Cable
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Nexans	Sonepar
Northern Cables	Southwire
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A 'REEL' LOOK

AT WIRE & CABLE in the Canadian Electrical Channel

This document is intended to provide an overview of wire and cable reels, specifically returnable wooden reels, and their handling and management as an essential material asset. It is intended to provide supportive information and guidance to all members involved in the Canadian wire and cable supply chain, such as:

- Electrical distributors with large, dedicated wire and cable distribution centres.
- Full line electrical distributors that handle and sell cable.
- Manufacturers, suppliers, and resellers of wire and cable.
- Contractors and end-users who manage and install wire and cable on site.

Wire and cable, and the reels that carry them, must be protected and adequately maintained to ensure safe and efficient use, installation, and operation. This care includes transporting, handling, and storing wire and cable at all steps between the factory floor and the installation site.

The wire and cable that is wound onto each reel must be treated with care; the same attention is required for the reel itself. When returned in proper condition, the reel is an important material asset to reuse multiple times. The appropriate use of reels is fundamental to the safe, and efficient handling, transportation and distribution of wire and cable to the end user. Wire and cable products require robust reels and have specific structural specifications to prevent mechanical damage and the ingress of moisture, dirt, and chemicals that may potentially damage the cable.

While reels are necessary for safely and efficiently delivering wire and cable, once a reel is empty, it often results in a series of challenges for several reasons:

- Lack of consistency in reel return programs offered by suppliers (manufacturers or distributors).
- A wide range of reel sizes and configurations and the quality of reels can be variable.
- Transportation costs are a serious consideration for the return of reels; the vast geography of Canada and the wide disbursement of reels, often to remote locations, magnify logistics considerations.
- The collection, reuse, and recycling of reels is not yet subject to government regulation; as such, environmental impacts are resulting from reels being abandoned or sent to landfills.

This document provides guidance to help standardize best practices related to the use and handling of reels to help minimize the challenges listed above and provide insights on the evolution of reels programs and innovations in Canada. The range of this document includes practical information and current practices on the structure, sizes, and capacity of wire and cable reels, both reusable and non-reusable reels. This document specifically addresses returnable wooden reels, and their handling as a material asset.

Throughout this document, you will learn:

- Best practices centred on the use and handling of wire and cable reels in Canada.
- Specific reel programs that the Canadian wire & cable channel partners are involved with.
- Reel innovations and technology advancements.

This document is not a regulation; as indicated above, it is a reference guide to support the Canadian electrical industry.

For further learning beyond this document, a collection of additional resources and reference materials can be found online at: www.electrofed.com/resource-library-wire-cable-reels/



There are various types of reels available to carry wire and cable products. These reel types include steel, metal-framed wood, wood, plywood, and plastic. Reels are designed to hold a given weight range and length of cable and the intention for reuse or single-use. Reusable wooden reels for return in Canada are the focus of this document.

NEMA WC26 Bi-national Wire and Cable Packaging Standard defines Returnable Reels as “steel, plastic, or extra heavy duty wood reels (Class 3), intended to provide a package for the delivery, storage, and dispensing of the product. The reels are intended to be returned to the cable manufacturer or the designated agent and used for multiple shipments of product.”]

Other than a reels reusability feature, other considerations drive the selection of a reel for a particular task, such as fit, handling, and location. Many distributors have a racking system to store the cable to pull from the reel to cut the wire without removing the reel from the rack. Such racking systems will have a fixed width and will only accommodate reels up to that width. Distributors may be faced with weight-lifting capacity due to equipment limitations, such as a forklift rated for a limit of 5,000 lbs. On construction sites, reels may need to fit onto an elevator or through a 30" doorway, and job sites may be so remote that to return reels economically is extremely difficult. Long outdoor utility-cable runs will require colossal and robust reels, while someone installing lighting circuits inside a classroom may need only a smaller single-use reel for their cable.



Steel reel



Wood and steel reel



Wood reels



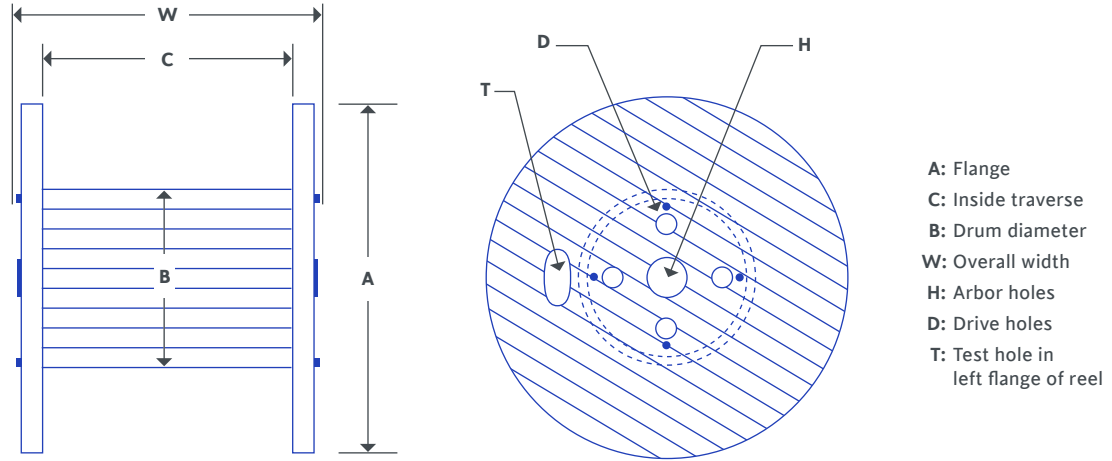
Plywood reels

REEL TYPES

REEL SPECIFICATIONS

The anatomy standards for the typical reusable wooden reels used in the Canadian electrical industry are detailed in the NEMA No. WC26/EEMAC Standards Publication 201.

The following diagram shows the essential features, and the tables that follow are NEMA tables of reel dimensions and capacities.



Reel dimensions are typically shown as: Flange x Inside Traverse x Drum length, e.g. 72" x 48" x 36", and are accompanied by the reel's carrying capacity in pounds (LBS) or kilograms (KGS).

Here are details on the range of Wooden Reels typically in use, including their sizes, specifications, & capacities.

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 NAIL WASHERS	MIN. # 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
55	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	265	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	818	370	6000	2720

*See Note B.

NOTES

- 1 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".
- 2 Tapered cable test holes are required. Elongated test holes can be provided upon request.
- 3 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.
- 4 Construction dimensions may be varied for cable weight and/or the volumetric capacity of the reel.
- 5 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.
- 6 Metal bushings are required when gross weight is in excess of 2500 lbs.
- 7 The tare weight is an approximation. The weight of wood reels can vary significantly based on wood species, moisture content, age, etc.

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	
FL	TRAV DRUM	INCHES	INCHES	INCHES	INCHES	QTY	DIA	RADIUS						LBS	KGS	LBS	KGS
30	22	16	1.500	28.25	3.06	1	1.00	4.5	1.5		4 x 3/8	2.0	3	60	36	1000	455
36	24	17	1.750	28.50	3.06	1	1.25	6.0	2.0		4 x 3/8	2.5	3	81	37	2500	680
36	22	18	1.750	28.50	3.06	1	1.25	6.0	2.0		4 x 3/8	2.5	3	85	39	2500	1135
38	22	20	1.750	28.50	3.06	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	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	1.25	6.0	2.0		4 x 3/8	2.5	4	110	50	3000	1360
42	26	21	1.750	32.50	3.06	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	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	1.50	10.0	2.5		6 x 3/8	2.5	4	160	73	3500	1590
50	32	24	2.125	36.00	3.06	1	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	1.50	10.0	3.0		6 x 3/8	2.5	5	235	107	6500	2960
58	32	28	2.125	39.50	3.06	1	1.50	10.0	3.0		6 x 3/8	2.5	5	265	120	6500	2960
60	28	28	2.750	35.50	3.06	1	3.00	11.5	3.0	YES	6 x 1/2	3.0	5	300	136	6500	2960
66	28	30	2.750	35.50	3.06	1	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	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	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	3.00	11.5	4.0	YES	8 x 1/2	3.0	5	540	245	8000	3630
72	46	36	3.000	56.00	3.06	1	3.00	11.5	4.0	YES	8 x 1/2	3.0	5	565	255	8000	3630
78	46	42	3.000	56.00	3.06	1	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	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	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	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.

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

REEL DIMENSIONS		MIN FLANGE PLY	MAX O'ALL WIDTH	ARBOR HOLE DIA	MIN STAVE THICK	DRIVE PIN			TEST HOLE	HUB PLATE	TIE RODS	MIN. DIA. ASSEMBLY WASHERS	MIN. # OF NAIL RINGS	APPROX TARE WT.	CAPACITY		
FL	TRAV DRUM		INCHES	INCHES	INCHES	QTY	DIA	RADIUS		SIZE BOLTS	No. & Size	INCHES		LBS KGS	LBS KGS		
36	18	16	2 x 1.125	22.5	3.06	1	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	16	2 x 1.375	24.0	3.06	1	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	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	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	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	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	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	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	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	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 2270
66	36	36	2 x 1.375	42.0	3.06	1	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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.

The amount of cable that will fit onto a reel varies by the size and shape of the cable, and its weight. The type of cable being wound onto a reel may be a simple single round cable, a non-round cable, a collection of paralleled cables or an assembly of pre-placed cables. NEMA offers the simple calculation method below to determine the length of a round cable that will fit onto a particular reel size. It is always best to consult with the manufacturer or supplier to determine the length of non-round or more complex cable required to fit the reel.

7.1 CALCULATION OF REEL CAPACITY FOR ROUND CABLES

The formulas for calculating the capacities of reels for round cable are shown in 7.1.1 and 7.1.2 and the parameters are defined in 7.1.3. A five percent nesting factor and a 95 percent traverse utilization have been built into the formula. Therefore, cables must be wound evenly to obtain uniformity, compactness, and the nesting of successive turns and layers.

7.1.1 Reel Capacity in Feet

$$F = .2617 \left[\left[B + \left(\frac{A - 2X - B}{19D} \right)^* \right] \left[\frac{A - 2X - B}{19D} \right] \left[\frac{0.95C}{D} \right]^* \right]$$

*Round off the resultant to the nearest lower whole number.

7.1.2 Reel Capacities in Meters

$$M = .3048 \times F$$

7.1.3 Reel Capacity Parameters

The following parameters are used in the formula in 7.1.1 and 7.1.2 above.

- F = Feet of cable on reel
- M = Meters of cable on reel
- A = Flange diameter, in inches
- B = Drum diameter, in inches
- C = Inside traverse, in inches
- D = Diameter of cable, in inches
- X = Defined as the clearance distance between the cable and the outer edge of the reel flange and is equal to 1" or one cable diameter, whichever is larger. On RMT reels, the clearance is based on 1" or one cable diameter, whichever is larger, plus the tire consideration of 3".

7.2 NON-ROUND CABLES

For non-round cables reel capacity for cables other than round configuration (such as SEU, paralleled, etc.), the user should consult with the cable manufacturer.

REEL MARKING AND LABELLING

Reel marking and labelling serve to differentiate returnable reels from non-returnable reels. There is a wide range of wooden reel sizes and configurations, and their markings and labeling can differ among cable manufacturers and suppliers. Marking and labelling the reels serves to avoid confusion and highlights those returnable reels. It also helps avoid unexpected charges for non-returnable reels not being accepted upon return and having to be shipped back.

Practices for reel labelling, marking, and identification may differ among manufacturers and suppliers; however, here are some best practices guidelines.

MANUFACTURER BRAND NAME

Returnable Reels typically have markings to identify the name of the cable manufacturer/supplier and may be marked as to their NEMA Class (1,2 or 3) which can help to identify them as returnable.

- a) NEMA/EEMAC Class X, where X=1, 2, or 3 for the applicable reel class
- b) identification of Flange Traverse, and Drum Dimension. This identification is to identify the volumetric capacity of the reel and determine if it is a standard reel for reuse or recycling by other than the user.
- c) 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 consulted.

PACKAGING FEATURES

Once the cable is on a reel, it's paramount to protect it from damage, both by covering its surface and preventing unexpected motion of the reels it's wound on. A few essential packaging methods are critical to this.

Wrapping

Full reels often have a plastic, cardboard or plastic wrapping placed over the cable to protect it during transport. These coverings should remain in place until it's time to cut or install the cable.



Lagging and Closure Battens

Wooden battens are fitted across the drum flanges to protect the cable from becoming damaged if the reel is rolled, for example across the rough ground of a jobsite.



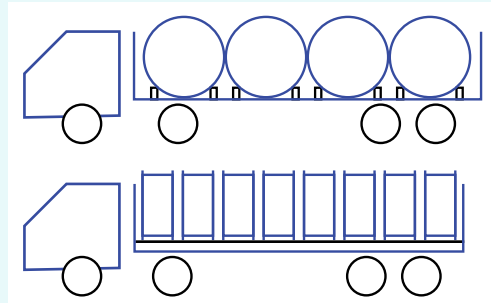
Cradling

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



Chocking

Wooden stops are placed in front and behind the flanges to stop the reel from rolling, for example while on a truck.



Strapping

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



Paletting

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



REEL HANDLING (LIFTING, MOVING, STACKING)

USE CAUTION

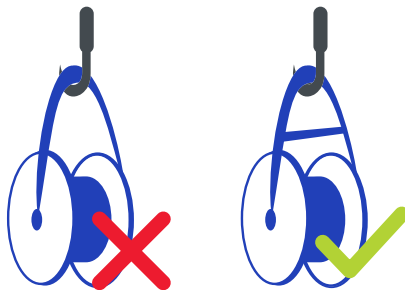
It is important when loading, unloading, or transporting reels over short distances, to avoid sudden or compressive movement. This could displace the weight and cause the reel to shift and create a safety hazard, or the cable on the reel to shift and be damaged.

When moving a reel, use devices that prevent breaking or damage to any packaging, and any tying-straps holding the cable in place.

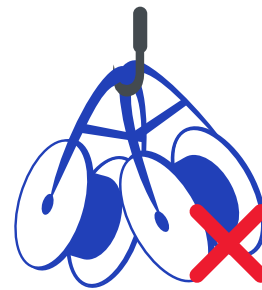
LIFTING REELS USING A CRANE

When handling reels by crane, two safety options are available: 1. use a cradle supporting the reel flanges or 2. a support bar, passing it through the central arbor hole in the reel so that the cable reel can be lifted by slings employing spreader bars. The angle between the bar and the lifting rope/chain should be less than or equal to 60° so that it does not damage the reel. This technique will reduce unstable situations such as the sling pressure against a reel flange, slanting of the reel, sliding of the sling, and the like. It is best to refer to specific supplier recommendations for lifting reels by crane.

A support bar is placed above the reel to separate the rope or chain.



Lift only one reel at a time.



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



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



LIFTING REELS USING A FORKLIFT TRUCK

When using a forklift to lift a horizontal reel, always place the forks under the bottom flange. Do not lift the horizontal reel by the top flange.

Depending on the size of reels, skids or pallets are used to lift and move the reels by forklift.

When lifting or moving a vertical reel by forklift, the forks must lift the reel at 90° to the flanges, and the forks must be long enough to make complete lifting contact with both flanges. The forks should be spaced far enough apart to touch the reel flanges at all times. Doing so will ensure that the lift pressure is uniformly distributed on both flanges, not on the cable itself.

Under no circumstances should the forks come into contact with the cable surface or the protective wraps.

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

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



ROLLING REELS

Rolling reels containing wire and cable product is not recommended; if rolling reels is necessary, always roll the reel in the opposite direction to which the cable is wrapped onto the reel (when marked, look for the direction indicated by the “arrows” on the sides of the reel flanges). Rolling the reels this way will avoid the release of the cable wraps (layers of cable wound around the reel drum), which may damage the cable, cause the cable wraps to overlap, tangle, and pose safety concerns to the handler.

Don't drag. Manual rolling is a risk.
Suitable devices should be used.



When an inclined ramp is used for unloading, the ramp must be wide enough to contact both flanges completely. Stopping the reel at the bottom should be accomplished by using the reel flanges and not the surface of the cable.

Be cautious about clearing any debris from the path over which the cable reels are to be rolled, as that might damage the cable and cause harm.

REEL FLIPPING

For safety reasons and to prevent damage, reels should typically not be flipped. However, when it is done, the proper equipment and expertise should be used by the handler. Please refer to the supplier or manufacturer's guidelines for reel flipping best practices.

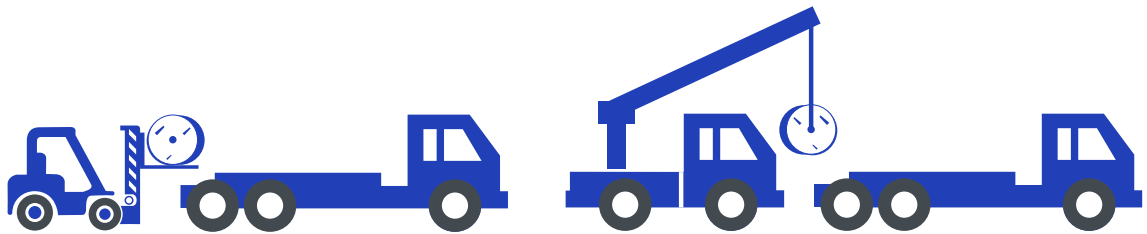
NOTE: Overhead products (for example, AAC, ACSR) that are tension-wound on the reel when in production should never be flipped for shipment or storage and remain upright during the complete shipping and storage process. The reason for this is that when wooden reels are flipped, they weaken, and when a conductor that has been tension-wound falls or “birdcages”; as a result, this can become a safety issue during installation.

TRANSPORTATION BY TRUCK

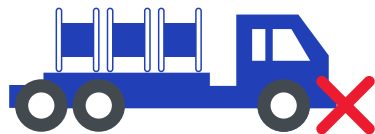
Loading

Depending upon their size and weight, reels can be stored or transported with the flange in either a horizontal or vertical position (refer to the Wire & Cable manufacturer guidelines). When in a vertical position, the reels should be chocked by appropriate wedges and locked into place to prevent the reel from shifting sideways or turning. The locks and wedges should be fixed on the floor of the transport platform.

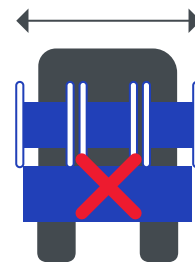
In order to handle or move the reels, always use a forklift, crane or winch.



The transportation should be carried out with flanges in an upright position. The reel core must be arranged perpendicularly to the direction of travel.



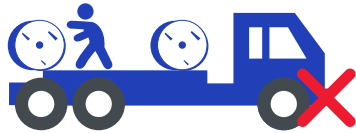
The reels should not exceed the useful width of the transport platform.



Unloading

Under no circumstances should reels be dropped from the delivering vehicle to the ground. Unloading and reel handling should be accomplished so that the equipment does not contact the cable's surface, and in the case of protective wrap that the equipment does not contact the protective wrap. When unloading by lifting the reel, use a rope or steel cable. If an inclined ramp is used for unloading, the ramp must be wide enough to contact both flanges completely. The stopping of the reels at the bottom must be accomplished by using the reel flanges and not the surface of the cable.

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



After unloading, always use the shim.



TRANSPORTATION BY SHIP

When transporting reels by ship, always put the reels on a flat surface, and the reels should be chocked. Do not place any other load on the reels. When loading the reels onto another load, cover that with a flat piece of material strong enough to withstand the heavy weight of the cable reels.

STORING & INVENTORY MANAGEMENT

Everyone involved with handling the cable must keep it in prime condition to perform as intended, which means that care needs to be taken with the reel's storage and handling.

Finished cables have no established shelf-life. As a general guideline, reels without preservative treatment can be stored in the open for eighteen (18) months. When treated with a salt-based preservative, the reels can be stored in the open for a maximum of twenty-four (24) months.

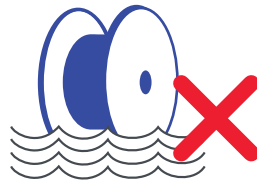
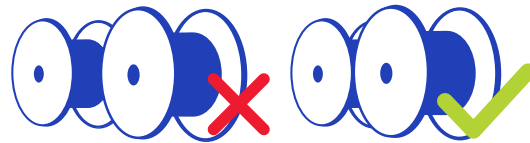
Manufacturers tend to have recommendations and best practices specific to their products, but here are some general guidelines:

- Reels should be flat or stored upright (like a wheel) with chocks or wedges used to prevent them from rolling. Reels may be set flat on their flange and stacked on the floor or pallets/skids.
- Wooden reels should be stored off the ground to prevent rotting. Reels stored in the open must be at least 10 cm above the ground and should be stored on a flat, hard surface so that the flanges do not sink into the earth. (The weight of the reel and cable must be carried at all times by the reel flanges.)
- For insulated or covered cables, the reels must be stored in a covered site. If the floor is coated and drained, the reels may be in contact with the floor.

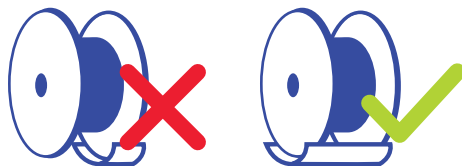
The reels can be transported or stored with flanges positioned horizontally or vertically.



In order to store two reels of the same width, align the flanges on the same plane



In storage sites there should be adequate drainage in order to prevent water accumulation near the reels.



The reels should be chocked to prevent displacement by gravity. Use shims of a width at least equal to the width of the reel.

Reel diameter	Shim thickness
Up to 1700 mm	90 mm
Up to 2700 mm	120 mm

- The flange of a reel should not be in contact with the flange of another reel or other objects and buildings to allow for good ventilation between reels. There must be at least 15 cm clearance between two reels or between the reels and buildings or objects.

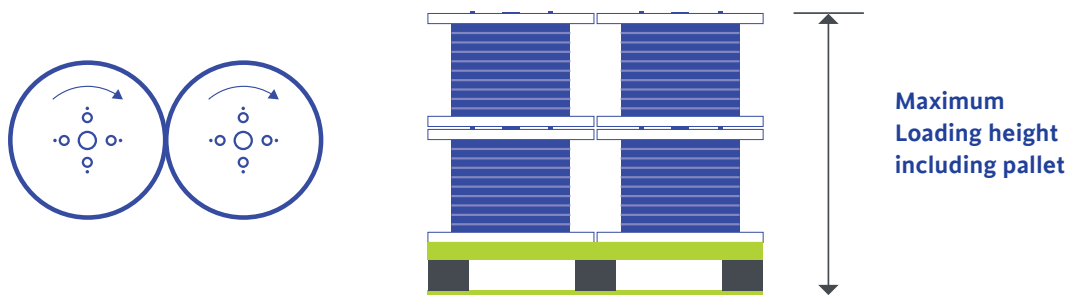


We do not recommend the storage of reels on a floor with a slope greater than 2%.

- No materials may be placed on the reels to cover them since they could prevent adequate ventilation.

CONSIDERATIONS FOR LOADED REELS

- **Storage temperature:** Reels of cables with a cold temperature marking, for example, -10°C, -25°C, or -40°C, can be stored outdoors. Reels of cables without a cold temperature marking must be kept indoors. When a wire and cable reel is stored in a lower temperature space than the temperature recommended for its installation, the handler should be cautious to prevent the cable from being damaged through bending or impact.
- **Storage protection:** Cable reels should be stored with their protective covering or lagging in place. If the reel has been lagged, the wooden battens should remain fixed to the drum to shield the cable sheath from excessive temperatures and UV light. Inspecting wooden battens is important to maintain the quality of the wire and cable product, and any damaged battens require replacement.
- **Seal cable ends:** cable ends should remain sealed to prevent the ingress of moisture. When the cable is cut from the reel, the handler must immediately seal the cable end to prevent moisture ingress.
- **Construction sites:** Wire and cable reels should not be stored in an area where construction equipment, falling or flying objects, or other materials can contact and damage the cable.
- **Hazardous locations:** Cable should not be stored in an area where chemicals or petroleum products might be spilled or sprayed on the cable.
- **Drum inspection:** Inspect the cable drums regularly, and if a drum has been damaged, rewrap the cable onto a replacement drum.
- **Every six months:** A drum should be rotated by 90° every six months.
- **Marking & Labelling:** Any identification labels fixed to the drum shall not be removed.
- **Avoid falls & collisions:** Reels cannot fall or collide with other objects or reels for safety and quality concerns. Only at the cable installation site after the reel has been placed into the release equipment to ready the cable for pulling should the lagging and closure battens be removed.
- **Releasing cable:** The recommended direction for unrolling the cable is indicated on the reel flanges. For reels with rods, the tightness of nuts must be checked before releasing cable from the reel for cutting.



REEL ADMINISTRATION

The administration of reels has been a financial concern for manufacturers, distributors, and customers. These concerns include capital costs, balance sheet liabilities, and budgeting uncertainties, as well as the cost of refurbishing damaged units and the administration of deposits. While reels are necessary for delivering wire or cable, once a reel is empty, it, unfortunately, becomes a burden on the customer to return or dispose of the reel.

Reels are an asset. Cable manufacturers or distributors ship product on a reel and the reel may not be returned by the customer after use for various reasons; therefore, the reel's cost is typically built into the cost of the cable or charged for separately on the order invoice. Returning an empty reel offers the customer an opportunity to save on cost and disposal. It is also often preferred by suppliers to have their branded wooden reels returned after use for reuse purposes.

REEL RETURN DEPOSITS

All returnable reels are typically billed at 100% of a reel deposit amount at the time of shipment. This value is set by reel size and varies by supplier. Upon reel return, a reel credit is issued (typically between 12 and 24 months from the shipment date) for all or most, for example, 90%, of the deposit paid depending upon the supplier policy or order agreement, provided that the reel is in good and reusable condition.

The value of outstanding deposits can be very high, given the sheer volume of cable sales and the accumulation of the reels that it's shipped on, so it's important to get these reels back as soon as possible. If too much time has elapsed, reels are typically not returnable for credit, and they can start to take up valuable warehouse or yard space.

The reels may still be reusable and repurposed before disposing of them in landfills. Manufacturers themselves may be interested in having good reels back for reuse (without the deposit credit) and may offer a buy-back price, or Reel Return Depots may have programs to buy back such reels.

DEPOSITS AND REFUNDS

Deposit charges for reels are typically paid for at the time of the wire and cable order transaction. All deposit charges are subject to Goods and Service Tax (GST) or Harmonized Sales Tax (HST).

DEPOSIT INVOICING

The recommendation is for reel deposits and cable charges to be listed on the same invoice. Listing the reel deposit on the same invoice allows charge-throughs and credits for reel returns to be tracked against orders from the supplier from the distributor and the end-user for their specific job.

RETURNING REELS

All reels for which a deposit has been paid should be returned, freight prepaid, either to the cable supplier directly or to their nearest supplier-approved Reel Return Depot. Special arrangements for pickup may be available by the Depot and may be negotiated directly with them. Please note to check the manufacturers policy guide to confirm that they will accept reel returns as not all manufacturers accept reels back to their facility.

Returned reels must be in reusable condition, according to the supplier's criteria, to qualify for deposit credit. Returning Reels should be accompanied by a packing list and bill of lading and must meet any other stipulations required by the cable supplier. A Return Materials (RMA) or Return Goods Authorization (RGA) may also be required to return the empty returnable reels.

If returned reels are not in good and reusable condition, no credit will be issued, and the reels will likely be returned to the sender at their cost.

The following is a list of manufacturers' reel return preferences according to geographic locations. Many use these Reel Return Depots and Service Providers to take back and manage their reels for deposit crediting, while others take their reels back directly. These service companies may also offer buy-back opportunities for reels where no deposit credit is available.

CANADIAN REEL RETURN DEPOTS INCLUDE, BUT MAY NOT BE LIMITED TO, THE FOLLOWING:

BRITISH COLUMBIA

Tenold Transportation

19470 94th Avenue
Surrey, British Columbia V4N 4E5
(604) 888-7800; 800-663-0094

ALBERTA

Tenold Transportation

4503 17th Street
Edmonton, Alberta T6P 1X2
(780) 453-2761

QUÉBEC

J. Hamelin Ind.

2140 Boul. Industriel
Chambly, Québec J3L 4V2
(450) 658-5251

PRAIRIES

Tenold Transportation

54 Queen Street
Weyburn, Saskatchewan S4H 2L3
(306) 848-1700 or (800) 667-8828

Payne Transportation

435 Lucas Avenue,
Winnipeg, Manitoba R0H 1E0
(204) 953-1524 or Toll Free 866-467-2963

J. Hamelin Ind.

1783 East Avenue
Weyburn, Saskatchewan S4H 2Y7
(306) 842-1004

ONTARIO

Allin Cable Reels

179 Baseline Road East
Bowmanville, Ontario L1G 3L4
(905) 623-4455

Tenold Transport

138 Commerce Drive,
Johnstown, Ontario K0E 1T1
(800) 267-4325 ext. 102

Gan Reel

900 Queen St, Unit 103,
Gananoque, Ontario K7G 2B7
(613) 382-0063

ATLANTIC

ADTS

31 John Snook Blvd.
Debert, Nova Scotia B0M 1G0
(902) 662-5105

Keltic Transportation

90 MacNaughton Ave,
Caledonia Industrial Park,
Moncton, New Brunswick E1H 3L9
(506) 854-1233

REEL CARE, REPAIR & DISPOSAL

Reel care, repair, and disposal require documentation practices. The delivery/receiving date, manufacturer, commercial value or inventory locations, and any extenuating circumstances associated with reels should be documented and on file. Despite the possibility of receiving a credit for a returned reel, some reels may be destroyed in the field by burning or burying, and the credit will be forfeit.

Most of the Reel Return service providers previously listed will receive the returned reels on behalf of the cable manufacturer or supplier for a fee and inspect and grade them as to their condition. They take care of repairing the reels where possible, remove old labels, and prepare them for reuse, using methods and techniques that comply with standards such as the Canadian Wood Packaging and Certification Program (CWPCP). Some providers are HT-certified also to heat treat wood before re-distribution.

Suppose the condition of the reels renders them unrepairable and unusable. In that case, these providers take care of the reel knockdown and scrapping, selling off any wood or steel they can and depositing the balance in dumpsters for waste disposal or landfill.

Regular Inspection

Reels can become damaged over time, either due to handling or to weathering or storage conditions. The following are recommendations for regular inspection:

- Always inspect reels before receiving them and signing them off, whether full or empty and before shipping.
- Inspect reels before moving them to a new location.
- If the cable reels are stored in a secure area and not exposed to the effects of the weather, an annual inspection of the reels should be satisfactory.
- Reels stored in areas exposed to weather conditions should perform a bi-monthly inspection to observe any deterioration signs.
- If the reels are exposed in a non-secure area, policing of the area at frequent intervals may be required depending on circumstances.
- It is recommended to have an inspection conducted before shipping a reel back to a supplier to avoid incurring additional costs such as return-shipping expense for reels deemed in an un-reusable condition and returned.

REEL INNOVATION

The Wire & Cable industry closely monitors new developments in reel technology to understand how these innovations can support the safe and efficient handling, transportation, and distribution of wire and cable to the end- user.

The following are some of the latest developments in reel innovation:

New Reel Styles

New methods of improving cable handling at job sites are always in demand. New ways of reeling cable to better support site needs have been driving new reels, and these reels are returnable for reuse.

Chamber or Channel Reels

The chamber or channel reels may be metal or wood, and instead of holding a single cable or cable assembly, they can carry multiple individual cables. For example, a four-channel reel may hold four different pieces of the same type of cable, and these can be the same or different colours. The reel can be pre-loaded with cable by the supplier and then shipped to the site, incurring freight costs for only a single reel instead of four. Once the multiple reel chamber or channel reel is on-site, the contractor will find it less cumbersome to pull the cables off of the reel altogether. For example, when installing cable into a facility needing a four-conductor 3-phase run, each cable in the set of 4 needs to be a specific colour: one black, one red, one blue, and one white; this improves job site efficiency installation. Also, when finished, the contractor/end-user has only a single reel to return for credit, with the lower freight costs and less handling.



Reel-in-Reel

Another reel style innovation seen at some job sites is the Reel-in-Reel (or Reel within a Reel). This reel style can be either wood or metal. As its name implies, this reel design has an inner reel section affixed inside an outer set of flanges. This inner reel can rotate on its axis while the outer flanges remain stationary, making it easy for cable to be pulled directly from the reel without the need for stands or unique reel mounts. When empty, these are returnable.



REEL MANAGEMENT TECHNOLOGY INNOVATIONS

New, more efficient tracking and management of reels inventory offer ways to save labour, warehouse space, freight costs, and asset dollars.

SMART REELS FOR LOCATION MANAGEMENT

Smart reels help users manage reels within their facility and as well as offsite. Smart reels allow the seller to know where the reel is physically and if the contractor or end-user has returned it. The reel automatically communicates from the job site when the reel is ready for pick-up. Also, a smart reel allows the distributor to consolidate several manufacturers' reels into one truck and still identify the individual reels, minimizing the manual work.

Benefits:

- Better tracking of reels.
- Quicker return of reels.
- Less environmental impact with the timely return of reels.
- Less inventory of reels at customer warehouses and sites.
- Monitoring the amount of cable left on the reel.
- Tracking of any adverse shocks or exposure to abnormal temperatures.

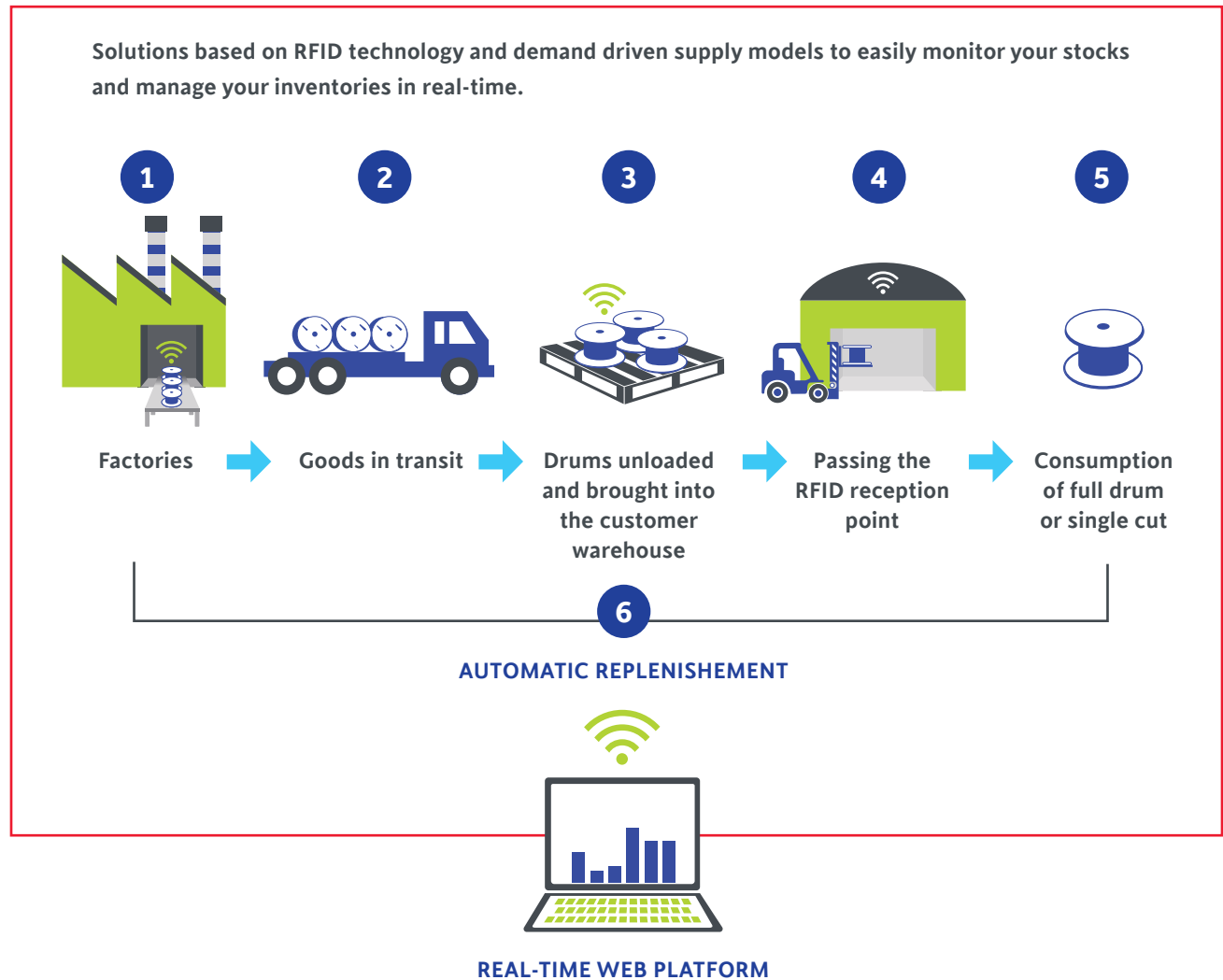
RFID FOR WAREHOUSE CABLE MANAGEMENT

Current technology allows for the printing of RFID tags as part of a reel tag. RFID allows for real-time stock availability, a quick inventory reception, and fast and easy physical stock taking.





To optimize the use of RFID technology, follow these best practices:

- Have RFID-capable printers at the manufacturer/shipping facility.
- Have cross-reference linkage between supplier part numbers and customer part numbers.
- Use RFID readers at the supplier location to provide automatic confirmation of material shipped.
- Use RFID readers at the customer location to automatically confirm receipt of material. RFID readers also allow for automatically updating a customer's inventory, using a mobile device to scan the physical inventory.
- Automatic scheduling of reels for a pick-up is possible through a confirmation process that triggers when the reel has left the building.

SMART INVENTORY MANAGEMENT — SAMPLE OF RFID PROCESS



YOUR BENEFITS

-  Real-time stock visibility
-  Stock consumption in real-time
-  Quick reception process
-  Fast and easy physical stock counting

SENSOR MOUNTED REEL TRACKING

The reels of the wire and cable industry products are often shipped to remote locations or job sites. In both cases, knowledge of the reel location and the easy ability to track and find the reels can reduce waste at the job sites and return time delays. Low-cost GPS devices now exist that are permanently affixed to the reel, which facilitates real-time location tracking. This device and associated tracking software can provide real-time information to end-users (for example, Utilities), giving them instant information to manage material and manage the quick return of reels for credit.

In brief, a sensor mounted tracker system provides:

- GPS location
- Temperature and motion sensing
- Cable-length monitoring
- Live communication

The associated tracking software and an online portal provide the user with:

- Reel return management
- Cloud data storage
- Intuitive overview
- Analytics
- Event notifications

Such detailed and timely knowledge can drive better inventory management, easier and more accurate inventorying, reduced “searching” time looking for reels, and improved financials.

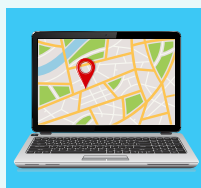
IOT (INTERNET OF THINGS) DRUM TRACKING AND GEOLOCALISATION PROJECT

Hardware



- Tracking device
- Connectivity
- Multi sensor (temperature, movement)
- 6-year battery
- GPS

Software



- Web platform
- iOS & Android and mobile app
- ERP interface

Services



- Installation
- Maintenance and repair
- Software upgrade

Your benefits

- Automatic delivery notification
- Cable theft detection
- Management of residual length
- Full fleet geolocalisation

Real time information push notification



- 1 Drums leave the cable plant



- 2 Drums are delivered to the construction site



- 3 Empty drums ready for collection are scanned with QR code



- 4 Empty drums return to the plant

CONCLUSION

Wire and cable products are of high value for manufacturers and distributors and their contractors and end-users. So too are the reels that carry and protect that wire and cable product. The value of reels is easily overlooked when the cost of disposal and impacts on the environment are not considered. Millions of dollars worth of reels are in circulation across North America; therefore, the diligent handling of reels at every point in the supply chain can offer big rewards. Returnable Reels may be reused many times, avoiding the cost of disposal and producing new reels, reducing the impact of landfill waste on the environment, and returning reels that meet Manufacturers' and Distributors' Reel Return Policy guidelines offer recovery of deposits paid. The returns for managing reels will make an effort well worth it, financially and environmentally.

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