

High-Temperature, Low-Sag Conductor, 3M



1. Scope

This standard covers the requirements for high temperature, low sag (HTLS), overhead transmission line conductor manufactured by 3M.

The various HTLS conductor designs are proprietary and not exact equals to each other.

HTLS conductor may also be referred to as follows:

- High capacity
- Aluminum conductor composite reinforced (ACCR)
- Aluminum conductor composite core (ACCC)

This standard applies to Stock No. 013632.

HTLS conductor deadend and splice requirements are outside the scope of this standard. See SCL 6962.32.

HTLS conductor commission testing requirements prior to energization are outside the scope of this standard.

See SCL 6001.27 for the CTC proprietary version of this conductor.

2. Application

HTLS is similar in construction and dimensions to Aluminum Conductor Steel Reinforced (ACSR); however, HTLS has a higher strength-to-weight ratio and lower thermal expansion than comparably-sized steel core conductors. Because it is lighter and sags less, even at higher operating temperatures, higher line ratings are possible at equivalent tensions and clearances. Note: Joule heating (line losses) increase linearly with operating temperature.

The first use of HTLS at Seattle City Light (SCL) was to re-conductor the Bothell to SnoKing #1 and #2 (BO-SK #1/#2) 230 kV transmission lines.

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3. Industry Standards

HTLS conductor shall meet the applicable requirements of the following industry standards:

ASTM B976-11; Standard Specification for Fiber Reinforced Aluminum Matrix Composite (AMC) Core Wire for Aluminum Conductors, Composite Reinforced (ACCR)

ASTM B978/B978M-14; Standard Specification for Concentric-Lay-Stranded Aluminum Conductors, Composite Reinforced (ACCR)

ASTM B987/B987M-14; Standard Specification for Carbon Fiber Composite Core (CFCC/TS) for use in Overhead Electrical Conductors

ASTM B857-14; Standard Specification for Shaped Wire Compact Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Supported (ACSS/TW)

HTLS conductor design and correspondence shall use the methods, terms, and definitions cited in the following industry standard:

IEEE Std 738-2012; IEEE Standard for Calculating the Current-Temperature Relationship of Bare Overhead Conductors

HTLS conductor packaging shall meet the applicable requirements of the following industry standard:

NEMA WC-26-2000; Binational Wire and Cable Packaging Standard

4. Requirements

For evaluation purposes, physical and electrical property performance requirements shall be based on the parameters cited in the appendix.

4.1 Physical Properties

Table 4.1. High-Temperature, Low-Sag Conductor Physical Properties

Description	Value
Diameter, total conductor, minimum	1.0 in
Total weight, maximum	1.25 lb/ft
Tensile strength, ultimate, minimum	32,000 lb

HTLS conductor shall be as follows:

- Corrosion resistant
- Creep resistant
- Fatigue resistant
- Thermally stable

4.2 Electrical Properties

Table 4.2. High-Temperature, Low-Sag Conductor Electrical Properties

Rating	Value (A)
Winter	1950
Summer	1800

5. Packaging

5.1 General

HTLS conductor shall be packaged on reels according to the requirements of NEMA WC 26.

Reels shall be protected for shipment with coverings consistent with the recommendations of NEMA WC 26, Section 4.

The inner end shall not be brought out through the reel arbor.

The outer end shall be securely fastened to the inner side of the flange.

Each reel shall be legibly marked with the following information:

- Manufacturer identification
- Product description
- Shipping length of wire on reel
- Gross weight
- Tare weight
- Net weight
- Date of manufacture
- Reel identification according to NEMA WC 26, Section 5
- SCL stock number

5.2 Supplemental Requirements

In addition to the general requirements cited in section 5.1, HTLS conductor intended for receipt, storage, and installation by SCL shall be packaged on reels conforming to the requirements of Table 5.2.

Table 5.2. Supplemental Requirements

Reel type	Steel RMT
Maximum outside flange diameter (in)	84
Maximum outside width (in)	52
Nominal drum diameter (in)	42
Length per reel, +/- 10% (ft)	7,980

Reel gross weight shall not exceed 17,000 lb.

6. Shipping

Reels shall be shipped and delivered in the upright position (on the flange edges) on open flatbed trucks suitable for side unloading by forklift.

Reels shall not be strapped or palleted.

7. Issuance

Stock unit: FT

8. Approved Manufacturer

Manufacturer: 3M

Product ID: ACCR 1033-TW-T13 (Curlew-Trap Wire) with non-specular finish

9. References

SCL Material Standard 6001.27; “High-Temperature, Low-Sag Conductor, CTC”

SCL Material Standard 6963.32; “Accessories, High-Temperature, Low-Sag Conductor, 3M”

10. Sources

3M ACCR 1033-TW-T13 Conductor (Non-Specular) Material Specifications for Aluminum Conductor Composite Reinforced (ACCR), revised July 17, 2014

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Appendix

For evaluation purposes, the physical and electrical property performance requirements specified in Section 4 shall be based on the parameters cited below:

Frequency (Hz)	60
Date	June 21
Time	Noon
Environmental Conditions	
Ambient (°C)	
Winter	0
Summer	30
Emissivity	0.50
Solar absorption	0.50
Elevation (ft)	0
Latitude	47°
Wind speed (ft/s)	2
Wind angle to conductor	90°
Atmosphere	Clear
Line azimuth	90°
Short-circuit withstand, 30 cycles, minimum (kA)	50
Load factor	50%
Other	
Operating voltage (kV)	230
Ruling span (ft)	1120
Working tension, maximum (lb)	14,500 (NESC medium)