

## ITEM OPPORTUNITY SYNOPSIS

<b>Scouting Number:</b>	2024-088
<b>Name of the item to be scouted:</b>	Medium Voltage Electrical Cable
<b>State item to be used in:</b>	Colorado

### Describe the Item:

<p>Please describe the item application/the end use of the item.</p>	<p>For the construction of the new Energy and Minerals Research Facility (EMRF) for the U. S. Geological Survey (USGS) at the Colorado School of Mines (Mines), 1000 18th Street, Golden, Colorado 80401, provide a medium voltage (MV) wire/cable delivered to the EMRF construction site. This project is federally funded by the President Joe Biden's Bipartisan Infrastructure Law (BIL). Therefore, the material used for construction is required to be compliant with the Build America, Buy America Act (BABAA). This NIST MEP Supplier Report seeks a BABAA compliant MV wire that meets or exceeds the basis of design. The basis of design is Prysmian Group (General Cable), 15kV aluminum cable. The basis of design MV cable meets or exceeds the design requirements including the strict technical requirements, maximum delivery schedule, and the maximum cost parameters enclosed. See also the requirements stated in the enclosed specifications, drawings, performance requirements, and other documents including warranty requirements.</p>
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### Supplier Information:

<b>Type of Supplier Being Sought (select from the list below):</b>	
Manufacturer	x
Contract Manufacturer	
Distributor	
Other (Please Specify)	

<b>Reason for Scouting Submission (select from the list below)</b>	
2nd Supplier	
Price	
Re-Shore	
Past supplier no longer available	
New Product Startup	
BABA	x
Other (Please Specify)	

### Summary of Technical Specifications and Performance Requirements:

<b>Describe the manufacturing processes (elaborate to provide as much detail as possible)</b>	Electronic and mechanical assembly.
<b>Provide dimensions / size / tolerances / performance specifications of the item</b>	See information provided.
<b>List required materials needed to make the product, including materials of product components, if applicable</b>	Varies, see information provided.

<b>Are there applicable certification requirements?</b>	
Yes	x
No	

<p>Please explain:</p>	<p>IEEE UL IEEE C2 - National Electrical Safety Code(R) (NESC(R)) 2023. NEMA WC 74 - 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy 2022. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems 2021. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements. UL 1072 - Standard for Medium Voltage Power Cables.</p>
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<b>Are there any applicable regulations that apply to the production of this item?</b>	
Yes	x
No	

<p>Please explain:</p>	<p>Comply with: UL 1072 and NEMA WC 74. Temperature Rating: MV-105. Voltage Rating: 15 kV, grounded. Conductor: Copper or Aluminum Alloy, stranded, concentric lay. 1. Construction: Single conductor. 2. Conductor phase identification: Color-coded tape over insulation jacket. a. Phase A: Red. b. Phase B: White. c. Phase C: Blue. Insulation: Ethylene propylene rubber (EPR). 1. Level: 133 percent. Insulation Jacket: Sunlight-resistant polyvinyl chloride (PVC). 1. UL Listed and labeled for the installed condition.</p>
<p>Are there any other standards / requirements?</p>	
<p>Yes</p>	
<p>No</p>	<p style="text-align: center;">x</p>
<p>Please explain:</p>	
<p><b>Additional Comments:</b></p>	
<p>Additional technical comments:</p>	<p>See additional requirements and specifications stated in the attached documents.</p>
<p><b>Volume and Pricing:</b></p>	
<p>Estimated Potential Business Volume (i.e. #units per day, month, year):</p>	<p>Limit of one cable, available in one 500-foot supplied length.</p>
<p>Estimated Target Price/Unit Cost Information:</p>	<p>Maximum total costs shall be \$5,170.80 including shipping. Costs also include providing approved submittal paperwork required in the specifications.</p>
<p><b>Delivery Requirements:</b></p>	
<p>When is it needed by? (Immediate, 30 days, 6 months, etc.)</p>	<p>Delivery schedule shall be no later than 3:00 PM (local time) 3/30/2025 for the manufacturer, packaging, and transportation of the MV cable to the project. If the schedule is for the delivery of the MV cable occurs on a date prior to above, the arrival date will need to be coordinated with the general contractor. No storage fees will be allowed for the time between the manufacturing date and the delivery date. Submittal approval due date shall be no later than 3:00 PM (local time), 11/25/2024.</p>
<p>Describe packaging requirements (i.e. individually/group packaging, etc.)</p>	<p>Crate and package MV cable for secure and undamaged transportation and delivery.</p>
<p>Where will this item be shipped?</p>	<p>Shipping will be to Golden, Colorado 80401, at the construction site address listed above.</p>
<p><b>Additional Comments:</b></p>	
<p>Is there other information you would like to include?</p>	

## **SECTION 26 05 13**

### **MEDIUM-VOLTAGE CABLES**

#### **PART 1 GENERAL**

##### 1.01 SECTION INCLUDES

- A. Medium voltage cable.
- B. Cable splices.
- C. Cable terminations
- D. Cable accessories.

##### 1.02 RELATED REQUIREMENTS

- A. Section 26 05 53 - Identification for Electrical Systems.
- B. Section 26 08 00 - Electrical Commissioning Requirements: Additional requirements for Commissioning.

##### 1.03 REFERENCE STANDARDS

- A. IEEE C2 - National Electrical Safety Code(R) (NESC(R)) 2023.
- B. NEMA WC 74 - 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy 2022.
- C. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems 2021.
- D. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 1072 - Standard for Medium Voltage Power Cables.

##### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cables, terminations, and accessories, including detailed information on materials, construction, ratings, listings, and available sizes and configurations.
- C. Samples: Submit two samples of each size cable, 24 inches (600 mm) in length.
  - 1. Select each length to include complete set of manufacturer markings.
- D. Test Reports: Indicate results of cable test in tabular form.
- E. For each cable run, submit the following calculations for both forward and reverse directions:
  - 1. Pulling tension at all bend points.
  - 2. Maximum sidewall pressure for run.
- F. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

Include instructions for storage, handling, protection, examination, preparation, and installation of product.

- G. Project Record Documents: Record actual sizes and locations of cables.
- H. Certificate of Compliance: Indicate approval of installation by authority having jurisdiction.
- I. Maintenance Data: Include instructions for testing and cleaning cable and accessories.

#### 1.05 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Installer Qualifications: Authorized installer of specified manufacturer with service facilities within 100 miles (160 km) of Project.
- C. Products: Listed, classified, and labeled as suitable for the purpose intended.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store cables in accordance with manufacturer's instructions.

#### 1.07 FIELD CONDITIONS

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
  - 1. Notify Architect no less than 20 working days in advance of interruption of electric service. Obtain direction before proceeding with work.

### **PART 2 PRODUCTS**

#### 2.01 MEDIUM-VOLTAGE CABLE

- A. Manufacturers:
  - 1. Okonite: [www.okonite.com](http://www.okonite.com).
  - 2. Prysmian Group: [www.prysmiangroup.com](http://www.prysmiangroup.com).
- B. Comply with: UL 1072 and NEMA WC 74.
- C. Temperature Rating: MV-105.
- D. Voltage Rating: 15 kV, grounded.
- E. Conductor: Copper or Aluminum Alloy, stranded, concentric lay.
  - 1. Construction: Single conductor.
  - 2. Conductor phase identification: Color-coded tape over insulation jacket.
    - a. Phase A: Red.
    - b. Phase B: White.
    - c. Phase C: Blue.

- F. Insulation: Ethylene propylene rubber (EPR).
  - 1. Level: 133 percent.
- G. Insulation Jacket: Sunlight-resistant polyvinyl chloride (PVC).
  - 1. UL Listed and labeled for the installed condition.

## 2.02 CABLE SPLICES

- A. Manufacturers:
  - 1. 3M: [www.3m.com](http://www.3m.com).
  - 2. TE Connectivity; Raychem Products: [www.te.com](http://www.te.com).
  - 3. Eaton Cooper.
  - 4. Approved equivalent.
- B. 600A 15/25kV Class: separable splice with test point

## 2.03 CABLE TERMINATIONS

- A. Manufacturers:
  - 1. TE Connectivity; Raychem Products; Tyco HVT-Z: [www.te.com](http://www.te.com).
  - 2. Shawcor: [www.shawcor.com](http://www.shawcor.com).
  - 3. 3M: [www.3m.com](http://www.3m.com).

## 2.04 MODULAR CABLE TERMINATIONS

- A. Manufacturers:
  - 1. Eaton Cooper; BOL-T.
  - 2. Thomas & Betts; Elastimold: [www.tnb.com](http://www.tnb.com).
- B. Separable Insulated Connectors: Disconnecting type single-pole cable terminators with matching plug-in dead front terminals.
- C. Terminations at Distribution Points: Terminators installed on cables and terminal junctions for interconnecting cables.
- D. Dead-break Cable Terminators: Elbow-type terminators with 600 ampere continuous current rating for de-energized disconnecting and connecting, with capacitive test point.
- E. Grounding Kit: Assembly to ground both the cable and the elbow.

## 2.05 CABLE ACCESSORIES

- A. Fault Indicators:
  - 1. Manufacturer: Eaton; Cooper Power: S.T.A.R. series FCI type with test point reset, low trip rating, and auxilliary contacts.
- B. Arc-Proofing Materials:
  - 1. Arc-proofing Tape: Flexible fireproof tape compatible with cable jacket.
  - 2. Glass-cloth Tape: Pressure-sensitive adhesive tape.

# PART 3 EXECUTION

## 3.01 EXAMINATION

- A. Verify that conduit or duct are ready to receive cable.
- B. Verify routing and termination locations of cable bank prior to rough-in.

- C. Cable routing is shown in approximate locations unless dimensioned. Route as required to complete wiring system.

### 3.02 PREPARATION

- A. Use swab to clean conduits and ducts before pulling cables.

### 3.03 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Avoid abrasion and other damage to cables during installation.
- C. Use suitable lubricants and pulling equipment.
  - 1. Where necessary, use manufacturer approved lubricant that will not deteriorate conductor or insulation.
- D. Sustain cable pulling tensions and bending radii below recommended limits.
- E. Ground cable shield at each termination and splice.

### 3.04 FIELD QUALITY CONTROL

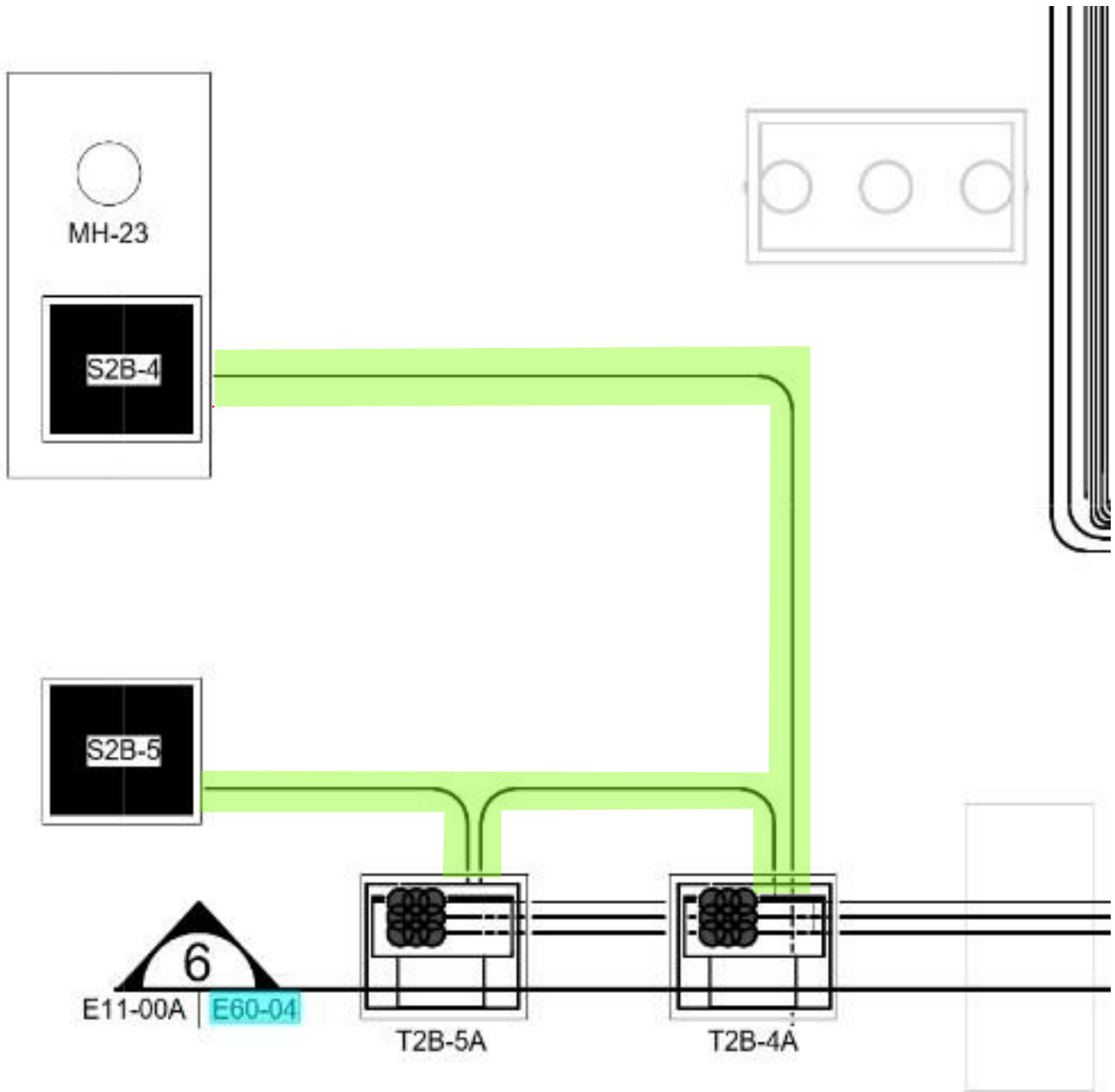
- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. See Section 26 08 00 - Electrical Commissioning Requirements, for additional requirements.
- C. Inspect exposed cable sections for physical damage.
- D. Inspect cable for proper connections as indicated.
- E. Inspect shield grounding, cable supports, and terminations for proper installation.
- F. Inspect and test in accordance with NETA ATS, except Section 4.
- G. Perform inspections and tests listed in NETA ATS, Section 7.3.3. The cable time domain reflectometer (TDR) measurements on each conductor listed as optional are not required.
- H. Provide off-line partial discharge (PD) test in accordance with IEEE Standard 400.3.
- I. Replace damaged or defective cables.
- J. Submit detailed reports indicating inspection and testing results and corrective actions taken.
- K. Campus phase rotation is clockwise.

### 3.05 PROTECTION

- A. Protect installed cables from entrance of moisture.

## **END OF SECTION**

## From the Drawings



Snippet from sheet E11-00A: this particular cable will be used to make the connections between the Transformers (T2B-5A, T2B-4A) and the Switches (S2B-5, S2B-4) in service yard.



# Aluminum Uniblend® PVC High Speed

EPR/Copper Tape Shield/PVC, Medium-Voltage Power, Shielded  
**15 kV**, UL Type MV-105, 133% Ins. Level, 220 Mils



**Features (cont'd.):**

- Meets cold bend test at -35°C
- 105°C rating for continuous operation
- 140°C rating for emergency overload conditions
- 250°C rating for short circuit conditions

**Compliances:**

- National Electrical Code (NEC)
- UL 1072
- ICEA S-93-639/NEMA WC74
- ICEA S-97-682
- AEIC CS8
- UL listed as Type MV-105 for use in accordance with NEC, UL File # E5518856
- UL 1685 (Sizes 1/0 AWG and larger) UL Flame Exposure Test
- Sizes 1/0 AWG and larger are listed and marked "Sunlight-Resistant FOR CT USE" in accordance with NEC
- IEEE 1202 (70,000 BTU/hr)/CSA FT4 EPA 40 CFR, Part 261 for leachable lead content per TCLP method
- OSHA Acceptable
- RoHS Compliant

**Product Construction:**

**Conductor:**

- 2 AWG thru 1000 kcmil 1350 aluminum compressed Class B strand

**Extruded Strand Shield (ESS):**

- Extruded thermoset semi-conducting stress-control layer over conductor

**Insulation:**

- Lead-free Ethylene Propylene Rubber (EPR) insulation, contrasting in color to the black semi-conducting shield layers

**Extruded Insulation Shield (EIS):**

- Thermoset semi-conducting polymeric layer free stripping from insulation

**Metallic Shield:**

- 5 mil annealed copper tape(s) with an overlap of 25%

**Jacket:**

- Low-friction, lead-free, flame-retardant, moisture- and sunlight-resistant Polyvinyl Chloride (PVC)

**Options:**

- STRANDFILL® – blocked conductor. Tested in accordance with ICEA T-31-610

**Applications:**

- Superior performance in petrochemical plants, pulp and paper mills, sewage and water treatment plants, environmental protection systems, railroads, mines, utility power generating stations, steel mills, textile plants and other industrial three-phase applications
- For use in wet or dry locations when installed in accordance with NEC
- For use in aerial, conduit, open tray and underground duct installations
- For use in direct burial if installed in a system with a ground conductor that is in close proximity, and conforms with NEC 250.4(A)(5)

**Features:**

- Rated at 105°C
- High Speed low friction technology for easy cable pulling
- Excellent heat, moisture and sunlight resistance
- Excellent flame resistance
- Outstanding corona resistance
- Flexibility for easy handling
- High dielectric strength
- Low moisture absorption
- Electrical stability under stress
- Low dielectric loss
- Chemical-resistant

**Packaging:**

- Material cut to length and shipped on non-returnable wood reels. Lengths in excess of 10,000 lbs. are provided on returnable steel reels that require a deposit
- Extra charges apply for cuts less than 1000 ft., lagging, pulling eyes, paralleling and triplexing

CATALOG NUMBER	COND. SIZE (AWG/kcmil)	NOMINAL CONDUCTOR DIAMETER		INSULATION DIAMETER INCHES		NOMINAL JACKET THICKNESS		NOMINAL CABLE				COPPER WEIGHT		AMPACITY						CONDUIT SIZING (4) (INCHES)	
		INCHES	MIN.	MAX.	INCHES	mm	DIAMETER		WEIGHT		ALUMINUM WEIGHT		CONDUIT IN AIR (1)		UNDERGROUND DUCT (2)		TRAY (3)				
							INCHES	mm	LBS/1000 FT	kg/km	LBS/1000 FT	kg/km	LBS/1000 FT	kg/km	90°C	105°C	90°C	105°C	90°C		105°C
20400087	2	0.28	0.725	0.815	0.080	2.03	0.99	25.22	525	782	62	92	72	107	115	130	120	130	-	-	3
20400084	1/0	0.36	0.805	0.895	0.080	2.03	1.07	27.23	610	909	99	147	79	118	150	170	155	165	150	170	3.5
20400388	2/0	0.41	0.850	0.935	0.080	2.03	1.12	28.35	665	991	125	186	83	124	175	200	175	190	175	195	3.5
20400085	4/0	0.51	0.955	1.045	0.080	2.03	1.22	31.04	823	1226	199	296	92	137	230	260	230	245	235	265	4
20400387	250	0.56	1.010	1.100	0.080	2.03	1.28	32.46	886	1320	234	348	97	144	255	290	250	270	260	290	4
20400088	350	0.66	1.115	1.200	0.080	2.03	1.38	35.08	1052	1567	329	490	106	158	310	350	305	330	325	360	5
20400086	500	0.79	1.240	1.330	0.080	2.03	1.51	38.33	1280	1907	468	696	116	173	385	430	370	400	400	450	5
20400339	750	0.97	1.430	1.520	0.080	2.03	1.70	43.08	1653	2462	703	1046	133	198	485	540	455	490	515	585	6
20400401	1000	1.12	1.575	1.670	0.110	2.03	1.91	48.51	2109	3141	937	1394	144	214	565	640	525	565	620	705	6

Dimensions and weights are nominal. Subject to industry tolerances.

\* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.

(1) Ampacities are in accordance with Table 310.60(C)(74) of the NEC for triplexed or three single conductor aluminum cables in isolated conduit in air based on a conductor temperature of 90°C (194°F) or 105°C (221°F), temperature denoted in column header, and an ambient air temperature of 40°C (104°F).

(2) Ampacities are in accordance with Table 310.60(C)(78) of the NEC for triplexed or three single conductor aluminum cables in underground ducts (three conductors per duct), based on a conductor temperature of 90°C (194°F) or 105°C (221°F), temperature denoted in column header, and an ambient earth temperature of 20°C (68°F), electrical duct arrangement per Figure 310.60 Detail 1, 100% load factor, and earth thermal resistance (rho) of 90.

(3) Ampacities are based on single conductor Type MV-105 sizes #1/0 AWG and larger in an uncovered tray in accordance with Section 392.80(B)(2) of the NEC at an ambient air temperature of 40°C (104°F) the ampacities are based on 75% of the values per Table 310.60(C)(70), operating temperature denoted in column header. For cable trays with unventilated covers for more than 6 feet, the ampacities shall not exceed 70% of the values per Table 310.60(C)(70).

(4) Based on nominal cable diameters, three single cables in the duct (PVC Schedule 40) with no ground wire and a maximum of 40% fill. Jam ratio has been considered but should be checked for individual installations.

¥ 100% insulation level is available upon request.

Note: a) Sizes smaller than 1/0 AWG do not include "FOR CT USE".

b) The NESC Lightning bolt symbol is on all Uniblend® constructions.

