L1-CHE-SPE-147

TECHNICAL SPECIFICATION FOR ELECTRIC CABLE – 500mm² ALUMINIUM OR COPPER CONDUCTOR 3.8/6.6kV XLPE INSULATED WITHOUT METALLIC SCREEN

Version: 1
Issued: July 2016

Owner: Head of Engineering - Electrical

Approved By: Head of Engineering - Electrical
ELECTRICAL NETWORKS SPECIFICATION
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Approval

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Amendment Record

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1. Purpose
This document is the technical specification for a single core, 500mm$^2$ Aluminium or Copper stranded Conductor, 3.8kV XLPE Insulated, PVC/HDPE Sheathed Electric Cable without a Metallic Screen. This is a standard Cable for 1500V DC use on the MTM 1500 Volt DC Traction System where a metallic screen is not required.

2. Abbreviations
HDPE - High Density Polyethylene
MTM - Metro Trains Melbourne
PVC - Polyvinyl Chloride
XLPE - Cross Linked Polyethylene

3. Definitions
For all technical terms refer to AS/NZS 1429.1.
Shall is used as the descriptive word to express a requirement that is mandatory to achieve conformance to the standard.
Should is used as the descriptive word to express a requirement that is recommended in order to achieve compliance to the standard. Should can also be used if a requirement is a design goal but not a mandatory requirement.

4. References & Legislation
4.1 Standards
The cable shall comply with AS/NZS 1429.1 2006 Electric Cables – Polymeric Insulated, Part 1: For working voltages 1.9/3.3 (3.6) kV up to and including 19/33 (36) kV, with the exception that an Insulation Screen is required and Metallic is not required.
Note: All materials and components shall comply with the relevant Australian Standard or, where these do not exist, with the relevant IEC or EN Standard.

4.2 Latest Issues and Amendments
Reference to all standards shall be read as a reference to the latest edition of that standard and amendments available at the time of tendering.
5. **Service Conditions**

The Cable is to be used on the Melbourne Railway 1500 Volt DC Electric Traction System. This System consists mainly of an overhead catenary wiring construction. It is susceptible to lightning, switching surges and short-circuits.

The Cable shall be suitable for use when installed directly in the ground, installed in ducting, on cable racks or trays protected and exposed to the weather and ultra-violet radiation.

The exact number of cables or application is not covered in this document.

6. **Cable Details and Ratings**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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<tr>
<td>Rated Voltage</td>
<td>3.8/6.6 (7.2) kV</td>
</tr>
<tr>
<td>Cores</td>
<td>Single-core, Category A</td>
</tr>
<tr>
<td>Conductor Material</td>
<td>Aluminium / Copper</td>
</tr>
<tr>
<td>Conductor Cross Sectional Area</td>
<td>500mm²</td>
</tr>
<tr>
<td>Conductor Stranding</td>
<td>Stranded circular compacted</td>
</tr>
<tr>
<td>Conductor Screen</td>
<td>Required</td>
</tr>
<tr>
<td>Insulation Material</td>
<td>XLPE</td>
</tr>
<tr>
<td>Insulation Colour</td>
<td>Neutral</td>
</tr>
<tr>
<td>Insulation Screen</td>
<td>Not Required</td>
</tr>
<tr>
<td>Metallic Screen</td>
<td>Not Required</td>
</tr>
<tr>
<td>Oversheath Material</td>
<td>Twin Sheathed - Inner Sheath PVC Polypropylene - Outer Sheath HDPE Both Polypropylene and HDPE sheaths UV stabilised</td>
</tr>
<tr>
<td>Sheath Colour</td>
<td>Inner Sheath - Orange Outer Sheath - Black</td>
</tr>
<tr>
<td>Metre Markings</td>
<td>Required</td>
</tr>
<tr>
<td>Cable Marking</td>
<td>RAILWAY ELECTRIC CABLE 1500V DC</td>
</tr>
<tr>
<td>Cable Drum Type</td>
<td>Wooden</td>
</tr>
<tr>
<td>Nominal Length of Cable on Drum</td>
<td>500m</td>
</tr>
</tbody>
</table>

The cable shall be supplied on drums clearly marked with full particulars of the cable, including length.

The Cable will be delivered to a location Melbourne, Victoria, which will be nominated at or after the cable is ordered.

Each drum shall contain a continuous run of cable without any joints.

The length of cable on the drums will be specified separately.
7. Quality
The manufacturer shall state full details of its Quality Assurance Accreditation with copies of the relevant Accreditation Certificates and supporting documentation.

The cable proposed to be purchased shall be reviewed for quality and adherence to this specification and shall only be purchased once it has been placed onto the Approved Engineering Product List (AEPL).

8. Testing

8.1 Type Test
Type Test Certificates shall be supplied on request.
8.2 Factory Tests

The cable shall be subjected to Routine Tests at the Manufacturer's Works as described in AS 1429.2.

MTM reserves the right to appoint a representative to witness these tests. Seven working days’ notification shall be given to MTM of intention to carry out factory testing.

8.3 Test Certificate

The results of all tests shall be recorded on test certificates. The test certificates shall clearly show the performance of the equipment and shall be accompanied by tables showing the actually measured values and all calculations.

The test certificates shall be forwarded to MTM and the results approved by MTM prior to delivery.

8.4 Tests after Delivery

After delivery, the cable will be inspected and subjected to such tests as may be considered necessary to determine compliance with this Specification.

9. Warranty

The Cable shall be warranted by the Supplier against faulty design, materials, processing and workmanship for a minimum of two years after delivery.

10. Approved Product List

Only cable listed on the Approved Product List shall be used.

Prior to any cable being placed on the Approved Product List each manufacturer shall provide a 1 metre sample to MTM Engineering for review against this Standard MTM Engineering on Approval. On approval the cable shall be placed on the MTM Approved Product List.

11. Information to be Supplied by Tenderer

The Tenderer shall inset where provided for all of the information required in the Appendix - Technical Data Schedule Form. Failure to do so may render the offer liable to rejection.
12. **Appendix – Technical Data Schedule Form**

The Tenderer shall supply the following information and guaranteed performance.

**Compliance**

Does the cable fully comply with this Specification?  YES / NO

**Manufacturer**

Name  

Address  

Outside Diameter

Of Cable (mm)  

Of Conductor (mm)  

Of Conductor and insulation (mm)  

Operating Voltage

Rated Operating Voltage (kV)  

Conductor

Nominal Area (mm²)  

Stranding (/mm)  

Material  

Form  

Insulation

Material  

Colour  

Thickness (mm)  

Curing Method
Oversheath
Material and Type ..............................................
Colour ..............................................................
Thickness of PVC (mm) .......................................... (mm)
Thickness of HDPE (mm) ......................................... (mm)
Carbon Content (%) ............................................... (%)
Ultra-Violet Stabilised YES / NO
Metre Marked? YES / NO

Current Rating of Cable
(for installation conditions of: 2 single core cables in a single way underground duct,
ground temperature 25°C, ground thermal resistivity 1.2 °C m/w, depth of laying 0.8m)
Continuous Current rating (A) ..............................................
Two Hour Current Rating (A) ......................................
One Minute Current Rating (A) ......................................

Short Circuit Current Rating (20 ms)
Conductor (kA) .....................................................

Maximum Conductor Temperature
At Continuous Current Rating (°C) ..............................................
At Short Circuit Current Rating (°C) ..............................................

Weights
Weight of Cable (kg/m) ..................................................
Weight of Drum (kg) .....................................................

Quality Assurance
Manufacturers Quality Assurance Accreditation ..............................................
Are Quality Assurance Documents attached Yes/No
Has all information for the AEPL been attached Yes/No
Dimensions of Drum

Outside Diameter: (m)

Width: (m)

Diameter of Barrel: (m)

Nominal Length of Cable on Drum: (m)