



A Division of Transnet SOC Limited

TECHNOLOGY MANAGEMENT

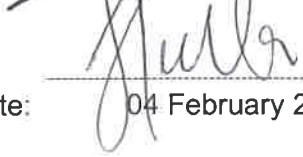
SPECIFICATION

REQUIREMENTS FOR THE SUPPLY OF ELECTRIC CABLES

Author:	Chief Engineering Technician Technology Management	B. L. Ngobeni
Approved:	Senior Engineer Technology Management	L.O. Borchard
Authorised:	Principal Engineer Technology Management	S.E. Sibande







Date: 04 February 2019

Circulation Restricted To:

Transnet Freight Rail
Transnet and Relevant Third Parties

"I acknowledge that this application contains personal information as defined in the Protection of Personal Information Act, 2013 (the "Act"). By accessing/using this application, I consent to the processing of my personal information in accordance with the requirements of the Act. I acknowledge that I cannot unreasonably withhold my consent. I acknowledge that the purpose for processing my personal information is in terms of this application."

© This document as a whole is protected by copyright. The information herein is the sole property of Transnet SOC Ltd. It may not be used, disclosed or reproduced in part or in whole in any manner whatsoever, except with the written permission of and in a manner permitted by the proprietors.

TABLE OF CONTENT

1.0	SCOPE	3
2.0	STANDARDS AND PUBLICATIONS	3
3.0	APPENDIX	3
4.0	TENDERING PROCEDURE	3
5.0	MEDIUM VOLTAGE CABLES	3
6.0	CABLES FOR FIXED INSTALLATIONS	4
7.0	QUALITY ASSURANCE	5
8.0	INSPECTION AND TESTING	5
9.0	BIBLIOGRAPHY	5
10.0	APPENDIX 1	6

1.0 SCOPE

This specification covers Transnet Freight Rail's requirements for cables used for:

- Medium voltage reticulation systems, distribution systems, traction substation supplies, and 3 kV DC feeder applications (3,3/3,3 kV to 19/33 kV).
- Cables used for fixed installations (300/500 V to 1900/3300 V).

2.0 STANDARDS AND PUBLICATIONS

The following standards or publications (latest version) are referred to herein.

2.1 SOUTH AFRICAN NATIONAL STANDARDS

- SANS 97: Electric cables - Impregnated paper insulated metal-sheathed cables for rated voltages 3,3/3,3 kV to 19/33 kV (excluding pressure assisted cables).
- SANS 1339: Electric cables – Cross-linked polyethylene (XLPE) insulated cables for rated voltages 3,8/6,6 kV to 19/33 kV.
- SANS 1507: Electric cables with extruded solid dielectric insulation for fixed installations 300/500 V to 1900/3300 V,
Part 1-General,
Part 3-PVC Distribution cables,
Part 4-XLPE distribution cables,
Part 5-Halogen free distribution cables.

2.2 TRANSNET FREIGHT RAIL'S PUBLICATION

- BBD5994: Technical Documentation Management Policy.

3.0 APPENDIX

The following appendix forms an integral part of this specification.

- 3.1 Appendix 1: Schedule of Requirements: Details of the cable to be supplied.

4.0 TENDERING PROCEDURE

- 4.1 Tenderers shall indicate clause-by-clause compliance with the specification. They shall take the form of a separate document listing all the specifications clause numbers indicating the individual statement of compliance or non-compliance in English.
- 4.2 The tenderers shall motivate a statement of non-compliance.
- 4.3 The tenderer shall submit technical specifications of the cables offered.
- 4.4 Failure to comply with clauses 4.1, 4.2 and 4.3 could preclude a tender from consideration.

5.0 MEDIUM VOLTAGE CABLES

5.1 IMPREGNATED PAPER INSULATED.

- 5.1.1 Paper impregnated lead sheathed (PILC) cables used for reticulation systems and traction power supplies and other applications shall be in accordance with SANS 97.
- 5.1.2 The voltage range for the cables shall be between 3,3kV and 33kV.
- 5.1.3 The cables shall be three core with stranded copper conductors.
- 5.1.4 The cables shall be paper insulated, screened type, lead sheathed provided with an extruded PVC bedding.
- 5.1.5 The armouring shall be galvanised steel wire with outer extruded PVC over sheath over the armouring.
- 5.1.6 The cable shall be so manufactured that it is fully protected against the effect of electrolysis.
- 5.1.7 Single core cables used for 3 kV DC application shall withstand a test voltage of 10,5 kV for one minute.

- 5.1.8 Cables shall be suitable for laying directly in soil and concrete trenches.
- 5.1.9 The cables shall withstand exposure to water, corrosive conditions as well as high ultra violet conditions caused by direct sunlight.
- 5.1.10 The cables shall be tested in accordance with SANS 97. Type test certificates shall be submitted with the cables offered.
- 5.1.11 The packing, marking and sealing of cables and cable drums shall be in accordance with SANS 97.
- 5.2 CROSS – LINKED POLYETHYLENE INSULATED (XLPE).**
- 5.2.1 XLPE cables used for reticulation systems, 3kV DC traction feeders and traction power supplies and other applications shall be in accordance with SANS 1339.
- 5.2.2 The voltage range for the cables shall be between 3,8kV and 33kV.
- 5.2.3 Cables shall be single or three core with stranded copper conductors.
- 5.2.4 The cables shall be type A (armoured) for single and three core cables.
- 5.2.5 Single core type A cable shall be copper tape screened, aluminium wire armoured and provided with a PVC outer sheath.
- 5.2.6 Single core cables shall be rated for 3,8/6,6kV.
- 5.2.7 Single core cables used for 3 kV DC application shall withstand a test voltage of 10,5 kV for one minute.
- 5.2.8 Three core type A cable shall be copper tape screened, galvanised steel wire armoured and provided with a PVC outer sheath.
- 5.2.9 The manufacture of the single and three core cables shall be such that the cables are fully protected against the effect electrolysis.
- 5.2.10 The cables shall be suitable for laying directly in soil and concrete trenches.
- 5.2.11 The cables shall withstand exposure to water, corrosive conditions as well as high ultra violet conditions caused by direct sunlight.
- 5.2.12 The cables shall be tested in accordance with SANS 1339. Type test certificates shall be submitted with the cables offered.
- 5.2.13 Where specified flame-retardant and halogen free cables shall be in accordance with SANS 1339.
- 5.2.14 The packing, marking and sealing of cables and cable drums shall be in accordance with SANS 1339.
- 6.0 CABLES FOR FIXED INSTALLATIONS**
- 6.1 Unless otherwise specified single and multi-core, wire armoured, extruded PVC insulated cables shall be used for fixed installations. The cables shall be in accordance with SANS 1507 part 1 and part 3.
- 6.2 The voltage range is between 300/500 V to 1900/3300 V.
- 6.3 Cables shall have stranded annealed copper conductors.
- 6.4 The cables shall be marked according to SANS 1507 part 3. Core identification shall be by means of colour code or numbering of the insulation.
- 6.5 The cable shall be manufactured in a way that it is fully protected against the effect of electrolysis.
- 6.6 Where XLPE or halogen free cables are specified the cables shall be in accordance with SANS 1507 parts 4 and 5.
- 6.7 The cables shall be tested in accordance with SANS 1507 of part 3, part 4 and part 5. Type test certificates shall be submitted with the cables offered.

- 6.8 The packing, marking and sealing of cables and cable drums shall be in accordance with SANS 1507.

7.0 QUALITY ASSURANCE

- 7.1 Transnet Freight Rail reserves the right to carry out inspection and tests on the equipment at the works of the supplier/manufacturer.
- 7.2 Arrangements must be made timeously for such inspections and type/routine tests in accordance with the cable specifications are carried out before delivery of the cables to the site.

8.0 INSPECTION AND TESTING

- 8.1 Transnet Freight Rail reserves the right to carry out inspections and any tests on cables at the factory of the supplier/ manufacture.
- 8.2 Arrangements must be made with Senior Engineer, Technology Management (Electrical) Transnet Freight Rail for inspections to be carried out before delivery of the equipment.

9.0 BIBLIOGRAPHY

- [1] SANS, "SANS 97:2017 Electric cables - Impregnated paper insulated metal-sheathed cables for rated voltages 3,3/3,3 kV to 19/33 kV (excluding pressure assisted cables).," SABS Standards division, Pretoria, South Africa, 2017.
- [2] SANS, "SANS 1339:2017 Electric cables – Cross-linked polyethylene (XLPE) insulated cables for rated voltages 3,8/6,6 kV to 19/33 kV," SABS standards division, Pretoria, South Africa, 2017.
- [3] SANS, "SANS 1507:2007 Electric cables with extruded solid dielectric insulation for fixed installations 300/500 V to 1900/3300 V,," SABS standards division, Pretoria, South Africa, 2007.
- [4] T. F. R. Transnet, "BBD 5994: Technical Documentation Policy," Transnet, Johannesburg, 2011.

10.0 APPENDIX 1

SCHEDULE OF REQUIREMENTS

(To be completed by the client)

1.0 MEDIUM VOLTAGE CABLES

1.1 PAPER IMPREGNATED LEAD SHEATHED (PILC)

1.1.1 Rated Voltage (V):

1.1.2 Number of cores:

1.1.3 Length of cables (m):

1.1.4 Size of conductors (mm²):

1.2 CROSS LINKED POLYETHYLENE INSULATED (XLPE)

(XLPE is recommended for 3 kV DC Applications)

1.2.2 Rated Voltage (V):

1.2.3 Number of cores:

1.2.4 Length of cables (m):

1.2.5 Size of conductors (mm²):

1.2.6 Flame retardant (required/not required):

2.1 CABLES FOR FIXED INSTALLATIONS

2.1.1 Type of cable required:

- PVC Distribution cables: (Yes/ No):
- XLPE Distribution cables: (Yes/No):

2.1.2 Rated Voltage (V):

2.1.3 Number of cores:

2.1.4 Length of cables (m):

2.1.5 Size of conductors (mm²):

-----END-----