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|  Eskom | Standard | Central East Cluster |
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Title: **PROPOSAL FOR THE PURCHASE OF CABLE FAULT LOCATOR AND TEST EQUIPMENT FOR MV CABLES FROM 1KV UP TO AND INCLUDING 33KV**

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1. Introduction

This specification has been prepared for the Eskom Distribution Central East Cluster. It will be used by the Central East Cluster as a requirement guide when purchasing cable fault locator test equipment for PILC and XLPE-insulated medium voltage (MV) cables with nominal voltages from 1kV up to and including 33 kV.

2. Supporting clauses

2.1 Scope

This specification covers the Central East Cluster minimum requirements for the trailer-mounted cable fault locator test equipment that will be used on PILC and XLPE-insulated MV cables with nominal voltages from 1kV up to and including 33 kV for commissioning and maintenance purposes.

2.1.1 Purpose

This document has been compiled to provide technical requirements for purchasing cable fault locator test equipment, which includes a cable fault locator test set mounted on a trailer for testing PILC and XLPE-insulated MV cables with nominal voltages from 1kV up to and including 33 kV.

2.1.2 Applicability

This document shall apply for Eskom Holdings Limited (Distribution).

2.2 Normative/informative references

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] ISO 9001, Quality Management Systems
- [2] SANS 60060-3, High-voltage test techniques Part 3: Definitions and requirements for on-site testing
- [3] IEEE Std 1234™-2007, IEEE Guide for Fault-Locating Techniques on Shielded Power Cable System
- [4] 240-56063805, LV Power and Control Cable with Rated Voltage Standard 600/1000V
- [5] 240-56063792, Specification for Medium Voltage XLPE and Impregnated Paper Insulated Cables Standard

2.2.2 Informative

- [6] 32-9: Definition of Eskom documents.
- [7] 32-644: Eskom documentation management standard.
- [8] 474-65: Operating manual of the Steering Committee of Technologies (SCOT).

2.3 Definitions

2.3.1 General

| Definition | Description |
|----------------------------|--|
| Supplier/OEM | Supplier or original equipment manufacturer |
| Cable fault locator | Test equipment used to locate faults on power cables |

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

| Abbreviation | Description |
|---------------------|---------------------------------|
| Dx | Distribution |
| LV | Low voltage |
| MV | Medium voltage |
| OEM | Original equipment manufacturer |
| Std. | Standard |
| SI | Standards Implementation |
| PD | Partial discharge |
| PILC | Paper insulated lead cables |
| PPM | Power Plant Maintenance |
| XLPE | Cross-linked polyethylene |

2.5 Roles and responsibilities

All Eskom employees and/or appointed bodies involved in the procurement of the cable fault locator test equipment and/or the associated accessories shall ensure that the product meets the requirements of this specification. Any deviation from these requirements shall constitute a non-conformance unless it was in advance agreed to by a delegated specialist and is based on sound engineering judgement.

All suppliers/OEM of cable fault locator test equipment to Eskom must be conversant with the requirements of this standard and shall comply with the requirements. No deviations will be accepted, and suppliers shall ensure that they obtain clarity where required and obtain all supporting information or documents necessary to comply with this document.

2.6 Process for monitoring

A technical evaluation criteria document will be used for process monitoring as per Eskom requirements.

2.7 Related/supporting documents

Refer to clause 2.2.

3. Requirements

3.1 General requirements

The supplier/OEM shall be responsible for the design, manufacture and supply of the trailer-mounted cable fault locator test equipment for fault finding on MV power cables. The cable fault locator test equipment testing techniques and test voltages shall be in line with SANS 60060-3, international standard IEEE Std 1234™-2007 or any other relevant standard. The evaluation criteria on clause 7 will be used to evaluate the technical documentation submitted by tenderers. Each tenderer has to obtain a minimum score of 85% to qualify, any score below 85% will lead to immediate disqualification.

3.2 Operating environmental conditions

The trailer mounted cable fault locator test set shall be able to function in the following operating environmental conditions:

| | |
|-------------|-------------------------------|
| Temperature | 5 - 40°C |
| Humidity | 20% to 80% |
| Altitude | up to 1500 meters |
| Terrain | Rough, off-road conditions |
| Rainfall | summer - severe thunderstorms |

3.3 Cable fault locator test set

The cable fault locator test set shall be used during commissioning and maintenance of the underground cables to perform the tests stipulated in the subsections below, at 220 -230V at 50Hz.

3.3.1 Cable fault finding

The cable fault locator test set should be able to:

- Minimum 5kW inverter system with Minimum of 4x100AH deep cycle batteries
- Inject voltages up to 32kV
- Pre-locate and provide the fault distance from the source.
- Pinpoint the fault using Ground microphones, Headphones, audio transmitter etc.
- VLF Pressure-test the cable after repairs.

4. Trailer

The trailer shall be:

- Easily and securely attachable to any Eskom vehicle used during maintenance and/or commissioning
- Suitable for on-road and off-road conditions, due to cable routes that might deviate from normal roadways.
- Compliant with the South African Road Ordinance Act and shall be fitted with the latest approved Eskom Distribution Logos
- Supplied fully fitted with the cable fault locator test set

5. Additional information to be submitted by tenderer

1. The functionality and performance specification of each component of the trailer-mounted cable fault locator test set.
2. Life span expectancy of the cable fault locator test set.
3. Type of maintenance and intervals thereof
4. Guarantees offered to Eskom with regards to the safe operation and maintenance of the cable fault locator test set
5. List of utility references that have successfully used the cable fault locator test set

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6. Lead time from date of placement of order to have the cable fault locator test set delivered to Eskom– in weeks
7. Warranty information of cable fault locator test equipment

6. Training

The supplier/OEM shall provide training on the supplied equipment operation by the OEM accredited instructors.

7. Evaluation criteria

The threshold is set at 85%

| Technical evaluation criteria for supply of a trailer-mounted cable fault locator test set | | |
|--|--|-------|
| TASK / MEASURE | | |
| Criteria and Returnable | Weighting | Score |
| <p>1.The testing techniques using a cable fault locator test set are aligned with SANS 60060-3, IEEE Std 1234™-2007 and/or any other relevant standard</p> <p>Returnable: A datasheet or product brochure or a letter from the OEM confirming compliance with SANS 60060-3, IEEE Std 1234™-2007 and/or any other relevant standard.</p> | 20 | |
| <p>2.The operating environmental conditions of the cable fault locator test set comply with the ones stipulated in section 3.2 of this document.</p> <p>Returnable: A datasheet or product brochure or a letter from the OEM confirming compliance with section 3.2 of this document.</p> | 20 | |
| <p>3.The cable fault locator test set shall be able to perform cable fault finding as stipulated in section 3.3.1 of this document.</p> <p>Returnable: A datasheet or product brochure or a letter from the OEM confirming compliance with section 3.3.1 of this document.</p> | 20 | |
| <p>4.The trailer shall comply with requirements as stipulated in section 4 of this document and the drawing included in the tender pack for reference.</p> <p>Returnable: A datasheet or product brochure or a letter from the OEM confirming compliance with section 4 of this document and the Eskom supplied trailer drawing.</p> | 10 | |
| <p>5.The tenderer shall submit all the required additional information on this document.</p> | <p>20</p> <p>All documents = 20</p> <p>Four to six documents</p> | |

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| | | |
|---|--------------------------------------|------|
| Returnable: All documents listed in section 5 of this document. | = 10 Less than four documents = 0 | |
| 6.The tenderer must confirm training to Eskom staff on how to operate the cable fault location system. Returnable: A letter from the OEM confirming compliance training. | 10 | |
| TOTAL | | /100 |

8. Authorization

This document has been seen and accepted by:

| Name and surname | Designation |
|------------------|-------------|
| Mandy Hlatshwayo | PPM Manager |
| | |

9. Revisions

| Date | Rev | Compiler | Remarks |
|------|-----|----------|---------|
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10. Development team

The following people were involved in the development of this document:

Sandisiwe Mtshaulana, Phenny Bopape, Shabnum Behari, Rakeen Bhoola

11. Acknowledgements

The following PPM cables senior supervisors accepted the document.

Rakeen Bhoola