

 Eskom	Report	Technology
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Title: **TECHNICAL EVALUATION CRITERIA, POLE-MOUNTED AUTO RECLOSERS FOR OVERHEAD LINE NETWORKS AT NORMAL AC VOLTAGES OF 6.6 KV, 11 KV, 22 KV AND 33 KV**

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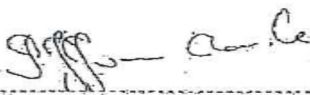


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1. Introduction

This document has been developed through several interventions of Eskom Holdings. It is aimed at setting the standard technical evaluation criteria to be used when evaluating tender submissions. This covers the technical evaluation on the various outdoor, POLE-MOUNTED AUTO RECLOSERS FOR OVERHEAD LINE NETWORKS AT NORMAL AC VOLTAGES OF 6.6 kV, 11 kV, 22 kV AND 33 kV within Eskom Holdings SOC (Ltd).. It has annexures developed to address various aspects required to perform the paper technical evaluation.

This method of evaluating has 2 main parts, namely paper evaluation and factory visit, which are related. A factory visit will only be undertaken if a supplier meets the minimum requirement for the paper evaluation.

2. Supporting Clauses

2.1 Scope

This document covers the technical evaluation of the various outdoor, POLE-MOUNTED AUTO RECLOSERS FOR OVERHEAD LINE NETWORKS AT NORMAL AC VOLTAGES OF 6.6 kV, 11 kV, 22 kV AND 33 kV within Eskom Holdings SOC (Ltd).

2.1.1 Purpose

This document addresses the standard documented technical evaluation criteria to be used when evaluating the tender submission in line with Eskom Holdings SOC (Ltd) requirement.

2.1.2 Applicability

This standard is applicable to all technical evaluations of the various outdoor, POLE-MOUNTED AUTO RECLOSERS FOR OVERHEAD LINE NETWORKS AT NORMAL AC VOLTAGES OF 6.6 kV, 11 kV, 22 kV AND 33 kV within Eskom Holdings SOC (Ltd).

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] 32-9: Definition of Eskom documents.
- [3] 32-644: Eskom documentation management standard.
- [4] 474-65: Operating Manual of the Steering Committee of Wires Technologies (SCOWT)
- [5] 240-71084644: (34-888): Pole-mounted Auto Reclosers Part 1 – General and Protection requirements.
- [6] 240-71084644 (34-889): Pole-mounted Auto Reclosers Part 2 – Telecontrol requirements.
- [7] 240-64038621: Remote device communication standard for data retrieval and remote access.
- [8] 240-51017654: Procedure for the Evaluation of Product Suitability.

2.2.2 Informative

None

2.3 Definitions

2.3.1 General

Note: See also specification/standard 240-75257542 definition and abbreviations.

Definition	Description
Eskom evaluating Representative(s)	The person(s) appointed by Eskom to perform evaluation of tender submission(s) in line with Eskom requirements.
Technical Gatekeepers	The actions that oversees the technical criteria that must be met to proceed with the process.
Familiar	A recloser that is currently utilised extensively on the Eskom network and is listed on the current list of approved products
Similar	A newer version of a recloser that is currently utilised extensively on the Eskom network and that is listed on the current list of approved products or on contract.
Unfamiliar	A recloser that has not been utilised by Eskom previously and is not listed on the current list of approved products.
Displace equipment cost	The monetary value assigned to additional features offered by a device that exceeds the requirement of the specification. Monetary value can only be assigned to features that enable displacement of other equipment for example a statistical measurement feature on a feeder protection relay obviates the need for a separate statistical meter.

2.3.2 Disclosure Classification

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

2.4 Abbreviations

Abbreviation	Description
OEM	Original Equipment Manufacturer
P & SCM	Procurement & Supply Chain Management
SD & L	Supplier Development & Localisation
DEV	Development cost in Rand.
TES	Cost of type tests in Rand
TR	Cost of training in Rand
SP	Cost of spares holding in Rand
ST	Cost of specialized tools
IMP	Cost of implementation in Rand
MAINT	Operational cost
AB	Cost of displaced equipment in Rand or Cost of displaced item in Rand x Utilization Factor

2.5 Roles and Responsibilities

Not applicable.

2.6 Process for monitoring

Not applicable.

2.7 Related/Supporting Documents

Not applicable.

3. Document Content

This document contains the technical evaluation criteria and associated documents of the various outdoor, POLE-MOUNTED AUTO RECLOSERS FOR OVERHEAD LINE NETWORKS AT NORMAL AC VOLTAGES OF 6.6 kV, 11 kV, 22 kV AND 33 kV within Eskom Holdings SOC (Ltd).

The method of evaluating has 2 main parts, namely paper evaluation and factory visit, which are related.

Note: The two parts will be scored separately.

4. Requirements

4.1 Paper evaluation

The paper evaluation exercise is performed by the Eskom evaluating representatives. This part of the evaluation starts when submissions are opened the first time. It begins with Level 1 gate keeper, and then proceeds to the level 2 scoring. **Refer to Annexure A.**

The Level 1 gate-keepers are meant for establishing if all the tender returnable is met. The submission that does not meet the Level 1 gate-keeper is **immediately disqualified**. Only the submission that meets Level 1 gate-keeper progresses to Level 2 scoring. The Eskom evaluating representatives goes through the details of the submission that made Level 1 gate-keepers and ensure Level 2 scoring are met. If the submission **does not** meet Level 2 scoring, it gets **disqualified**. Scoring is done on each item on the criteria. The tender submission must score a minimum of **80%** to be considered to participate in the Competitive Enquiry stage. The submission scoring below 80% is disqualified.

NB. The factory evaluation will only be done if the supplier meets the requirements of Level 2

4.2 Factory Evaluation/ Visit

Eskom evaluating representative(s) will contact and arrange to visit the factory of submissions that have passed the paper evaluation exercise, i.e. submission that have scored 80% and above.

At the factory, the Eskom evaluating representative(s) conducts the evaluation through the use of the standards 240-71084644, 240-76628305 and the evaluation documents. The standards 240-71084644, 240-76628305 and the evaluation documents are used to verify compliance to the equipment and tender submission documents. At the end of this exercise, the Eskom evaluating representative(s) list all the deviations, if any, on the evaluation documents. The representative conducts a formal discussion of the deviations in line with Eskom's requirements. Herein, the Tenderer and their OEM are given opportunity to decide whether they agree or disagree to meet Eskom requirements upon contract award. At the end, the Eskom, Tenderer/Vendor and OEM representatives sign the evaluation agreement document which continues to be used for concluding the Technical Evaluation report. Where the Tenderer and OEM agreed to meet Eskom requirements, all of these form part of the contract and verification afterwards.

4.3 Technical adjustments (Hidden Cost)

The following technical adjustments will be **added** to determine the cost of change as indicated in the "Procedure for the Evaluation of Product Suitability 240-51017654".

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Technical adjustments (Hidden Costs) = $DEV + TES + TR + SP + ST + IMP + MAINT - AB$

The detail can be seen in Annex B.

5. Requirements for the Technical Tender Submission

5.1 General

- The **technical submission** shall be made in duplicate
- The submission shall be clearly marked "Technical".
- All submissions including drawings, test reports, etc. shall be made in the **English language only**.
- All submissions shall be made in electronic format only (i.e. MS Word, MS Excel and/or Adobe Acrobat PDF), and shall be contained by optical media (i.e. "Compact Disk" CR-R, etc.).

The CD's, etc. shall be clearly marked to reflect:

- the applicable Eskom enquiry number,
- the tenderer's organization name, and
- the words: "Technical".

Caution: Marking of CD's, etc. by means of odd sized stick-on labels must be strictly avoided. A suitable marking pen should be used instead. Submissions in hard copy (paper) format will **NOT** be acceptable.

5.2 Format

- The submission shall be structured in a logical format that is user friendly.
- Folders with descriptive titles and structured in a logical hierarchy should be utilized to group relevant information, **for example**:

Example: POLE-MOUNTED AUTO RECLOSERS FOR OVERHEAD LINE NETWORKS AT NORMAL AC VOLTAGES OF 6.6 kV, 11 kV, 22 kV AND 33 kV:

Complete A&B schedules Part 1

Complete clause by clause compliance schedules

Configuration Software

Drawings

Test Reports

Product brochures

Additional information

- Documents should be submitted in separate files as far as possible, e.g. do not combine the entire submission in one or two PDF document(s).
- Duplication of documentation should be avoided.
- The location (i.e. folder names) of relevant documentation should be indicated in column 3 of the compliance schedule

5.3 Documentation

The technical submission shall contain the following documentation as a minimum:

- Covering letter, containing a list of items offered and brief summary of each item (e.g. product name, ratings, etc).
- Compliance A&B Schedules for Part 1 - General and Control requirements, 240-71084644
- Complete clause by clause compliance schedules for Part 1- General and Control requirements, 240-71084644
- Compliance A&B Schedules for Part 2 - Tele-control requirements, 240-76628305
- Complete clause by clause compliance schedules for Part 2 - Tele-control requirements, 240-76628305
- Mounting drawings,
- Completed test report summary sheet,
- Copies of test reports; clearly labelled and arranged in the same order as the type test report summary sheet,
- Training requirements,
- Cost of training requirements
- Additional information,
- Technical manuals and product brochures,
- Installation files of the configuration software.

6. Revisions history

Date	Rev	Compiler	Remarks
Aug 2016	1	S van Aarde	First issue.

7. Authorization

This document has been seen and accepted by:

Name and surname	Designation
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S van Aarde	Senior Adviser - Power Delivery
R Asmal	MV & LV Study Committee Chairperson
M Khan	MV Equipment Care group Chairperson

8. Development Team

- Sakkie van Aarde
- Jan Scholtz

9. Acknowledgement

Not applicable

Document Classification: Controlled Disclosure

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AUTO RECLOSERS FOR OVERHEAD LINE NETWORKS
AT NORMAL AC VOLTAGES OF 6.6 KV, 11 KV, 22 KV
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Annex A – Gatekeepers & Scoring

240-71084644 & 240-76628305, POLE-MOUNTED AUTO RECLOSERS FOR OVERHEAD LINE NETWORKS AT NORMAL AC VOLTAGES OF 6.6 kV, 11 kV, 22 kV AND 33 kV (Paper exercise only).			
Level 1 GATEKEEPER			
TASK / MEASURE			
Activity	Clause	Acceptance	Comments
Completed A&B Schedules submitted – Part 1	240-71084644 Rev 2	Yes / No	
Completed A&B Schedules submitted – Part 2	240-76628305Rev 2	Yes / No	
Type test reports submitted	240-71084644 Rev 2	Yes / No	
DNP3 device profile submitted	240-76628305 Rev 2	Yes / No	
Technical deviations submitted		Yes / No	
Technical Manual		Yes / No	
Comment:			

Level 2 Scoring General- Part 1			
Activity	Specification/standard 240-71084644 Clauses – reference.	Weighting	Score
General Technical Requirements			
1. Does it meet Eskom service conditions?	3.1.1.	1%	
2. Does it meet Eskom configuration requirements?	3.1.2.	1%	
3. Does it meet Eskom insulation levels?	3.2.2.	1%	
4. Does it meet Eskom mounting requirements?	3.2.3.	1%	
5. Does it meet Eskom material and finish requirements?	3.2.4.	1%	
6. Does it meet Eskom bushing requirements	3.2.5.	1%	
7. Does it meet Eskom surge arrester mounting requirements?	3.2.6.	1%	
8. Does it meet Eskom sensor requirements?	3.2.7. & 3.2.8.	1%	
9. Does it meet Eskom mounting requirements?	3.3.1.	1%	
10. Does it meet Eskom material	3.3.2.	1%	

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Level 2 Scoring General- Part 1			
Activity	Specification/standard 240-71084644 Clauses – reference.	Weighting	Score
and finish requirements?			
11. Does it meet Eskom construction requirements?	3.3.3, 3.3.4, 3.3.5 & 3.3.6.	2%	
12. Does it meet Eskom control cable requirements?	3.4.	1%	
13 Does it meet Eskom power supply requirements?	3.5.	1%	
14. Does it meet Eskom configuration requirements?	3.6.	1%	
15. Does it meet Eskom electronic control equipment requirements?	3.7.	1%	
General Protection and Metering Requirements – Part 1			
16 Does it meet Eskom general requirements?	3.8.1.	1%	
17 Does it meet Eskom overcurrent requirements?	3.8.2.	1%	
18 Does it meet Eskom Earth fault requirements?	3.8.3.	1%	
19 Does it meet Eskom SEF requirements?	3.8.4.	1%	
20 Does it meet Eskom Live load blocking requirements?	3.8.5.	1%	
21 Does it meet Eskom Auto Reclose requirements?	3.8.10.	1%	
22 Does it meet Eskom measurement functions requirements?	3.9.	1%	
23. Does it meet Eskom local control requirements?	3.10.	1%	
24. Does it meet Eskom local engineering requirements?	3.13.	1%	
25. Does it meet Eskom external interface module requirements	3.13.7.	1%	
26. Does it meet Eskom configuration software and firmware requirements?	3.14.	1%	
Total Score: General		27%	

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Type test certificates to general standard – Part 1

The type test must be performed at an accredited test facility. The type test results must not be older than 10 years

	Specification/standard 240-71084644 Clause – reference.	Test Passed	Not older than 10 years	Score
1. Insulation (dielectric) tests	3.18.1.2.1.	1%	1%	
2. Switching tests	3.18.1.2.2	1%	1%	
3. Making current capability (verified with standard operating duty test)	3.18.1.2.3	1%	1%	
4. Rated symmetrical interrupting current tests	3.18.1.2.4	1%	1%	
5. Minimum tripping current tests	3.18.1.2.5	1%	1%	
6. Partial discharge (corona) tests (applicable to ARs using non-restoring dielectric as the primary insulation (e.g. solid dielectric)).	3.18.1.2.6	1%	1%	
7. Radio influence voltage tests (applicable to ARs using self-restoring dielectric as the primary insulation (e.g. oil, gas & air))	3.18.1.2.7	1%	1%	
8. Temperature rise test	3.18.1.2.8	1%	1%	
9. Time–current tests	3.18.1.2.8	1%	1%	
10. Control electronic elements surge withstand capability tests	3.18.1.2.10	1%	1%	
11. Short–time withstand current test in accordance with IEC 60694	3.18.1.3.	1%	1%	
12. KIPTS natural ageing and pollution performance test	3.18.1.4.	1%	1%	
13. All protection curves shall have been type tested: IEC 60255 and IEC 62271-111	3.18.1.6.	2%	2%	
Total Score: Type Test		28%		

Level 2 Scoring tele-control – Part 2

Activity	Specification/standard 240-76628305: Clause – reference.	Weighting	Score
Technical requirements			
1. Does it meet Eskom hardware requirements?	3.1	5%	
2. Does it meet Eskom power supply requirements?	3.2	3%	

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Level 2 Scoring tele-control – Part 2			
Activity	Specification/standard 240-76628305: Clause – reference.	Weighting	Score
3 Does it meet Eskom communication interfaces?	3.3	5%	
4. Does it meet Eskom communications device requirements?	3.4	7%	
5. Does it meet Eskom RTU requirements?	3.5	5%	
6. Does it meet Eskom software and firmware requirements?	3.6	3%	
7. Does it meet Eskom Protocol requirements (Data Acquisition and remote access)?	3.7	1%	
8. Does the manufacture supply the required manuals?	3.8	1%	
Total Score: General		30%	

Type test certificates tele-control standard – Part 2				
The type test must be performed at an accredited test facility. The type test results must not be older than 10 years				
	Specification/standard 240-76628305 Clause – reference.	Test Passed	Not older than 10 years	Score
DNP3 certification - Proof of independent testing and verification of the DNP3 protocol functionality shall be provided by the supplier	3.4 a 4)	8%		
The integrated cellular modem shall be type-approved by the Independent Communications Authority of South Africa (ICASA). Certificate for the cellular modem shall be provided by the supplier.	3.4.a 2)	7%		
Total Score: Type Test		15%		

Annex B – Technical adjustments (Hidden Cost)

In accordance with the procedure, **Evaluation of Product Suitability 240-51017654** it is required that the real cost of introducing a new commodity to the business is determined during the technical evaluation phase. There are always hidden costs such as maintenance costs, training costs, cost of specialized tools, etc. associated with a particular product. These costs can however differ significantly between products from different manufacturers. The hidden costs must therefore be quantified and categorised (Familiar, Similar and Unfamiliar) in order to establish the most cost effective product.

The following parameters should be considered as a minimum when calculating the hidden costs:

Technical adjustments (Hidden Costs) = $DEV + TES + TR + SP + ST + IMP + MAINT - AB$. The meaning of the abbreviations may be found under heading 2.4. The hourly rates of Eskom staff are based on the SAP Activity Type Price Report.

The Unfamiliar equipment will be used as an example to calculate the hidden cost:

DEV= The development costs entail those costs incurred by Eskom during the engineering phase of the contract to confirm that the equipment complies with all the specified requirements. The example that we will be using is for **Unfamiliar equipment**, therefore two or more rounds of acceptance testing may be required. A Second round or more testing will only be required if the first round evaluation did not meet the requirements as specified. The costs related to the expected man-hours spent and travel and subsistence allowances of the evaluation team. The evaluation team consist of 4 engineers (1 x HV plant, 1 x Protection, 1 x Tele-control, 1 x Quality).

If two rounds of acceptance testing are required, development costs will be double the amount calculated for **Similar equipment**.

$\therefore DEV = R ?$

TES= Cost of type testing

The cost of type testing is already included in the per unit tender price.

$\therefore TES = R 0$

TR = Cost of training (TR = TR(a) + TR(b))

The cost of training consists of two parts: a) $TR_{(a)}$ = costs related to the man-hours spent by Eskom staff while attending the training courses and b) $TR_{(b)}$ = the cost as quoted by the supplier for developing and presenting the training course.

The training courses have to consist of 3 modules: Protection, Tele-control and Operator modules.

The Protection and Tele-control modules are aimed at engineers and technicians and 30 delegates (15 per module; 5 engineers; 10 technicians) per region attend the training. The duration of the training courses is 2 days per module and one course is presented per region, 9 regions in total.

The Operator training is aimed at field staff and is typically a one day course. Due to the large number of staff that requires training (assume 50 delegates per region) at least three training courses must be presented in each region, 9 regions in total.

Travel and accommodation costs are not included in the calculation.

Man-hours: 10 engineers x 9 regions x 2 days x 8 hours x R?/hour = R ?

20 technicians x 9 regions x 2 days x 8 hours x R?/hour = R ?

$\therefore TR_{(a1)} = R ?$

$TR_{(a2)}$ for Operator Module:

Man-hours: 50 operators x 9 regions x 1 day x 8 hours x R?/hour = R ?

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$$\therefore TR_{(a2)} = R ?$$

$$TR_{(b)}:$$

As quoted per supplier

$$\therefore TR = TR_{(a1)} + TR_{(a2)} + TR_{(b)}$$

SP = Cost of spares holding,

Cost of spares holding in Rand. These costs will be calculated separately for each product offered.

ST = Cost of specialized tools

The costs associated with additional equipment and tools that are required for the standard installation, operation and maintenance of the product (e.g. test equipment, software, interface cables etc.). These costs will be calculated separately for each product offered.

IMP = Cost of implementation

Although training has been stipulated under TR, in reality a new auto-recloser is only fully understood by the Protection and Tele-control engineers/technicians once they have done the settings, tested installed and commissioned the first few units.

It is assumed that it takes 5 days longer to implement the first 5 units of an 'unfamiliar' product per region, 2 days for 'similar' products and 0 days for the 'familiar' products. It is assumed that at least 3 engineers (1 x Protection, 1 x Tele-control, 1 x Settings) are involved per implementation. The cost of implementation is calculated as the additional man-hours spent to implement the first 5 units per region.

Costs associated with possible project delays are ignored.

Man-hours: 3 engineers x 5 units x 9 regions x 5 days x 8 hours x R?/hour = R ?

$$\therefore IMP = R ?$$

MAINT = Life cycle cost of maintenance in Rand

AB = Cost of displaced equipment

Cost of displaced item in Rand x Utilization Factor. The monetary value assigned to additional features offered by a device that exceeds the requirement of the specification. Monetary value can only be assigned to features that enable displacement of other equipment. A utilization factor is included to relate the percentage use of the displaced equipment to the commodity. These costs will be calculated separately for each product offered.