



Standard

Technology

Title: **TECHNICAL EVALUATION
CRITERIA FOR POLE AND
GROUND MOUNTED
TRANSFORMERS**

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1. Introduction

This tender technical evaluation strategy and criteria was created to evaluate all formal tenders for pole and ground MV Distribution mounted transformers. The technical tender evaluation is a critical process in the enquiry chain. It assists bidders in understanding the customer's requirements and ensures that all suppliers bidding to supply pole and ground mounted transformers to Eskom will be evaluated in a standardized, fair, and transparent manner. It minimises the influence of an individual discretion of a person doing the evaluation.

The assessment outcome of each supplier will be based on the information the supplier provides during the tender stage, and on the factory assessment.

This is the technical tender evaluation criteria to be used for tenders in line with the standard 240-45395762. This document details the method of evaluating based on:

- The tender returns as detailed in the Mandatory and Functional Scoring Criteria
- The factory assessment

The document shall be used for the evaluation of all MV Distribution pole and ground mounted transformers.

2. Supporting clauses

2.1 Scope

This document details the technical evaluation strategy and criteria for MV Distribution pole and ground mounted transformers. It does not specify the requirements of this equipment.

2.1.1 Purpose

This document is in place to ensure that the technical evaluations are carried out according to the standard 240-45395762

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

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] 240-45395762 - Specific Requirements for Distribution Pole and Ground Mounted Transformers up to 33kV and 1MVA
- [3] 32-1033 - Eskom Procurement Policy
- [4] 32-1034 – Eskom Procurement and Supply Chain Procedure
- [5] 240-48929482 - Tender Engineering Evaluation Procedure
- [6] 240-53114081 - Loss Factors for Procurement of Transformers (2019 Calculation)
- [7] 240-142598739 - Rescinding of KIPTS Testing as Mandatory Requirement and Guidance on Technical Standards Applicable for Pollution Related Qualification of High Voltage Equipment

2.2.2 Informative

- [8] 32-9, Definition of Eskom documents.
- [9] 32-644, Eskom documentation management standard.

2.3 Definitions**2.3.1 General**

Definition	Description
Desktop evaluation	An evaluation of the documentation included in the tender returnable.
Tender returnable	Items/evidence stipulated in the Tender Enquiry, to be submitted as part of the tender submission at the time of the tender closing.
Technical Evaluation Team (TET) member:	The delegated engineers / technical specialists who are responsible to review and evaluate technical aspects of the tender documentation as per the Tender Technical Evaluation Strategy.
Eskom Assessment Representative(s)	The person(s) appointed by Eskom to perform evaluation of tender submission(s) in line with Eskom requirements.
Original Equipment Manufacturer	The original manufacturer of the equipment
Supplier	Means a current or potential Supplier, vendor, contractor, consultant, or service provider.
MV Distribution Transformer	Reference to: Pole mounted transformers with primary voltages of 3.3kV, 6.6kV, 11kV, 22kV or 33kV with low voltage on the secondary, with power ratings from 16kVA up to 500kVA. Ground mounted transformers with primary voltages of 3.3kV, 6.6kV, 11kV or 22kV with low voltage on the secondary, with power ratings from 100kVA up to 1 MVA. SWER Isolation transformers with primary voltages of 11kV, 22kV and 33kV and secondary voltages of 19kV (phase to ground), with power ratings up to 400kVA. SWER distribution transformers with a primary voltage of 19kV and low voltage on the secondary with power ratings of 16kVA, 32kVA and 64kVA.

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
SABS	South African Bureau of Standards
SCOT	Steering Committee of Technology
TBA	To be announced

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Abbreviation	Description
TET	Technical Evaluation Team
TCO	Total Cost of Ownership

2.5 Roles and responsibilities

All the Eskom employees and/or appointed bodies involved in the tender technical evaluations for Eskom MV Distribution pole and ground mounted transformers, shall make use of this document when preparing the technical documentation for the commercial process, as well as during the execution of technical tender evaluations for these products.

2.6 Process for monitoring

This document and its relevance will be periodically evaluated by Distribution Engineering Operations Enablement. The document shall be monitored to ensure alignment with the documents as stated in the Normative References.

2.7 Related/supporting documents

The B schedule and deviation schedule of the relevant AB schedules shall form part of the evaluation.

3. Evaluation Criteria

3.1 Methodology

This evaluation criteria will be used to measure the bidders in their ability to supply Eskom with pole and ground mounted transformers in accordance with the specific requirements of 240-45395762. This will be achieved by doing both the desktop evaluation using technical tender returnable and by undertaking a factory assessment for the purpose of evaluating each factory at which the equipment supplied to Eskom will be manufactured.

The methodology and relevant scoring can be summarized as follows:

Table 1: Methodology and Relevant Criteria

Item	Marks	Remarks
Tender returns: Mandatory	N/A	Mandatory evaluation criteria are must meet criteria. If any one of the mandatory requirements is not met, the submission for the specific SAP number shall be deemed non-responsive and will be disqualified and removed from the evaluation process.
Tender returns: Functional	100%	Bids meeting the Mandatory evaluation criteria shall be evaluated against the Functional evaluation criteria to allocate an evaluation result (score). Each tender submission will start with a score of 0. Each criterion is allocated a score. Scores shall be allocated to each bid per SAP number, and per criterion, if the tender returnable complies and demonstrates compliance to the tender and criterion requirements.
Factory assessment		Bids meeting the requirements of the Functional threshold shall be eligible for the factory assessment. Only the factories that have been declared accredited after the factory assessment, i.e. no risks outstanding, can proceed to the next stage of evaluation. Any risk identified during the assessment must be addressed within 30 calendar days, from the date of written notification.

The functional threshold (minimum pass score) is 80.00%.

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3.2 Mandatory Requirements

3.2.1 Completeness of Mandatory Returnable

The Mandatory returnable will be reviewed for completeness against the criteria stipulated in section 4. Completeness checks shall include verification that the required document has been returned and that the document contains the required information.

The bidder is required to submit all the information required and the document must be correctly completed.

The gaps (blanks), TBA, and similar remarks that are not an appropriate/relevant response shall render the document incomplete. Cases where the required information is provided as an attachment or accompanying page and the details are not recorded in the AB Schedule must be so indicated as such in the AB Schedule and made easy to reference.

If any of the required documents or information is not available, the submission shall be deemed non-responsive; the submission shall be disqualified and not evaluated further.

3.3 Functional Requirements

Functional criteria will only be evaluated for bids that have passed the mandatory requirements.

Scoring will be in accordance with section 5. Submissions achieving a minimum score of 80.00% shall proceed to the next stage of the technical evaluation.

3.4 Factory Assessment

The factory assessment will be done for each factory that is intended to supply Eskom with the transformers. Companies that have more than one factory will not be getting a blanket assessment and/or approval; each factory will be evaluated on its own merit.

The checks shall be done as per the factory assessment spreadsheet.

Oil filling requirements as stated in 240-45395762 Section 3.2.6 and anti-corrosive/ painting procedures will be assessed at this point.

3.5 Design Reviews

Design reviews are mandatory and will be conducted with suppliers found to be compliant with Eskom's requirements, prior to contract award as per the requirements stated in 240-45395762 Section 5. Design reviews will be conducted on all designs that have not previously undergone Eskom design reviews or have not previously been accepted by an Eskom design review.

The following requirements will also be assessed (in addition to the full design review scope) at the design review stage:

- Transformer bushing compliance to relevant standards and Eskom requirements.
- 240-45395762 Section 3.1 k – oil level requirements.
- 240-45395762 Section 3.2.6 – handling and management of ester oils.
- 240-45395762 Section 3.2.6 – oil filling of the transformer and oil impregnation.
- 240-45395762 Section 3.2.7 – electrical clearances.

4. Mandatory Requirements

The following criteria and returnable will be assessed per SAP number contained in the bid documents:

Table 2: Mandatory Requirements per SAP number

Item	Mandatory Criteria	Mandatory	Tender Returnable Requirements
1	Are the technical schedules completely filled and all the information provided?	Yes	Technical A&B Schedule, issued for with the tender. Schedule B is to be filled in as per 3.2.1
2	Are the ratings (MVA and all voltages) offered correct as per schedule A?	Yes	Technical A&B Schedule
3	Is the vector group correct?	Yes	Technical A&B Schedule
4	Are the terminal arrangements supplied as required in the standard document (clause 3.2.4 of 240-45395762)?	Yes	OEM General Arrangement Drawing (minimum requirements as per 3.5 of 240-45395762)
5	Do the transformer dimensions comply with the requirements indicated in schedule A?	Yes	OEM General Arrangement Drawing (minimum requirements as per 3.5 of 240-45395762)
6	Are the specific design impedances indicated as required in schedule A?	Yes	Technical A&B Schedule
7.	Are the losses offered less than or equal to those given in SANS 780 (latest revision) or Table 6 or Table 7 of 240-45395762?	Yes	Technical A&B Schedule

Note 1: A "No" in any of these items the submission will be deemed non-responsive and will be disqualified.

Note 2: Refer to section 9 regarding test reports.

5. Scoring Criteria: Functional Requirements

The following criteria and returnable will be assessed per SAP number contained in the bid documents that has met the Mandatory requirements:

Table 3: Functional Requirements per SAP number

Scored Criteria			
General Requirements			
Item	Functional Criteria	Points Awarded	Tender Returnable Requirements
1.	Does the insulation level BIL comply completely with the requirements of schedule A (5 marks each for LV and MV)?	10	Technical A&B Schedule and Deviation Schedule (and relevant supporting evidence)
2.	Does the Power frequency withstand voltage comply completely with the requirements of schedule A (5 marks each for LV and MV)?	10	Technical A&B Schedule and Deviation Schedule (and relevant supporting evidence)
3.	Are all the temperature rise figures complying with the requirements as indicated in SANS780?	10	Temperature Rise Test Reports

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Scored Criteria			
General Requirements			
Item	Functional Criteria	Points Awarded	Tender Returnable Requirements
4	Regarding tapping Range (a for single phase, b for dual and three phase)	10	
4 a	For single phase transformers, is the tapping range 0 to 5% in steps of 2.5% via external tapping connections?		Technical A&B Schedule and Deviation Schedule (and relevant supporting evidence)
4 b	For dual and three phase transformers, is the tapping range -5 to +5% in steps of 2.5%?		Technical A&B Schedule and Deviation Schedule (and relevant supporting evidence)
5	Is the Inter-turn winding Insulation stress less than 5kV/mm?	10	Technical A&B Schedule and Deviation Schedule (and relevant supporting evidence)
6	The Highest Interlayer Stress in the non-tapping part of the winding must be stipulated in the schedules, and must be less than 5kV/mm. (Note: an answer of <5kV/mm is not acceptable as the calculated value must be presented)	10	Technical A&B Schedule and Deviation Schedule (and relevant supporting evidence)
7	The Highest Interlayer Stress in the tapping part of the winding must be stipulated in the schedules, and must be less than 5kV/mm. (Note: an answer of <5kV/mm is not acceptable as the calculated value must be presented)	10	Technical A&B Schedule and Deviation Schedule (and relevant supporting evidence)
8	Is the minimum clearance between live terminals and from live terminals to any part of the tank greater than twice the BIL? e.g. for 22kV = 2x 150= 300mm AND Is a minimum mechanical clearance of 100mm between the brackets and LV bushings maintained?	10	OEM General Arrangement Drawing (minimum requirements as per 3.5 of 240-45395762)
9.	Are the other specific requirements offered in the B schedule compliant with the requirements in the A schedule (i.e. specific requirements not evaluated in criteria 1 to 8)	10	Technical A&B Schedule and Deviation Schedule (and relevant supporting evidence)
10.	As per the Eskom standard 240-45395762 and SANS780. 1. Have the type and routine test lists been provided? 2. Have the type test reports/certificates been provided for the specific designs offered on the tender? Important note: reports with failed tests will not be awarded points. (10 points if the test lists and all the type tests certificates are provided, 0 if any list, or test on the list or test reports/certificates are not provided.) (Type tests and routine tests are listed below)	10	Type Test lists, Routine Test Lists and Type Test Reports

Note 3: Refer to section 9 regarding test reports.

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The following Type Tests are required as per the Eskom standard (240-45395762), and the test reports may be issued from a registered SABS facility, accredited test facility or the Factory Test Facility:

- Temperature rise test
- Dielectric type test
- Tank stiffness test
- Corrugated tank fatigue test
- Equivalent disturbing current test (This test is only applicable to SWER transformers)
- Short Circuit Withstand Test
- Natural ageing and pollution performance test

The following Routine Tests are to be included on the list of routine tests conducted on an existing unit:

- Measurement of winding resistance
- Measurement of voltage ratio and phase displacement
- Measurement of short-circuit impedance and load loss
- Measurement of no-load loss and current
- Separate source voltage test
- Induced overvoltage test
- Measurement of paint thickness
- Test for effectiveness of sealing
- Measurement of secondary voltage across outer two terminals to be 484 V. (Only applicable to dual-phase transformers.)
- Measurement of insulation resistance test
- Reactance (%)
- Dielectric routine tests
- Vector group test

6. Deviations from Eskom's Requirements

If any aspect of the bid deviates from the technical requirement stipulated in the Eskom standard or the A schedule of the A&B Schedule then this deviation must be noted on the deviation schedule, with an explanation of the deviations and a thorough motivation requesting Eskom to consider a concession. Additional evidence to support the motivation may be included but must be referenced on the deviation schedule.

It is left to Eskom's discretion to accept or reject deviations from the stipulated standards.

In the case that a deviation is accepted, the relevant credit shall be awarded in the evaluation.

In the case that a deviation is not accepted, the relevant credit may not be awarded resulting in a potential disqualification at Mandatory stage, or in the case of the Scoring stage, the points shall not be awarded.

7. Prior Approved Concessions to Deviate from the Standard

If any aspect of the bid deviates from the stipulated requirement, and if the bidder has a previous concession from Eskom to allow the deviation, then the deviation must still be noted on the deviation schedule with the motivation and the evidence of the Concession offered by Eskom must be included as supporting evidence.

8. Load and No-Load Loss Evidence for the TCO Calculations

These criteria shall be evaluated at the mandatory stage using the Technical A&B Schedule.

These submissions will also be utilised for the determination of the Total Cost of Ownership related to the offer.

9. Acceptance of Mineral Oil Test Reports for the Ester Oil Transformers Range

Type test reports for Mineral Oil designs will be accepted for Ester Oil filled offers only if there is no change to the design.

If the Ester Oil design offered does not have equivalent Mineral Oil testing, then testing performed on the Ester filled unit must be submitted.

Eskom reserves the right to request successful tenderers to perform testing on untested Ester transformers offers at any stage during the contract period.

10. Rules for Range Acceptance of Transformers of Similar Design

In all cases below, it is preferred that the test specific for the SAP number on offer is provided.

However, in the case where tests for specific SAP number units are not available, then the following options can be submitted for consideration:

a. **Temperature Rise Test, Dielectric type test, Tank stiffness test, Corrugated tank fatigue test –**

Tests within the stipulated kVA group may be accepted as evidence.

The following kVA Grouping applies:

- Group 1: 16kVA, 32kVA, 64kVA
- Group 2: 25kVA, 50kVA, 100kVA
- Group 3: 200kVA, 315kVA, 500kVA

b. **Short Circuit Withstand Test** - The tendering company may clarify that the transformer design meets the definition of a similar transformer as per SANS 60076-5, and that the compliance of the tendered transformer can be confirmed through comparative analysis and evaluation. However, it is preferred that the following grouping be applied if possible:

- Group 1: 16kVA, 32kVA, 64kVA
- Group 2: 25kVA, 50kVA, 100kVA
- Group 3: 200kVA, 315kVA, 500kVA

11. Mark Scheme Permits

The mark scheme permits (or application for permits) shall be submitted as part of the original tender.

This returnable will not be scored.

12. Electronic Submissions

Electronic submissions containing all the required technical evidence stated in this document are to be included in the tender submission. This electronic submission is in addition to the hard copy printed submissions and will not be valid if the original printed documentation is not supplied as per the requirements of the commercial enquiry.

Electronic submissions must contain PDF'ed information that is searchable for ease of reference.

13. Continuous Assessment of Contractual Compliance Requirements over the Term of the Contract

Successful bids that are awarded to the contract will be continuously assessed for compliance, specifically but not restricted to the following scenarios:

- Changes to designs.
- Exceedances of contractually guaranteed losses.
- Trended failures.

These assessments may include review of documentary evidence (such as type tests), design reviews and factory assessments.

14. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Mfundu Songo	Senior Manager – Technology & Engineering (Dx)
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Queeneth Khumalo	CS&MES Study Committee Chairperson
Mohamed Khan	MV&LV Study Committee Chairperson
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15. Revisions

Date	Rev	Compiler	Remarks
March 2023	3	MM Moabelo	Table 2, Criterion 7 – Test reports removed as returnable. Added to 3.5: Design reviews will be conducted on all designs that have not previously undergone Eskom design reviews or have not previously been accepted by an Eskom Transformer Specialist. Sections 9, 10 and 13 inserted.
March 2022	Draft 1.2	MM Moabelo	Definitions and abbreviations were updated. Added new section for design reviews. Added new mandatory requirement 7. Added new scoring requirement 9 and adjusted scoring to accommodate the new criterion and to add up to 100%. Added sections 6, 7, 8, 9, and 10. Added Annex A.

Date	Rev	Compiler	Remarks
Nov 2020	Draft 1.1	MM Moabelo	"Are all the temperature rise figures complying with the requirements as indicated in SANS780?" moved to functional requirement. List of type and routine tests added for reference during desktop evaluation. Definitions and abbreviations were updated.
Sept 2017	1	A Singh	For technical evaluation of pole and ground mounted transformers.

16. Development team

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

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17. Acknowledgements

The development team would like to acknowledge previous standard authors for the development of the superseded technical evaluation criteria.

Annex A – Test report summary sheet – from 240-45395762

The tenderer shall submit a separate test report summary sheet per item offered.

Item description:					
Test		Report no.	Test facility	Comments	Report submitted (Y/N)
4.2.1	Temperature rise test				
4.2.2	Dielectric type test				
4.2.3	Tank stiffness test				
4.2.4	Corrugated tank fatigue test				
4.2.5	Short-circuit and short-time current withstand tests				
4.2.6	Pollution performance test (1000 hour and Pollution Test)				
4.2.7	Equivalent disturbing current test This test is only applicable to SWER transformers)				
4.3	Routine tests (all tests as per 4.3 of 240-45395762 are required)				

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