Eskom Rotek Industries	Scope of Work (SOW)	Turbo Gen Services

Title: **Scope of Work for Silver Plating of Generator Components**

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Content

1. INTRODUCTION

Silver-plating of generator components serves to improve the electrical contact between contact surfaces, thus preventing electrical problems associated with uneven contact surfaces.

Typical generator components requiring silver-plating include, but is not limited to:

1. Rotor slot wedges, overhang dampers, slot dampers, damper links, stalk bolts, main leads, stalk bolt nuts, stalk bolt washers, d-leads, various connection links and plates
2. Stator terminal connections, bar-to-bar connection clamps, phase droppers, and flexible connections
3. Exciter base plates, various connection links and plates, and DC connection rings

2. SUPPORTING CLAUSES

2.1 Scope

2.1.1 Purpose

This document covers Silver plating to be completed on generator rotor and stators related components (e.g. -rotor slot wedges,dampers etc), to improve the electrical contact between contact surfaces.

2.1.2 Applicability

This document shall apply throughout Eskom Rotek Industries SOC Ltd.

2.1.3 Effective Date

This document shall be effective once authorised

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**

ASTM B 571 – 97 Standard Practice for Qualitative Adhesion Testing of Metallic Coatings

2.2.2 **Informative**

TWG-F-89 Care and Handling of Generator and Exciter Rotors

2.3 Definitions

Definition	Description
Contractor	An organisation or the staff and representatives of an organisation with which Eskom has entered into a contract requiring them to perform work on a part or all of the generator system

2.4 Abbreviations

Abbreviation	Explanation
FME	Foreign material exclusion
MSDS	Material safety data sheet
QC	Quality control

2.5 Roles and Responsibilities

2.5.1 QC

Quality control personel are responsible to ensure that the quantity and condition of all components dispatched to the contractor are recorded through formal as-dispatched and as-received inspection reports, including photographic evidence. QC is also responsible to verify that the contractor scope is executed as per the approved or accepted procedure and QCP. Verification of the correctness and completeness of the QCP is the responsibility of the quality control personnel. All final acceptance tests must be witneesed by QC.

2.5.2 Engineering

The Works Engineer is responsible to provide written instructions for the scope, specifications, drawings, and confirm that the acceptance criteria is achived by analysis all reports and check sheets.

2.5.3 Contractor

The contractor is responsible to ensure that the scope is executed as per the engineering instruction, applicable standards, or approved QCP. All consumables and equipment required to complete the scope must be supplied by the contractor. Registered and approved work procedures and MSDS for checmicals used to be supplied by the contractor.

2.6 Related or Supporting Documents

2.6.1 Drawings (if available)

2.6.2 Engineering instruction or customer SOW with details of components requiring silver plating and specification

2.6.3 As-dispached or as-found QC report with quantities and condition of items requiring silver plating

2.6.4 Quality control plan for preceeding work

3. REQUIREMENTS

3.1 SHEQ

3.1.1 Compliance with the Occupational Health and Safety Act 85 of 1993 is compulsory.

3.1.2 Adherence to Quality Management System Policies, Procedures and related requirements of ISO 9001.

3.1.3 Adherence to Occupational Health and Safety Policies, Procedures and related requirements of the OHSAS 18001.

3.1.4 Adherence to environmental aspects, related impacts and legal requirements associated with work activities in accordance with ISO 14001.

3.1.5 Adherence to Life Saving Rules.

3.1.6 Compliance with the Eskom Plant Safety Regulations.

3.1.7 Only authorised documents and processes are to be used in the execution of duties.

3.1.8 Continuously seek methods for improvements from a process, quality and safety perspective.

3.1.9 Obey all instructions.

3.1.10 Familiarize with:

3.1.11 The applicable work instructions and procedures in place.

3.1.12 Safe working conditions and procedures.

3.1.13 All legal and contractual requirements.

3.1.14 Discipline and integrity.

3.1.15 Compliance to all ERI Work Instructions, processes, procedures, and standards

3.1.16 Adherence to ERI’s disciplinary code or practice.

3.1.17 Set example to co-workers and others.

3.1.18 Participate in Risk Assessments.

3.1.19 Responsible for own safety.

3.1.20 Responsible for Personal Protective Equipment issued.

3.1.21 Execute duties promptly and safely.

3.1.22 Safeguard tools and safety equipment issued.

3.1.23 Keep good relationship with all personnel.

3.1.24 Compile a HIRA for each and every activity that needs to be performed.

3.1.25 Ensure the activities are carried out following a Works Instructions and Procedure.

3.1.26 Adhere to clean condition policy where required.

3.1.27 All activities to be carried out as per the documented processes and comply with the requirements of ISO and OHSAS certification

3.1.28 Service provider to comply to Eskom PPE (Personal Protective Equipment) Policy with regards to issuing of PPE to resources

3.1.29 Proper use of PPE to be followed

3.1.30 Ensure that tools and equipment are stored correctly in a safe place.

3.2 Technical

3.2.1 Given that silver-plating material is conductive and the requirement to ensure that generator components operate free from foreign materials; adequate foreign material exclusion (FME) measures, application of silver plating, inspection, and testing of the applied silver coating is critical. An incorrect application of the silver coating can lead to the silver-plating material flaking off, contaminating generator components, and exposing the generator or related components to the risk of ground faults and shorted turns.

3.2.2 The deposit used for the silver electro-plating finish (for electrical contact purposes) shall be pure silver with a 99.9 % minimum silver content. It can be applied to copper, copper base alloys, aluminum base alloys and steel.

3.2.3 The plating shall have a minimum thickness of 0.0045 mm and have a good surface finish. The finish should be free from all visible defects and have a matt appearance.

3.2.4 Adhession test should be tested by applying OEM recommended methods or recommended standards.

3.3 Equipment

3.3.1 All equipmemnt and facilities required to complete the scope to be supplied by the contractor.

3.4 Resources

3.4.1 The service requested will require highly skilled technical personnel to execute the scope and ensure that there is no rework or contamination of generator components during execution of work.

4. SCOPE OF WORK

4.1.1 Provide work procedures or method statements on company letter, including checmicals used and MSDS for review and acceptance. **Note**: ERI Engineering to provide the specification and acceptance criteria, depending on the OEM of the components silverplated

4.1.2 Pre-treatment or cleaning of components before silver coating to ensure good adhersion

4.1.3 Silver plate components at contractor premises or off site, depending on the scope or component to be silver plated. **Note:** it may be required to silver plate components in situ without disassembling the parts (e.g. exciter DC rings). Methods used should make provision for application of silver plating in-situ. (Hold point for ERI QC and Supervisor to approve method used to cocoon.

4.1.4 All components must be tested for adhesion using the non-destructive peel or tape test (ASTM Standard B 571-97(2008)), unless a different method is recommended by the OEM or ERI engineer.

4.1.5 Final clean, package, and deliver silver plated components at contract site. **Note:** as-received QC inspection to be complete or verification of cleanliness for componnets silver plated in situ.

5. KEY DELIVERABLES

The following deliverables are to be met by the service provider during the project duration:

- No customer complaints
- Compliance to all ERI Work Instructions, processes, procedures, and standards
- No SHEQ incidents
- Project milestones are to be achieved on time, or earlier

6. KEY PERFORMANCE INDICATORS

The performance of the contractor will be evaluated on the KPIs in the table below:

Objective	**Key Performance Indicator**	**Measure**	**Unit of Measure**	**Source of Evidence**
Safety Sustainability	LTI Free days	LTI Free days	Days	To be provided by supplier
Due Date Performance	Due Date Performance	Average contracted delivery days	Days	To be provided by supplier
Reduce the Number of Rework Incidents	No of Rework Incidents	Number of Rework Incidents	Nr	To be provided by supplier
No of Legal & Environmental Contraventions	No of Legal & Environmental Contraventions	Number of contraventions	Nr	To be provided by supplier
Zero Fatalities Excl 3rd party at fault	Zero Fatalities Excl 3rd party at fault	Number of fatalities	Nr	To be provided by supplier

7. REVISIONS

Date	Rev.	Compiler	Remarks
14/07/2022	0	JK Lengwati	First draft

8. DEVELOPMENT TEAM

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

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