	Standard	Technology
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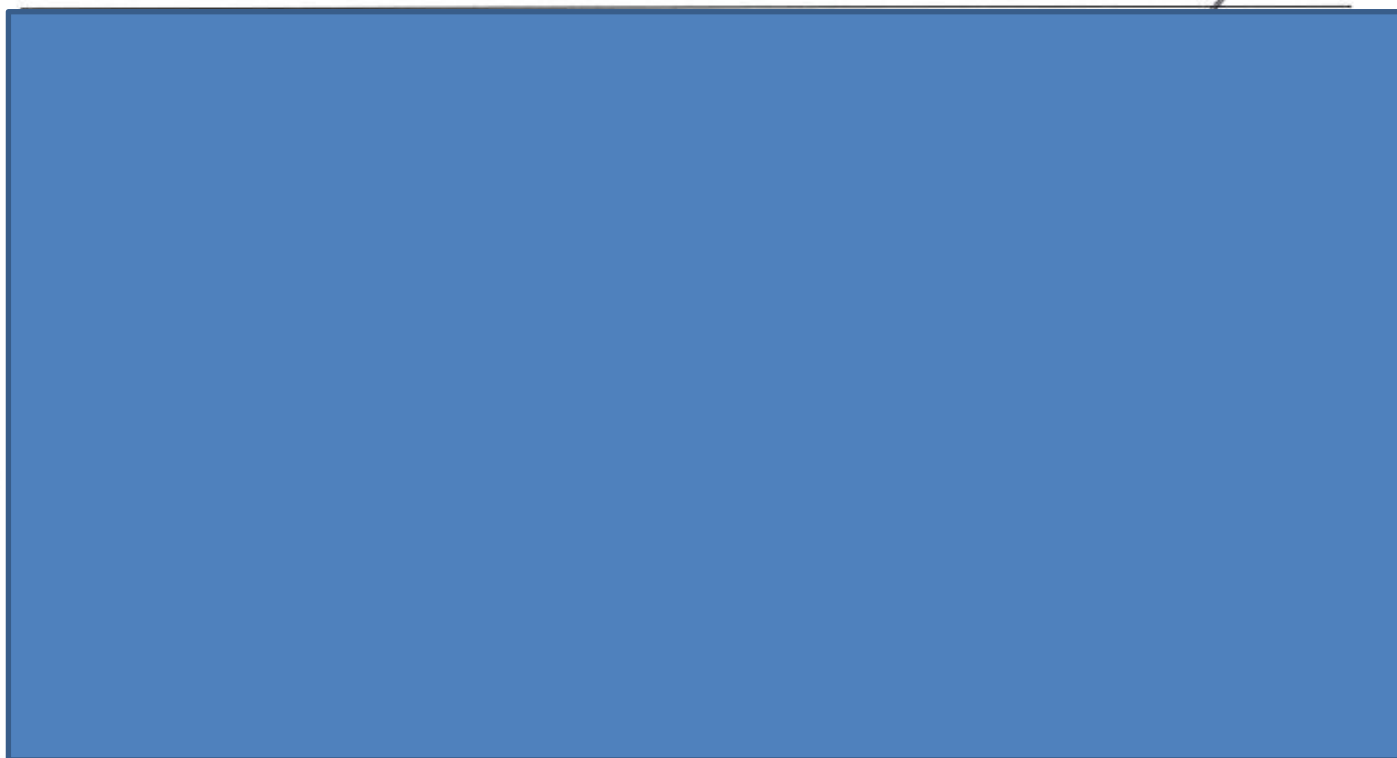
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1. INTRODUCTION

This standard provides the minimum requirements for approvals of companies intending to offer the metallographic replication service to Eskom power plants. The document is intended to give processes to follow when approving new companies/suppliers and managing the existing ones for replica lifting on both pipework and turbine components.

2. SUPPORTING CLAUSES

2.1 SCOPE

The document covers the system that Eskom employs to manage the replication service proposals for new companies and performance evaluation of existing companies.

2.1.1 Purpose

The purpose of this document is to ensure that Eskom's requirements are consistently met by all replication companies, and clarify measures that Eskom may take against any company that deviates from this standard.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings SOC 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] [240-71443868](#): Standard for Evaluation of Surface Microstructures Using the Metallographic Replication Technique
- [3] [240-75109745](#): Metallographic Replication Procedure Applicable to High Temperature High Pressure Components on Eskom Plant
- [4] [240-75114345](#): Standard for Metallographic Replication Applicable to High Temperature High Pressure Turbine and Generator Components on Eskom Plant
- [5] [240-83539806](#) Manual Ultrasonic Wall Thickness Testing on Eskom Power Plants

2.2.2 Informative

- [6] None

2.3 DEFINITIONS

Definition	Description
Company	A supplier/contractor approved by Physical Metallurgy Section to perform the duties of taking metallographic replicas on Eskom plants
Site Rep	An Eskom appointed Metallurgical Engineer/Technologist/Advisor that is responsible for advising a Power Station with regard to remaining life analysis of high temperature high pressure components
Supplier/ Contractor	An organisation that needs approval/approved by Physical Metallurgy section to perform the duties of taking metallographic replicas on Eskom plants

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2.3.1 Disclosure Classification

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

2.4 ABBREVIATIONS

Abbreviation	Description
ESMQR	Eskom Metallographic Quality Representative
HP	High Pressure Components
NCR	Non Conformance Report
QC	Quality Control
QCP	Quality Control Plan
RT&D	Research, Testing and Development
WHMIS	Workplace Hazardous Material Information System

2.5 ROLES AND RESPONSIBILITIES

2.5.1 Company

The contractor must submit a request or proposal (detailing the company profile, with the proposition letter to render replication services) to RT&D together with their internal Metallographic Replication Procedure (if it differs from Eskom standard) and the Quality Control Plan (QCP). Should the mentioned documents be approved by RT&D, the following will be required:

1. Names of staff with Identity numbers and levels of approvals for:

- Responsible Metallurgist
- Supervision approval will include site knowledge and replica procedure knowledge. QC approval will include replica quality, understanding labeling and addressing replica quality issues
- Site Supervisor (Supervisor and replication approval) approval will include understanding the basics of replica preparation, labeling knowledge, i.e. positions on site and component descriptions.
- Quality Control technician (QC approval)
- Wall thickness technician
- Replica technician (Replication approval)
- Replica preparation technician (Basic surface preparation approval)
- Admin support (Labeling approval) approval will include basic knowledge of the plant and components, i.e. Unit, Pipework System and Area (U1, 3:00 up-stream). Labeling standard with regards to rework and additional work.

2. Arrangement for practical and theoretical evaluation dates which will take place at RT&D premises. The evaluation will require the individuals to have the following knowledge:

Theoretical evaluation:

- Knowledge of metallography (QC tech and Metallurgist)
- Knowledge of Eskom plant
- Knowledge of Eskom's Metallographic Replication Standard, for boiler or turbine plant whichever is applicable (All)

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- On site safety (all except for Labeling tech's – Including Workplace hazardous material information system WHMIS training)
- Quality requirements, cleanliness and wall thickness measurement ability especially important in the turbine plant (all except for Labeling tech's)

Practical evaluation on the following materials:

- Carbon steel
- Low alloy
- 12 Cr steel
- Austenitic steels

2.5.2 Eskom Quality Representative (ESMQR)

- Responsible for contractor management.
- Approve all replica taking suppliers.
- Keep record of all the replicas evaluated and record all rejected replicas as a percentage of total replicas evaluated per supplier.
- Ensure that supplier's performance record is available on Hyperwave.
- Liaising with suppliers in case of quality problems.
- Site visits to power stations to ensure compliance to Eskom Standard for Metallographic Replication Applicable to High Temperature High Pressure Components in Eskom Plant (Unique Identifier : 240-75109745) and Standard for Metallographic Replication Applicable to High Temperature High Pressure Turbine and Generator Components on Eskom Plant Unique Identifier : 240-75114345).

2.5.3 Site Representative

Assists the ESMQR with the supplier assessment and approval for turbine components

2.5.4 Departmental Manager/section

Responsible for approval of supplier proposals which includes the company profile, and approved contractors

2.6 PROCESS FOR MONITORING

It is the responsibility of the ESMQR to approve the proposal, Metallographic Replication procedure and the Quality Control Plan for new companies and monitor the performance of existing contractors by arranging quality spot checks as and when required.

2.7 RELATED/SUPPORTING DOCUMENTS

Document Code	Document Title
240-75114345	Metallographic Replication Standard Applicable to High Temperature High Pressure Turbine and Generator Components on Eskom Plant
240-75109745	Metallographic Replication Standard Applicable to High Temperature High Pressure Components on Eskom Plants

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3. METALLOGRAPHIC REPLICATION APPROVAL PROCESS

3.1 NEW COMPANY APPROVAL

The company intending to offer its replication service to Eskom must submit all mandatory documents to RT&D for approval. All new companies are limited to High Pressure pipework replication service. Upon approval of these documents, the process below will be followed:

- The company must submit the names (have at least 5 technicians) and qualifications of their replication team.
- The date and time for theoretical and practical evaluation will be communicated to the company once all the required documents have been retained. The appointment will be sent via email together with Eskom safety rules.
- On the day of the evaluation each technician will independently write an examination to assess their knowledge of Eskom's Metallographic Replication Standard.
- Upon completion of the exam, each technician will be required to practically lift two replicas from two different materials.
- No preparation technician will be allowed for new companies
- The Metallurgist of the said company will be tested on replica quality evaluation.
- RT&D will then review the results of the theoretical and practical evaluation and approve staff according to the levels (as specified on *unique identifier: 240-75109745 Eskom's Standard for Metallographic Replication Applicable to High Temperature High Pressure Components in Eskom Plant*).
- Once the staff members have passed the evaluation, six months approval will be given to the contractor.
- This approval is valid for the specified technicians and is only valid as long as the technician remains employed by that particular contractor. The contractor should inform RT&D if an approved staff member is dismissed or has resigned from the company.
- The company is expected to have in excess of two year's HP pipework components replication experience before they may be considered for turbine components replication approval and only technicians that remained with the said company over this period are qualified for evaluation. During this period the company must meet Eskom's replication quality expectations on HP pipework fully.
- Should the company fail to adhere to Eskom Standard for Metallographic Replication Applicable to High Temperature High Pressure Components in Eskom Plant (Unique Identifier : 240-75109745), Standard for Metallographic Replication Applicable to High Temperature High Pressure Turbine and Generator Components on Eskom Plant Unique Identifier : 240-75114345) and Manual Ultrasonic Wall Thickness Testing on Eskom Power Plants (Unique Identifier : 240-83539806) , it will be suspended for six months and during this period it must re-train its technicians and re-apply for evaluation

3.2 EXISTING COMPANY APPROVAL

These are the companies that already have pipework or/and turbine replication approval with Eskom. The contractor management of these companies will be as follows:

- Re-approval to be renewed on a yearly basis based on the previous year's overall performance of the company.
- The contractor must submit a request for re-approval by providing RT&D with all the names of their current staff with identity numbers and level of approval required for evaluation.

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- Should a re-test or discussion be required the company will be informed at the time of the request.
- Part of the approval and review system will be continuous site audits to ensure the approved QCP and procedures are being managed on site by all contractors. Furthermore, the replication reject rate should be below 3% per contract, which will be measured based on rejected slides due to poor quality, incorrectly labelled boxes and incomplete/error transmittal sheets.
- NCR's will be raised should there be deviations which can lead to revoking of the companies Eskom approvals.

3.2.1 Withdrawal of Replication Approval

RT&D will verbally notify the supplier of any quality control concerns followed up with an e-mail. Should the concerns raised in the email not be addressed to the satisfaction of RT&D and the problem experienced continues or verbal/email concerns are raised three times within 3 months, an NCR (Non Conformance Report) will be raised against the company. The NCR must be addressed and resolved within 7 days, failure to do so will result in the approval being withdrawn within 30 days (to give Eskom power stations adequate time to source alternative suppliers).

Should a contractor's approval be revoked, the contractor will have to submit the following:

- A request for re-approval with a root cause analysis report
- An action plan stating what actions have been implemented to address RT&D's concerns
- Personnel to attend an evaluation at RT&D as per above process

After provisional approval an audit will be carried out by RT&D to ensure that the action plan has been implemented and all concerns have been addressed. Should there be other quality concerns within 3 years of re-approval; the replication letter will be permanently withdrawn.

4. AUTHORISATION

This document has been seen and accepted by:

Name & Surname	Designation

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5. REVISIONS

Date	Rev.	Compiler	Remarks
November 2014	0		First Draft Document
January 2015	0.1		Draft Document for Comments Review Process
February 2015	0.2		Updated Draft after Comments Review Process
February 2015	1		Final Document for Authorisation and Publication
July 2017	1.1		Draft Document for Comments Review
November 2017	1.2		Draft Document
November 2017	1.2		Draft Document for Comments Review Process
6 December 2017	2		Final Document for Authorisation and Publication

6. DEVELOPMENT TEAM

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



7. ACKNOWLEDGEMENTS

- Special thanks to everyone who assisted in compiling this document

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