Eskom	SOW	Camden Power Station

Title: **Conveyor Chute Repairs and Tiling of Flopper gates, V-Ploughs, Chutes and Ash Sluice ways for a period of 3 years Scope of Work**

Document Identifier:	**240-129953822**
HBS / Functional Location (Technical Docs):	
Area of Applicability:	**Common Plant**
Functional Area:	**Engineering**
Revision:	**02**
Total Pages:	**11**
Next Review Date:	**Once-off doc**
Disclosure Classification:	**Controlled Disclosure**

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Date: 2022/08/16	Date: 17/08/2022	Date: 2022/08/22	Date: 22/08/2022

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1. Introduction

This document details all the work that needs to be done with regards to the ceramic tiling of the conveyor belt chutes and ash sluice ways on the Coal and Ash Handling Plant at Camden Power Station.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

The purpose of this document is to give a clear scope of work with regards to the ceramic tiling of Coal Chutes, Flopper Gates, V-Ploughs and Sluice ways on the Camden Coal Handling and Ash Handling Plant.

2.1.2 Applicability

This document is applicable to Common Plant Maintenance and the *contractor* who will be executing the actual work of tiling on the Camden Coal Handling and Ash Handling Plant.

2.1.3 Normative References

[1] **ISO 9001** – Quality Management Systems.
[2] 240-55864504, Belt Conveyor Structural Steelwork and Welding Standard.
[3] 240-55864505, Erection of Belt Conveyor Mechanical Standard.

2.1.4 Informative References

None

2.2 Definitions

Table 1: List of Definitions

Definition	Description
Approved	Approved in writing by the Engineer.
Client	Eskom Generation Group.
Competent Supervisor	Supervisor from the Eskom Generation Group trained in basics of ceramic tiling.

Definition	Description
Contractor	Company to execute the scope of work with regards to industrial ceramic tiling.
Engineer	The responsible engineer at the Eskom Generation Group.
Industrial ceramic tiling	Skilled process of tiling industrial mechanical equipment with ceramic tiles using a specific epoxy as a bonding agent in order to reduce wear and surface friction between the mechanical equipment and the fluid this prolonging the life of the mechanical equipment
Repair	A repair is defined as any work performed on the plant in order to return the plant to its original functional condition.
Tiler	Contractor representative who is trained to execute the industrial ceramic tiling
Tiling Supervisor	Team leader for Contractor who is trained to execute the industrial ceramic tiling

2.3 Abbreviations

Table 2: List of Abbreviations

Abbreviation	Explanation
A1203	Aluminium Oxide
cm3/h	Centimetre cube per hour
CSY	Coal Stock Yard
GPa	Giga-Pascal
Kg/m3	Kilogram per cubic metre
Kg/m2	Kilogram per square metre
kN/mm2	Kilo-Newton per square millimetre
mm	Millimetre
Mm3	Millimetre cube
MPa	Mega-Pascal
N/mm	Newton per millimetre
PTW	Permit To Work
QCP	Quality Control Plan
Shore A	Degree Shore A
% Elongation	Percentage Elongation
>	Greater than
<	Less than

2.4 Roles and Responsibilities

Contractor: Supply a quality service of industrial ceramic tiling as per SANS, DIN and Eskom standard as stated in this scope of work.

Client: Ensure quality of work executed but contractor is of acceptable standards as per SANS, DIN and Eskom standard as stated in this scope of work.

2.5 Related/Supporting Documents

N/A

3. Scope of Work

3.1 Description of the work to be done by the *contractor*

The objective of this contract is for the Contractor to provide a service of installation, maintenance and repair of ceramic tiles on the Camden Coal and Ash Handling plant as and when required by the Employer, at Camden Power Station. The conveyors on-site are divided into Coal Stockyard, Staithes, Terrace and Bunker conveyors.

The Employer's conveyor systems are regarded as Level 1 plant (of highest importance) and therefore, critical to allow normal operations for electricity generation to continue uninterrupted. For this reason, the Contractor is required to have an effective quality management system in place which is **ISO 9001** approved. Furthermore, all activities will be done as per to the level of quality management stipulated therein.

The *Contractor* shall provide a qualified and competent team with all the necessary equipment (including tools and spares) to do ceramic tiling of Conveyor Chutes, Flopper Gates, V-Ploughs and Sluice way on-site.

The Contractor must possess all the necessary equipment to do the ceramic tiling from start to completion. The Contractor's team/s must always be led by an experienced tiling supervisor. Callouts by Camden Coal and Ash Handling Plant Maintenance shall be done telephonically and the Contractor is expected to report to site with three hours for emergency work, otherwise at the time given by the client for all pre-planned work.

3.1.1 Ceramic Liners Specification for coal and ash handling plant

- Alumina ceramic tiles (epoxy mortar fairing & coving compound)
- Density : 3600 kg/m^3
- Alumina content : 92 %
- Porosity : 0 %
- Modulus of elasticity : 260 GPa
- Hardness (Vickers) : 11 – 13 x 103 N/mm^2
- Application temperature : 1300 °C
- Thermal conductivity : 16 W/mK
- Modulus of rupture : 270 MPa
- Thermal expansion @ 40 °C : 6.67 x 10-6 / K
- Specific gravity : 1.48

3.1.2 Epoxy Specification for coal and ash handling plant

- Type : Ceramic beads
- Form : Paste
- Heat Resistance : 120 °C
- Shore Hardness (00) : 85-89

NB! Technical data sheet and certificates to be supplied stating maximum heat resistance and shore hardness, high temperature wear resistance epoxy, supplied with hardener and application gloves, material safety data sheets with environmental information in the 16 point format to be provided as required by the occupational health and safety act.

Table 3: Coal Plant tiling specification

Conveyor	Chute Type	Ceramic Tile Specification	Ceramic Tile Thickness
18	Feed Chute & Discharge Chute	Epoxy mortar fairing & coving compound	12mm
E1	Feed Chute & Discharge Chute	Epoxy mortar fairing & coving compound	12mm
4A	Feed Chute & Discharge Chute	Epoxy mortar fairing & coving compound	12mm
9A, 5B and 9B	Feed Chute & Discharge Chute	Epoxy mortar fairing & coving compound	25mm
6A, 6C, 10A and 10C	Feed Chute & Discharge Chute	Epoxy mortar fairing & coving compound	12mm
7A, 7B, 8A, 8B, 11A, 11B, 12A and 12B	Distribution chutes/Feed Chutes	Epoxy mortar fairing & coving compound	12mm
9A	Bi-directional plough	Epoxy mortar fairing & coving compound	12mm
7A, 7B, 8A, 8B, 11A, 11B, 12A & 12B	Tripper Cars	Epoxy mortar fairing & coving compound	6mm
5A, 5B, 9A & 9B	Travelling Chutes	Epoxy mortar fairing & coving compound	6mm

3.1.3 Work to be performed by the *Contractor* (Coal Plant)

1. Ensure PTW.
2. Risk assessment.
3. Complete workers register.
4. Empty the Chute (Roshcon Operator).
5. Thoroughly Inspect the Chute/ Flopper Gate/ V-Plough for signs of wear, holes and missing tiles.
6. Remove patched portion of conveyor chute if applicable.
7. Weld in new plate and grind flush ensuring an acceptable surface finish if applicable.
8. Thoroughly clean the Chute/ Flopper Gate/ V-Plough/ tripper car before tiling. This includes the removal of old damaged tiles and old hardened epoxy.

9. Ensure that the chute is dry and free of moisture.
10. Cut the tiles to the right sizes as and when required.
11. Install tiling as required (Epoxy or weld on).
12. Allow for curing time +-8h as specified by supplier (Roshcon operator)
13. Inspect work done and sign the QCP (Eskom QC).
14. Clear the PTW and return to service.

3.2 Ash Plant Tiling Specification

3.2.1 Sluice way Tiling Specification:

- The total distance of the sluice way from unit 1 to the end of unit 4 is approximately 150m. The sluice way distance from unit 5 to unit 8 is approximately 150m.
- Ceramic Tile Specification on Sluice way: epoxy mortar fairing & coving compound
- Ceramic Tile Thickness :12mm Thick Plain Tiles, straight semi-circle Pipe Work

3.2.2 Work to be performed by the *Contractor* (Ash plant)

1. Ensure PTW.
2. Risk assessment.
3. Complete workers register.
4. Remove gratings on the sluice way (Roshcon Operator).
5. Isolate the area to be tiled by sandbag to minimize water ingress.
6. Clean/Remove any ash slurry on the sluice way (Ops Support).
7. Thoroughly inspect the sluice way for signs of wear, holes and missing tiles.
8. Remove patched portion on the sluice way (if applicable).
9. Weld in new plate and grind flush ensuring an acceptable surface finish if applicable.
10. Ensure that the sluice way is dry and free of moisture before tiling.
11. Install tiling as required.
12. Allow for curing time ±8h as specified by supplier.
13. Inspect work done (Eskom QC).
14. Clear the PTW and return to service.

3.3 Employer's Requirements for Service

3.3.1 The *Contractor* must do ceramic tiling on Camden Coal and Ash Handling Plant Chutes, Flopper Gates, V-Ploughs and Sluice way using material (Tiles and Adhesive) that were manufactured according to **ISO 9001** Standard.

3.3.2 The *contractor* must do inspections on a monthly basis and submit a full report of all the damaged and worn-out tiles that need to be repaired or replaced.

3.3.3 All labour, materials, equipment, tools, transport and consumables for performing the services are to be supplied. This includes tiles, adhesive and cleaning equipment.

3.3.4 A Quality Control Plan (QCP) for the installation of ceramic tiles is to be submitted to the Coal & Ash Handling Plant System engineer for approval. This Quality Control Plan will be used for any job on-site and it is to be filled in, signed and submitted by the *Contractor* after each and every task of repair and installation of new tiles.

3.3.5 The *Contractor*'s competent person will conduct on-site investigative fault-finding surveys in conjunction with the site maintenance personnel on all chutes, flopper gates v-ploughs and Sluice way on a three monthly basis. This shall be done by a competent person and reports containing the results of the survey and recommendations to address the findings, in order to improve plant health, must be submitted to the Employer within three weeks after such a survey is done.

3.3.6 The *Contractor* shall report to site at the time planned by the client (Camden maintenance representative/s) otherwise the response time for a call-out shall not exceed three hours from the first telephonic notification. The respective *Contractor* must have the required equipment and personnel to provide the response and services. Low Performance Damages will be applicable for any deviation to these requirements.

3.4 Key Performance Indicators for Industrial ceramic Tiling on the Coal Handling and Ash Handling Plant

Table 4: Key Performance Indications

Area	KPI	Duration
Industrial Ceramic Tiling	No peeling off or damage of newly installed tiles/liners.	Not less or equal to two years from the time the tiles/liners are installed.
Response time Emergency call out	Response time during a call out	Not more than four hours from the time the call out is made
Identification of Repairs	Repair records inclusive of all technical information	All up to date tile repair records to be kept by the contractor as ready for client upon request.
Quality Control	Submission of QCPs to client	A fully completed Eskom QCP to be submitted to client prior the ceramic tiling PTW being cleared.

4. Acceptance

This document has been seen and accepted by:

Name	Designation	Signatures
Patrick Shange	Senior Supervisor Technical Maintenance	
Ranwedzi Mukhodobwane	Coal Plant Senior System Engineer	

5. Revisions

Date	Rev.	Compiler	Remarks
August 2017	00	Y Mgwebi	Original Issue
November 2018	01	Y Mgwebi	• Removed Ivory 350 name • Epoxy Specification for coal and ash handling plant added
August 2022	02	Y Mgwebi	Due for revision

6. Development Team

- Yamkela Mgwebi
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- Patrick Shange

7. Acknowledgements

N/A