



## NEC3 Term Service Contract (TSC3)

Between **ESKOM HOLDINGS SOC Ltd**  
(Reg No. 2002/015527/30)

and **[Insert at award stage]**  
(Reg No. \_\_\_\_\_ )

for **Coal, Ash Handling and Milling Plant Ceramic Tiling  
Service at Duvha Power Station.**

<b>Contents:</b>	<b>No of pages</b>
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**CONTRACT No. [Insert at award stage]**

## PART C1:      AGREEMENTS & CONTRACT DATA

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Contents:	No of pages
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[to be inserted from Returnable Documents at award stage]	
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[to be inserted from Returnable Documents at award stage]	
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## C1.1 Form of Offer & Acceptance

### Offer

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract for the procurement of:

### Coal, Ash Handling and Milling Plant Ceramic Tiling Service at Duvha Power Station.

The tenderer, identified in the Offer signature block, has examined the documents listed in the Tender Data and addenda thereto and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance the tenderer offers to perform all of the obligations and liabilities of the *Contractor* under the contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the *conditions of contract* identified in the Contract Data.

Options A	The offered total of the Prices exclusive of VAT is	R
	Sub total	R
	Value Added Tax @ 14% is	R
	The offered total of the amount due inclusive of VAT is <sup>1</sup>	R
	(in words)	

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document including the Schedule of Deviations (if any) to the tenderer before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the tenderer becomes the party named as the *Contractor* in the *conditions of contract* identified in the Contract Data.

Signature(s)

Name(s)

Capacity

**For the  
tenderer:**

(Insert name and address of organisation)

Name &  
signature of  
witness

Date

Tenderer's CIDB registration number:

**Acceptance**

By signing this part of this Form of Offer and Acceptance, the Employer identified below accepts the tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the *conditions of contract* identified in the Contract Data. Acceptance of the tenderer's Offer

<sup>1</sup> This total is required by the *Employer* for budgeting purposes only. Actual amounts due will be assessed in terms of the *conditions of contract*.

shall form an agreement between the Employer and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract, are contained in:

Part C1	Agreements and Contract Data, (which includes this Form of Offer and Acceptance)
Part C2	Pricing Data
Part C3	Scope of Work: Service Information

and drawings and documents (or parts thereof), which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Returnable Schedules as well as any changes to the terms of the Offer agreed by the tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Form of Offer and Acceptance. No amendments to or deviations from said documents are valid unless contained in this Schedule.

The tenderer shall within two weeks of receiving a completed copy of this agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the *conditions of contract* identified in the Contract Data at, or just after, the date this agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one fully completed and signed original copy of this document, including the Schedule of Deviations (if any).

Signature(s)

Name(s)

Capacity

**for the  
Employer**

*(Insert name and address of organisation)*

Name &  
signature of  
witness

Date

Note: If a tenderer wishes to submit alternative tenders, use another copy of this Form of Offer and Acceptance.

## Schedule of Deviations to be completed by the *Employer* prior to contract award

Note:

1. This part of the Offer & Acceptance would not be required if the contract has been developed by negotiation between the Parties and is not the result of a process of competitive tendering.
2. The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender.
3. A tenderer's covering letter must not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid be the subject of agreement reached during the process of Offer and Acceptance, the outcome of such agreement shall be recorded here and the final draft of the contract documents shall be revised to incorporate the effect of it.

No.	Subject	Details
1	[•]	[•]
2	[•]	[•]
3	[•]	[•]
4	[•]	[•]
5	[•]	[•]
6	[•]	[•]
7	[•]	[•]

By the duly authorised representatives signing this Schedule of Deviations below, the Employer and the tenderer agree to and accept this Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules, as well as any confirmation, clarification or changes to the terms of the Offer agreed by the tenderer and the Employer during this process of Offer and Acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the tenderer of a completed signed copy of this Form shall have any meaning or effect in the contract between the parties arising from this Agreement.

### For the tenderer:

### For the Employer

Signature

Name

Capacity

On behalf of *(Insert name and address of organisation)*

Name &  
signature  
of witness

Date

## C1.2 TSC3 Contract Data

### Part one - Data provided by the *Employer*

[Instructions to the contract compiler: (delete these two notes in the final draft of a contract)]

1. Please read the relevant clauses in the conditions of contract before you enter data. The number of the clause which requires the data is shown in the left hand column for each statement however other clauses may also use the same data.
2. Some TSC3 options are always selected by Eskom Holdings SOC Ltd. The remaining TSC3 options are identified by shading in the left hand column. In the event that the option is not required select and delete the whole row. Where the following symbol is used "[•]" - data is required to be inserted relevant to the specific option selected.]

Completion of this data in full, according to the Options chosen, is essential to create a complete contract.

Clause	Statement	Data
1	<b>General</b>	
	The <i>conditions of contract</i> are the core clauses and the clauses for main Option:	
		A: Priced contract with price list
		W1: Dispute resolution procedure
	dispute resolution Option	X1: Price adjustment for inflation
	and secondary Options	X2 Changes in the law
		X17: Low service damages
		X18: Limitation of liability
		X19: Task Order
		Z: <i>Additional conditions of contract</i>
	of the NEC3 Term Service Contract April 2013 <sup>2</sup> (TSC3)	
10.1	The <i>Employer</i> is (name):	Eskom Holdings SOC Ltd (reg no: 2002/015527/30), a state owned company incorporated in terms of the company laws of the Republic of South Africa

<sup>2</sup> Available from Engineering Contract Strategies Tel 011 803 3008 Fax 086 539 1902 [www.ecs.co.za](http://www.ecs.co.za)

	Address	<b>Registered office at Megawatt Park, Maxwell Drive, Sandton, Johannesburg</b>
	Tel No.	<b>[•]</b>
	Fax No.	<b>[•]</b>
10.1	The <i>Service Manager</i> is (name):	<b>Sanny Masombuka</b>
	Address	<b>Duvha Power Station</b>
	Tel	<b>017 612 6853</b>
	Fax	<b>N/A</b>
	e-mail	<b>MasombSM@eskom.co.za</b>
11.2(2)	The Affected Property is	<b>Milling and Coal Plant</b>
11.2(13)	The <i>service</i> is	<b>Maintenance Services on the Milling, Coal Plant and associated plant on Duvha Units 1 to 6</b>
11.2(14)	The following matters will be included in the Risk Register	<b>As identified by the parties from time to time and recorded in the plant specific Risk Register</b>
11.2(15)	The Service Information is in	<b>Part 3: Scope of Work and all documents and drawings to which it makes reference.</b>
12.2	The <i>law of the contract</i> is the law of	<b>the Republic of South Africa</b>
13.1	The <i>language of this contract</i> is	<b>English</b>
13.3	The <i>period for reply</i> is	<b>1 week</b>
2	<b>The Contractor's main responsibilities</b>	<b>Data required by this section of the core clauses is also provided by the <i>Contractor</i> in Part 2 and terms in italics used in this section are identified elsewhere in this Contract Data</b>
21.1	The <i>Contractor</i> submits a first plan for acceptance within	<b>A plan for each activity in the activity schedule shall be submitted with the Tender Returnable.</b>
3	<b>Time</b>	
30.1	The <i>starting date</i> is.	<b>01 February 2023 or as soon as possible thereafter</b>
30.1	The <i>service period</i> is	<b>60 Months</b>
4	<b>Testing and defects</b>	<b>The defect correction period is to be agreed on the first meeting when that defect is formally discussed.</b>
5	<b>Payment</b>	
50.1	The <i>assessment interval</i> is	<b>To specified o the task order</b>

51.1	The <i>currency of this contract</i> is the	<b>South African Rand</b>
51.2	The period within which payments are made is	<b>30 days from transmittal of the Contract's invoice to the Employer APS department.</b>
51.4	The <i>interest rate</i> is	<p>(i) the publicly quoted prime rate of interest (calculated on a 365 day year) charged by from time to time by the Standard Bank of South Africa Limited (as certified, in the event of any dispute, by any manager of such bank, whose appointment it shall not be necessary to prove) for amounts due in Rands and</p> <p>(ii) The LIBOR rate applicable at the time for amounts due in other currencies. LIBOR is the 6 month London Interbank Offered Rate quoted under the caption "Money Rates" in The Wall Street Journal for the applicable currency or if no rate is quoted for the currency in question then the rate for United States Dollars, and if no such rate appears in The Wall Street Journal then the rate as quoted by the Reuters Monitor Money Rates Service (or such service as may replace the Reuters Monitor Money Rates Service) on the due date for the payment in question, adjusted <i>mutatis mutandis</i> every 6 months thereafter (and as certified, in the event of any dispute, by any manager employed in the foreign exchange department of The Standard Bank of South Africa Limited, whose appointment it shall not be necessary to prove.</p>
6	<b>Compensation events</b>	Compensation Events are to be approved by the <i>Employer</i> prior to the commencement of any work related to the Compensation Event.
7	<b>Use of Equipment Plant and Materials</b>	There is no reference to Contract Data in this section of the core clauses and terms in italics used in this section are identified elsewhere in this Contract Data
8	<b>Risks and insurance</b>	
80.1	These are additional <i>Employer's</i> risks	<p>1. Work Quality not adhering to standards and procedures</p> <p>2. Unqualified or in-experienced personnel</p> <p>3. Internal strike due to salary payments</p>
9	<b>Termination</b>	<b>Termination will be in accordance with NEC2 Term Services Contract Termination Clause</b>
10	<b>Data for main Option clause</b>	
A	<b>Priced contract with price list</b>	
20.5	The <i>Contractor</i> prepares forecasts of the final total of the Prices for the whole of the <i>service</i> at intervals no longer than	<b>1 month.</b>



11	Data for Option W1			
W1.1	The <i>Adjudicator</i>	the person selected from the ICE-SA Division (or its successor body) of the South African Institution of Civil Engineering Panel of Adjudicators by the Party intending to refer a dispute to him. (see <a href="http://www.ice-sa.org.za">www.ice-sa.org.za</a> ). If the Parties do not agree on an Adjudicator the Adjudicator will be appointed by the Arbitration Foundation of Southern Africa (AFSA).		
	Address	[•]		
	Tel No.	[•]		
	Fax No.	[•]		
	e-mail	[•]		
W1.2(3)	The <i>Adjudicator nominating body</i> is:	the Chairman of ICE-SA a joint Division of the South African Institution of Civil Engineering and the Institution of Civil Engineers (London) (see <a href="http://www.ice-sa.org.za">www.ice-sa.org.za</a> ) or its successor body.		
W1.4(2)	The <i>tribunal</i> is:	Arbitration		
W1.4(5)	The <i>arbitration procedure</i> is	the latest edition of Rules for the Conduct of Arbitrations published by The Association of Arbitrators (Southern Africa) or its successor body.		
	The place where arbitration is to be held is	[•] South Africa		
	The person or organisation who will choose an arbitrator	the Chairman for the time being or his nominee of the Association of Arbitrators (Southern Africa) or its successor body.		
	- if the Parties cannot agree a choice or			
	- if the arbitration procedure does not state who selects an arbitrator, is			
12	Data for secondary Option clauses			
X1	Price adjustment for inflation			
X1.1	The <i>base date</i> for indices is	One month prior to the enquiry closing date		
	The proportions used to calculate the Price Adjustment Factor are:	proportion	linked to index for	Index prepared by SEIFSA

		0.80	SEIFSA C3 All hourly paid employees	SEIFSA Index, Actual Labour Cost				
		0.10	SEIFSA L2(A)	SEIFSA Index, Road Freight Costs				
		0.10	non-adjustable					
X2	Changes in the law	There is no reference to Contract Data in this Option and terms in italics are identified elsewhere in this Contract Data.						
X17	Low service damages							
X17.1	The service level table is in	<table><tr><th>Description</th><th>Penalty</th></tr><tr><td>Poor workmanship</td><td>Contractor to carry out repair costs of that activity task order.</td></tr></table>			Description	Penalty	Poor workmanship	Contractor to carry out repair costs of that activity task order.
Description	Penalty							
Poor workmanship	Contractor to carry out repair costs of that activity task order.							
X18	Limitation of liability							
X18.1	The Contractor's liability to the Employer for indirect or consequential loss is limited to	R0.0 (zero Rand)						
X18.2	For any one event, the Contractor's liability to the Employer for loss of or damage to the Employer's property is limited to	the amount of the deductibles relevant to the event described in the "Format TSC3" insurance policy available on <a href="http://www.eskom.co.za/Tenders/InsurancePoliciesProcedures/Pages/EIMS_Policies_From_1_April_2014_To_31_March_2015.aspx">http://www.eskom.co.za/Tenders/InsurancePoliciesProcedures/Pages/EIMS_Policies_From_1_April_2014_To_31_March_2015.aspx</a>						
X18.3	The Contractor's liability for Defects due to his design of an item of Equipment is limited to	The greater of <ul style="list-style-type: none"><li>the total of the Prices at the Contract Date and</li><li>the amounts excluded and unrecoverable from the Employer's insurance (other than the resulting physical damage to the Employer's property which is not excluded) plus the applicable deductibles in the Employer's assets and works / maintenance policies available on <a href="http://www.eskom.co.za/Tenders/InsurancePoliciesProcedures/Pages/EIMS_Policies_From_1_April_2014_To_31_March_2015.aspx">http://www.eskom.co.za/Tenders/InsurancePoliciesProcedures/Pages/EIMS_Policies_From_1_April_2014_To_31_March_2015.aspx</a></li></ul>						
X18.4	The Contractor's total liability to the Employer, for all	the total of the Prices other than for the additional excluded matters.						

	matters arising under or in connection with this contract, other than the excluded matters, is limited to	<p><b>The <i>Contractor's</i> total liability for the additional excluded matters is not limited.</b></p> <p><b>The additional excluded matters are amounts for which the <i>Contractor</i> is liable under this contract for</b></p> <ul style="list-style-type: none"> <li>• Defects due to his design, plan and specification,</li> <li>• Defects due to manufacture and fabrication outside the Affected Property,</li> <li>• loss of or damage to property (other than the <i>Employer's</i> property, Plant and Materials),</li> <li>• death of or injury to a person and</li> <li>• infringement of an intellectual property right.</li> </ul>
X18.5	The <i>end of liability date</i> is	<b>12 months after the end of the <i>service period</i>.</b>
<b>X19</b>	<b>Task Order</b>	
X19.5	The <i>Contractor</i> submits a Task Order programme to the <i>Service Manager</i> within	<b>2 days of receiving the Task Order</b>
<b>Z</b>	<b>The <i>additional conditions of contract</i> are</b>	<b>Z1 to Z14 always apply.</b>

## **Z1 Cession delegation and assignment**

- Z1.1 The *Contractor* does not cede, delegate or assign any of its rights or obligations to any person without the written consent of the *Employer*.
- Z1.2 Notwithstanding the above, the *Employer* may on written notice to the *Contractor* cede and delegate its rights and obligations under this contract to any of its subsidiaries or any of its present divisions or operations which may be converted into separate legal entities as a result of the restructuring of the Electricity Supply Industry.

## **Z2 Joint ventures**

- Z2.1 If the *Contractor* constitutes a joint venture, consortium or other unincorporated grouping of two or more persons or organisations then these persons or organisations are deemed to be jointly and severally liable to the *Employer* for the performance of this contract.
- Z2.2 Unless already notified to the *Employer*, the persons or organisations notify the *Service Manager* within two weeks of the Contract Date of the key person who has the authority to bind the *Contractor* on their behalf.
- Z2.3 The *Contractor* does not alter the composition of the joint venture, consortium or other unincorporated grouping of two or more persons without the consent of the *Employer* having been given to the *Contractor* in writing.

## **Z3 Change of Broad Based Black Economic Empowerment (B-BBEE) status**

- Z3.1 Where a change in the *Contractor's* legal status, ownership or any other change to his business composition or business dealings results in a change to the *Contractor's* B-BBEE status, the

*Contractor* notifies the *Employer* within seven days of the change.

- Z3.2 The *Contractor* is required to submit an updated verification certificate and necessary supporting documentation confirming the change in his B-BBEE status to the *Service Manager* within thirty days of the notification or as otherwise instructed by the *Service Manager*.
- Z3.3 Where, as a result, the *Contractor's* B-BBEE status has decreased since the Contract Date the *Employer* may either re-negotiate this contract or alternatively, terminate the *Contractor's* obligation to Provide the Service.
- Z3.4 Failure by the *Contractor* to notify the *Employer* of a change in its B-BBEE status may constitute a reason for termination. If the *Employer* terminates in terms of this clause, the procedures on termination are P1, P2 and P4 as stated in clause 92, and the amount due is A1 and A3 as stated in clause 93.

#### **Z4 Confidentiality**

- Z4.1 The *Contractor* does not disclose or make any information arising from or in connection with this contract available to Others. This undertaking does not, however, apply to information which at the time of disclosure or thereafter, without default on the part of the *Contractor*, enters the public domain or to information which was already in the possession of the *Contractor* at the time of disclosure (evidenced by written records in existence at that time). Should the *Contractor* disclose information to Others in terms of clause 25.1, the *Contractor* ensures that the provisions of this clause are complied with by the recipient.
- Z4.2 If the *Contractor* is uncertain about whether any such information is confidential, it is to be regarded as such until notified otherwise by the *Service Manager*.
- Z4.3 In the event that the *Contractor* is, at any time, required by law to disclose any such information which is required to be kept confidential, the *Contractor*, to the extent permitted by law prior to disclosure, notifies the *Employer* so that an appropriate protection order and/or any other action can be taken if possible, prior to any disclosure. In the event that such protective order is not, or cannot, be obtained, then the *Contractor* may disclose that portion of the information which it is required to be disclosed by law and uses reasonable efforts to obtain assurances that confidential treatment will be afforded to the information so disclosed.
- Z4.4 The taking of images (whether photographs, video footage or otherwise) of the Affected Property or any portion thereof, in the course of Providing the Service and after the end of the *service period*, requires the prior written consent of the *Service Manager*. All rights in and to all such images vests exclusively in the *Employer*.
- Z4.5 The *Contractor* ensures that all his subcontractors abide by the undertakings in this clause.

#### **Z5 Waiver and estoppel: Add to core clause 12.3:**

- Z5.1 Any extension, concession, waiver or relaxation of any action stated in this contract by the Parties, the *Service Manager* or the *Adjudicator* does not constitute a waiver of rights, and does not give rise to an estoppel unless the Parties agree otherwise and confirm such agreement in writing.

#### **Z6 Health, safety and the environment: Add to core clause 27.4**

- Z6.1 The *Contractor* undertakes to take all reasonable precautions to maintain the health and safety of persons in and about the execution of the *service*. Without limitation the *Contractor*:
- accepts that the *Employer* may appoint him as the "Principal Contractor" (as defined and provided for under the Construction Regulations 2014 (promulgated under the Occupational

- Health & Safety Act 85 of 1993) ("the Construction Regulations") for the Affected Property;
- warrants that the total of the Prices as at the Contract Date includes a sufficient amount for proper compliance with the Construction Regulations, all applicable health & safety laws and regulations and the health and safety rules, guidelines and procedures provided for in this contract and generally for the proper maintenance of health & safety in and about the execution of the *service*; and
- undertakes, in and about the execution of the *service*, to comply with the Construction Regulations and with all applicable health & safety laws and regulations and rules, guidelines and procedures otherwise provided for under this contract and ensures that his Subcontractors, employees and others under the *Contractor's* direction and control, likewise observe and comply with the foregoing.

Z6.2 The *Contractor*, in and about the execution of the *service*, complies with all applicable environmental laws and regulations and rules, guidelines and procedures otherwise provided for under this contract and ensures that his Subcontractors, employees and others under the *Contractor's* direction and control, likewise observe and comply with the foregoing.

## **Z7 Provision of a Tax Invoice and interest. Add to core clause 51**

- Z7.1 Within one week of receiving a payment certificate from the *Service Manager* in terms of core clause 51.1, the *Contractor* provides the *Employer* with a tax invoice in accordance with the *Employer's* procedures stated in the Service Information, showing the amount due for payment equal to that stated in the payment certificate.
- Z7.2 If the *Contractor* does not provide a tax invoice in the form and by the time required by this contract, the time by when the *Employer* is to make a payment is extended by a period equal in time to the delayed submission of the correct tax invoice. Interest due by the *Employer* in terms of core clause 51.2 is then calculated from the delayed date by when payment is to be made.
- Z7.3 The *Contractor* (if registered in South Africa in terms of the companies Act) is required to comply with the requirements of the Value Added Tax Act, no 89 of 1991 (as amended) and to include the *Employer's* VAT number 4740101508 on each invoice he submits for payment.

## **Z8 Notifying compensation events**

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- Z8.1 Delete the last paragraph of core clause 61.3 and replace with:

If the *Contractor* does not notify a compensation event within eight weeks of becoming aware of the event, he is not entitled to a change in the Prices.

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## **Z9 Employer's limitation of liability**

- Z9.1 The *Employer's* liability to the *Contractor* for the *Contractor's* indirect or consequential loss is limited to R0.00 (zero Rand)
- Z9.2 The *Contractor's* entitlement under the indemnity in 82.1 is provided for in 60.1(12) and the *Employer's* liability under the indemnity is limited to compensation as provided for in core clause 63 and X19.11 if Option X19 Task Order applies to this contract.

## **Z10 Termination: Add to core clause 91.1, at the second main bullet point, fourth sub-bullet point, after the words "against it": PART C1: AGREEMENTS AND CONTRACT DATA**

- Z10.1 or had a business rescue order granted against it.

## **Z11 Ethics**

For the purposes of this Z-clause, the following definitions apply:

<b>Affected Party</b>	means, as the context requires, any party, irrespective of whether it is the <i>Contractor</i> or a third party, such party's employees, agents, or Subcontractors or Subcontractor's employees, or any one or more of all of these parties' relatives or friends,
<b>Coercive Action</b>	means to harm or threaten to harm, directly or indirectly, an Affected Party or the property of an Affected Party, or to otherwise influence or attempt to influence an Affected Party to act unlawfully or illegally,
<b>Collusive Action</b>	means where two or more parties co-operate to achieve an unlawful or illegal purpose, including to influence an Affected Party to act unlawfully or illegally,
<b>Committing Party</b>	means, as the context requires, the <i>Contractor</i> , or any member thereof in the case of a joint venture, or its employees, agents, or Subcontractors or the Subcontractor's employees,
<b>Corrupt Action</b>	means the offering, giving, taking, or soliciting, directly or indirectly, of a good or service to unlawfully or illegally influence the actions of an Affected Party,
<b>Fraudulent Action</b>	means any unlawfully or illegally intentional act or omission that misleads, or attempts to mislead, an Affected Party, in order to obtain a financial or other benefit or to avoid an obligation or incurring an obligation,
<b>Obstructive Action</b>	means a Committing Party unlawfully or illegally destroying, falsifying, altering or concealing information or making false statements to materially impede an investigation into allegations of Prohibited Action, and
<b>Prohibited Action</b>	means any one or more of a Coercive Action, Collusive Action Corrupt Action, Fraudulent Action or Obstructive Action.

Z11.1 A Committing Party may not take any Prohibited Action during the course of the procurement of this contract or in execution thereof.

Z11.2 The *Employer* may terminate the *Contractor's* obligation to Provide the Services if a Committing Party has taken such Prohibited Action and the *Contractor* did not take timely and appropriate action to prevent or remedy the situation, without limiting any other rights or remedies the *Employer* has. It is not required that the Committing Party had to have been found guilty, in court or in any other similar process, of such Prohibited Action before the *Employer* can terminate the *Contractor's* obligation to Provide the Services for this reason.

Z11.3 If the *Employer* terminates the *Contractor's* obligation to Provide the Services for this reason, the amounts due on termination are those intended in core clauses 92.1 and 92.

Z11.4 A Committing Party co-operates fully with any investigation pursuant to alleged Prohibited Action. Where the *Employer* does not have a contractual bond with the Committing Party, the *Contractor* ensures that the Committing Party co-operates fully with an investigation.

## **Z12 Insurance**

### **Z\_12\_.1 Replace core clause 83 with the following:**

#### **Insurance cover 83**

83.1 When requested by a Party, the other Party provides certificates from his insurer or broker stating that the insurances required by this contract are in force.

83.2 The *Contractor* provides the insurances stated in the Insurance Table A from the *starting date* until the earlier of Completion and the date of the termination certificate.

#### **INSURANCE TABLE A**

Insurance against	Minimum amount of cover or minimum limit of indemnity
Loss of or damage caused by the <i>Contractor</i> to the <i>Employer's</i> property	The replacement cost where not covered by the <i>Employer's</i> insurance.  The <i>Employer's</i> policy deductible as at Contract Date, where covered by the <i>Employer's</i> insurance.
Loss of or damage to Plant and Materials	The replacement cost where not covered by the <i>Employer's</i> insurance.  The <i>Employer's</i> policy deductible as at Contract Date, where covered by the <i>Employer's</i> insurance.
Loss of or damage to Equipment	The replacement cost where not covered by the <i>Employer's</i> insurance.  The <i>Employer's</i> policy deductible as at Contract Date, where covered by the <i>Employer's</i> insurance.
The <i>Contractor's</i> liability for loss of or damage to property (except the <i>Employer's</i> property, Plant and Materials and Equipment) and liability for bodily injury to or death of a person (not an employee of the <i>Contractor</i> ) arising from or in connection with the <i>Contractor's</i> Providing the Service	<b><u>Loss of or damage to property</u></b> The replacement cost  <b><u>Bodily injury to or death of a person</u></b> The amount required by the applicable law.
Liability for death of or bodily injury to employees of the <i>Contractor</i> arising out of and in the course of their employment in connection with this contract	The amount required by the applicable law

**Z 12.2 Replace core clause 86 with the following:**

**Insurance by the Employer** 86

86.1 The *Employer* provides the insurances stated in the Insurance Table B

**INSURANCE TABLE B**

Insurance against or name of policy	Minimum amount of cover or minimum limit of indemnity
Assets All Risk	Per the insurance policy document
Contract Works insurance	Per the insurance policy document
Environmental Liability	Per the insurance policy document
General and Public Liability	Per the insurance policy document
Transportation (Marine)	Per the insurance policy document
Motor Fleet and Mobile Plant	Per the insurance policy document
Terrorism	Per the insurance policy document
Cyber Liability	Per the insurance policy document
Nuclear Material Damage and Business Interruption	Per the insurance policy document
Nuclear Material Damage Terrorism	Per the insurance policy document

### **Z13 Nuclear Liability**

- Z13.1 The *Employer* is the operator of the Koeberg Nuclear Power Station (KNPS), a nuclear installation, as designated by the National Nuclear Regulator of the Republic of South Africa, and is the holder of a nuclear licence in respect of the KNPS.
- Z13.2 The *Employer* is solely responsible for and indemnifies the *Contractor* or any other person against any and all liabilities which the *Contractor* or any person may incur arising out of or resulting from nuclear damage, as defined in Act 47 of 1999, save to the extent that any liabilities are incurred due to the unlawful intent of the *Contractor* or any other person or the presence of the *Contractor* or that person or any property of the *Contractor* or such person at or in the KNPS or on the KNPS site, without the permission of the *Employer* or of a person acting on behalf of the *Employer*.
- Z13.3 Subject to clause Z13.4 below, the *Employer* waives all rights of recourse, arising from the aforesaid, save to the extent that any claims arise or liability is incurred due or attributable to the unlawful intent of the *Contractor* or any other person, or the presence of the *Contractor* or that person or any property of the *Contractor* or such person at or in the KNPS or on the KNPS site, without the permission of the *Employer* or of a person acting on behalf of the *Employer*.
- Z13.4 The *Employer* does not waive its rights provided for in section 30 (7) of Act 47 of 1999, or any replacement section dealing with the same subject matter.
- Z13.5 The protection afforded by the provisions hereof shall be in effect until the KNPS is decommissioned.

### **Z14 Asbestos**

For the purposes of this Z-clause, the following definitions apply:

- AAIA** means approved asbestos inspection authority.
- ACM** means asbestos containing materials.
- AL** means action level, i.e. a level of 50% of the OEL, i.e. 0.1 regulated asbestos fibres



per ml of air measured over a 4 hour period. The value at which proactive actions is required in order to control asbestos exposure to prevent exceeding the OEL.

<b>Ambient Air</b>	means breathable air in area of work with specific reference to breathing zone, which is defined to be a virtual area within a radius of approximately 30cm from the nose inlet.
<b>Compliance Monitoring</b>	means compliance sampling used to assess whether or not the personal exposure of workers to regulated asbestos fibres is in compliance with the Standard's requirements for safe processing, handling, storing, disposal and phase-out of asbestos and asbestos containing material, equipment and articles.
<b>OEL</b>	means occupational exposure limit.
<b>Parallel Measurements</b>	means measurements performed in parallel, yet separately, to existing measurements to verify validity of results.
<b>Safe Levels</b>	means airborne asbestos exposure levels conforming to the Standard's requirements for safe processing, handling, storing, disposal and phase-out of asbestos and asbestos containing material, equipment and articles.
<b>Standard</b>	means the <i>Employer's</i> Asbestos Standard 32-303: Requirements for Safe Processing, Handling, Storing, Disposal and Phase-out of Asbestos and Asbestos Containing Material, Equipment and Articles.
<b>SANAS</b>	means the South African National Accreditation System.
<b>TWA</b>	means the average exposure, within a given workplace, to airborne asbestos fibres, normalised to the baseline of a 4 hour continuous period, also applicable to short term exposures, i.e. 10-minute TWA.

- Z14.1 The *Employer* ensures that the Ambient Air in the area where the *Contractor* will Provide the Services conforms to the acceptable prescribed South African standard for asbestos, as per the regulations published in GNR 155 of 10 February 2002, under the Occupational Health and Safety Act, 1993 (Act 85 of 1993) ("Asbestos Regulations"). The OEL for asbestos is 0.2 regulated asbestos fibres per millilitre of air as a 4-hour TWA, averaged over any continuous period of four hours, and the short term exposure limit of 0.6 regulated asbestos fibres per millilitre of air as a 10-minute TWA, averaged over any 10 minutes, measured in accordance with HSG248 and monitored according to HSG173 and OESSM.
- Z14.2 Upon written request by the *Contractor*, the *Employer* certifies that these conditions prevail. All measurements and reporting are effected by an independent, competent, and certified occupational hygiene inspection body, i.e. a SANAS accredited and Department of Employment and Labour approved AAIA. The *Contractor* may perform Parallel Measurements and related control measures at the *Contractor's* expense. For the purposes of compliance the results generated from Parallel Measurements are evaluated only against South African statutory limits as detailed in clause Z14.1. Control measures conform to the requirements stipulated in the AAIA-approved asbestos work plan.
- Z14.3 The *Employer* manages asbestos and ACM according to the Standard.
- Z14.4 In the event that any asbestos is identified while Providing the Services, a risk assessment is conducted and if so required, with reference to possible exposure to an airborne concentration of above the AL for asbestos, immediate control measures are implemented and relevant air monitoring conducted in order to declare the area safe.
- Z14.5 The *Contractor's* personnel are entitled to stop working and leave the contaminated area forthwith until such time that the area of concern is declared safe by either Compliance Monitoring or an AAIA approved control measure intervention, for example, per the emergency asbestos work plan, if applicable.

- Z14.6 The *Contractor* continues to Provide the Services, without additional control measures presented, on presentation of Safe Levels. The contractually agreed dates to Provide the Services, including the Completion Date, are adjusted accordingly. The contractually agreed dates are extended by the notification periods required by regulations 3 and 21 of the Asbestos Regulations, 2001.
- Z14.7 Any removal and disposal of asbestos, asbestos containing materials and waste, is done by a registered asbestos contractor, instructed by the *Employer* at the *Employer's* expense, and conducted in line with South African legislation.

## C1.2 Contract Data

### Part two - Data provided by the *Contractor*

**[Instructions to the contract compiler: (delete this notes before issue to tenderers with an enquiry)**

Whenever a cell is shaded in the left hand column it denotes this data is optional and would be required in relation to the option selected. In the event that the option is not required select and delete the whole row.]

#### Notes to a tendering contractor:

1. Please read both the both the NEC3 Term Service Contract April 2013 and the relevant parts of its Guidance Notes (TSC3-GN)<sup>3</sup> in order to understand the implications of this Data which the tenderer is required to complete.
2. The number of the clause which requires the data is shown in the left hand column for each statement however other clauses may also use the same data.
3. Where a form field like this [ ] appears, data is required to be inserted relevant to the option selected. Click on the form field **once** and type in the data. Otherwise complete by hand and in ink.

Completion of the data in full, according to Options chosen, is essential to create a complete contract.

Clause	Statement	Data
10.1	The <i>Contractor</i> is (Name): Address Tel No. Fax No.	
11.2(8)	The <i>direct fee percentage</i> is The <i>subcontracted fee percentage</i> is	% %
11.2(14)	The following matters will be included in the Risk Register	
11.2(15)	The Service Information for the <i>Contractor's</i> plan is in:	
21.1	The plan identified in the Contract Data is contained in:	
24.1	The key people are: 1 Name: Job: Responsibilities: Qualifications: Experience: 2 Name: Job	

<sup>3</sup> Available from Engineering Contract Strategies Tel 011 803 3008 Fax 086 5391902 or [www.ecs.co.za](http://www.ecs.co.za)

Responsibilities:

Qualifications:

Experience:

CV's (and further key person's data including  
CVs) are in \_\_\_\_\_.

A	Priced contract with price list
11.2(12)	The <i>price list</i> is in
11.2(19)	The tendered total of the Prices is R
11.2(12)	The <i>price list</i> is in

PART 2: PRICING DATA

TSC3 Option A

Document reference	Title	No of pages
C2.1	Pricing assumptions: Option A	2
C2.2	The <i>price list</i>	[•]

## C2.1 Pricing assumptions: Option A

### How work is priced and assessed for payment

Clause 11 in NEC3 Term Service Contract (TSC3) core clauses and Option A states:

<b>Identified and defined terms</b>	11	
	11.2	(12) The Price List is the <i>price list</i> unless later changed in accordance with this contract.
		(17) The Price for Services Provided to Date is the total of <ul style="list-style-type: none"><li>the Price for each lump sum item in the Price List which the <i>Contractor</i> has completed and</li><li>where a quantity is stated for an item in the Price List, an amount calculated by multiplying the quantity which the <i>Contractor</i> has completed by the rate.</li></ul>
		(19) The Prices are the amounts stated in the Price column of the Price List. Where a quantity is stated for an item in the Price List, the Price is calculated by multiplying the quantity by the rate.

This confirms that Option A is a priced contract where the Prices are derived from a list of items of service which can be priced as lump sums or as expected quantities of service multiplied by a rate or a mix of both.

### Function of the Price List

Clause 54.1 in Option A states: "Information in the Price List is not Service Information". This confirms that instructions to do work or how it is to be done are not included in the Price List but in the Service Information. This is further confirmed by Clause 20.1 which states, "The *Contractor* Provides the Service in accordance with the Service Information". Hence the *Contractor* does **not** Provide the Service in accordance with the Price List. The Price List is only a pricing document.

### Link to the *Contractor's* plan

Clause 21.4 states "The *Contractor* provides information which shows how each item description on the Price List relates to the operations on each plan which he submits for acceptance". Hence when compiling the *price list*, the tendering contractor needs to develop his first clause 21.2 plan in such a way that operations shown on it can be priced in the *price list* and result in a satisfactory cash flow in terms of clause 11.2(17).

### Preparing the *price list*

Before preparing the *price list*, both the *Employer* and tendering contractors should read the TSC3 Guidance Notes pages 14 and 15. In an Option A contract, either Party may have entered items into the *price list* either as a process of offer and acceptance (tendering) or by negotiation depending on the nature of the *service* to be provided. Alternatively the *Employer*, in his Instructions to Tenderers or in a Tender Schedule, may have listed some items that he requires the *Contractor* to include in the *price list* to be prepared and priced by him.

It is assumed that in preparing or finalising the *price list* the *Contractor*:

- Has taken account of the guidance given in the TSC3 Guidance Notes relevant to Option A;
- Understands the function of the Price List and how work is priced and paid for;
- Is aware of the need to link operations shown in his plan to items shown in the Price List;
- Has listed and priced items in the *price list* which are inclusive of everything necessary and incidental to Providing the Service in accordance with the Service Information, as it was at the time of tender, as well as correct any Defects not caused by an *Employer's* risk;
- Has priced work he decides not to show as a separate item within the Prices or rates of other listed items in order to fulfil the obligation to complete the *service* for the tendered total of the Prices.
- Understands there is no adjustment to items priced as lump sums if the amount, or quantity, of work within that item later turns out to be different to that which the *Contractor* estimated at time of tender. The only basis for a change to the (lump sum) Prices is as a result of a compensation event.

### **Format of the *price list***

(From the example given in an Appendix within the TSC3 Guidance Notes)

Entries in the first four columns in the *price list* in section C2.2 are made either by the *Employer* or the tendering contractor.

If the *Contractor* is to be paid an amount for the item which is not adjusted if the quantity of work in the item changes, the tendering contractor enters the amount in the Price column only, the Unit, Expected Quantity and Rate columns being left blank.

If the *Contractor* is to be paid an amount for an item of work which is the rate for the work multiplied by the quantity completed, the tendering contractor enters the rate which is then multiplied by the Expected Quantity to produce the Price, which is also entered.

If the *Contractor* is to be paid a Price for an item proportional to the length of time for which a service is provided, a unit of time is stated in the Unit column and the expected length of time (as a quantity of the stated units of time) is stated in the Expected Quantity column

## C2.2 the *price list*

Item no.	Description	Unit	Estimated Qty.	Rate	Total price
1	Contract Supervisor	Hr	1		R
2	Tiling Artisan	Hr	5		R
3	Safety Officer	Hr	1		R
4	Supply and delivery of tiles	m <sup>2</sup>	5000		R
5	Supply and delivery adhesives	m <sup>2</sup>	5000		R
6	Tools and Equipment (Refer to the Tools and Equipment List below)	sum	1		R
7	Site-Establishment (20FT Container)	Ea	1		R
8	Site de-establishment	Ea	1		R

**NB: Actual quantities and working hours to be confirmed on Purchase order placement**

### Labour Rates

Item no.	Skill	Normal Rate	Overtime	Saturday/Public Holiday Rate	Sunday Rate
7	Tiling Artisan				
8	Contract Supervisor				

NUMBERS	DESCRIPTION	Unit	Quantity
	<b>PRELIMINARY AND GENERALS</b>		
1	Tools and Equipment (REFER TO LIST OF TOOLS AND EQUIPMENTS BELOW)	Sum	1

### TOOLS AND EQUIPMENT

Numbers	Description
1	Angle grinder X3 (three-off)
2	Light rubber mallet or hard rubber roller X3 (three-off)
3	Lead light extension cables 220 volts ( 30 meter each) X3 (three-off)
4	Tape measures X3 (three-off)
5	Water spirit levels X3 (three-off)



**FIXED TERM ITEMS**

NUMBERS	DESCRIPTION	Unit	Quantity	RATE
	<b>FIXED TERM ITEMS</b>			
1	Transport (Home-work-home)	Km	1	
2	Accommodation	Day	1	

**NB: Actual quantities to be confirmed on Purchase order placement**

**TIME RELATED ITEMS**

NUMBERS	DESCRIPTION	UNIT	QUANTITY	Total Price
	<b>TIME RELATED ITEMS</b>			
1	Hard Hat	Yearly	5	
2	Safety Goggles or Shield	Yearly	5	
3	Gloves	Yearly	5	
4	Safety Shoes	Yearly	5	
5	Overalls	Yearly	5	
6	Dust mask	Yearly	5	
7	Periodic medical screening	Yearly	5	

<b>Document reference</b>	<b>Title</b>	<b>No of pages</b>
	This cover page	1
C3.1	<i>Employer's Service Information</i>	
C3.2	<i>Contractor's Service Information</i>	
	Total number of pages	

## C3.1: EMPLOYER'S SERVICE INFORMATION

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Otherwise insert list of contents manually.

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## **INTRODUCTION**

This document details all the work that needs to be done with regards to the ceramic tiling on Coal, Ash Handling and Milling Plant System at Duvha Power Station. The scope of work is defined in this document.

## **SUPPORTING CLAUSES**

### **SCOPE**

#### **Purpose**

The purpose of the document is to give a clear scope of work concerning the ceramic tiling of Coal Chutes, Bonnets, and Flopper Gates, Mill internals, PF pipings and Burners on Duvha Coal and Ash and Handling Plant including Milling Plant.

#### **Applicability**

This document applies to the contractor who will be doing the actual work of tiling on the Duvha Coal and Ash Handling Plant including Milling Plant.

## **NORMATIVE/INFORMATIVE REFERENCES**

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

### **Normative**

ISO 9001-Quality Management System

### **Informative**

32-1033: Eskom Procurement and Supply Chain Management Policy

32-1034: Eskom Procurement and Supply Management Procedure during the tender process

## **DEFINITIONS**

None

### **Classification**

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

## **ABBREVIATIONS**

<b>Abbreviation</b>	<b>Description</b>
GO	General Overhaul
IN	Interm
SOW	Scope of Work
MGO	Mini General Overhaul
N/A	Not Applicable
PF	Pulverised Fuel
WPS	Welding procedure specification

## **ROLES AND RESPONSIBILITIES**

### **PROCESS FOR MONITORING**

N/A

### **RELATED/SUPPORTING DOCUMENTS**

N/A

## **SCOPE OF WORK**

### **EXECUTIVE OVERVIEW**

The contract covers the supply and installation of alumina ceramic tiles during opportunity maintenances (services, Interim and general overhaul) and as when required basis at Duvha Power Station.

### **EMPLOYER'S REQUIREMENTS FOR SERVICE AND DESCRIPTION OF THE WORK TO BE DONE BY THE CONTRACTOR**

#### **General**

The objective of this contract is for the Contractor to provide a service of installation, maintenance and repair of ceramic tiles on the Duvha Coal and Ash Handling plant and Milling plant as and when required by the Employer, at Duvha Power Station. The conveyors onsite are divided into Coal Stockyard, Staithes, and Bunkers conveyors. The milling plant system onsite are divided into Mill internal, PF outlet duct, PF pipes, Distribution boxes, Mixing heads and PF burners.

The Employer conveyors and milling plant systems are regarded as Level 1 (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 (excluding tiles) such as resources, tools to do ceramic tiling of Conveyor Chutes, Flopper Gates, and Milling plant system 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. Call-outs by Duvha Coal and Ash Handling Plant including Milling 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.

All labour, materials, equipment, tools, transport and consumables for performing the services are to be supplied by the Contractor. This excludes tiles, adhesive and cleaning equipment. The Contractor shall supply technical details of applying methods that will be used, and Quote price per square meter including material equipment etc. The Contractor shall be requested to provide the breakdown from the Quote price per square meter. The price Quote per square meter shall include transportation, equipment and resources etc.

A Quality Control Plan (QCP) for the installation of ceramic tiles is to be submitted to all the system engineers involved (the Coal Handling Plant System, Burners and PF Piping System Engineer and Milling Plant System engineer including Eskom Quality personnel (Technical Support Service) ) 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 task of repair and installation of new tiles.

The Contractor's Engineer or competent person will conduct on-site investigative fault finding surveys in conjunction with the site maintenance personnel on all chutes, Bonnets, Flopper gates

and Mills internal , PF outlet duct, PF piping, Distribution boxes, Mixing heads & Burners 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.

The Contractor shall report to site at the planned by client (Duvha maintenance representatives) 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.

## **COAL PLANT SYSTEM**

### **4.1 Work to be Performed by the Contractor (Coal Plant)**

- Ensure PTW
- Risk assessment
- Complete workers register
- Empty the Chutes
- Thoroughly inspect the Chute /Flopper Gate for signs of wear, holes and missing tiles
- Remove patches portion of conveyor chute if applicable
- Weld in new plate and grind flush ensuring an acceptable surface finish if applicable
- Thoroughly clean the Chute /Flopper Gate/Tripper car before tiling. This includes the removal of old damaged tiles and old hardened epoxy
- Ensure that the chute is dry and free of moisture
- Cut the tiles to the right sizes as and when required
- Install tiling as required (Epoxy or weld on )
- Allow for curing time  $\pm 8$  hours as specified by supplier
- Insert work done and sign the QCP (Eskom QC)
- Clear the PTW and return to service The Contractor shall ensure that they conform to the ceramic lined pulverized fuel pipe work standard **240-56239143** If any discrepancies are found the contractor shall communicate with the system engineer prior to planning for the tiling activity.

### **4.2 Ceramic Liners Specification for Coal and Ash Handling Plant**

Alumina ceramic tiles (Ceramic tiles specifications: 92 or 95 series)

Category	92 series	95 series
AL <sub>2</sub> O <sub>3</sub>	≥ 92%	≥ 95%
Fe <sub>2</sub> O <sub>3</sub>	≤ 0.25	≤ 0.15



Density	> 3.60g/cm <sup>3</sup>	> 3.65g/cm <sup>3</sup>
HV Hardness	980MPa	1040MPa
Bending strength	260MPa	280MPa
Compression strength	1150MPa	1200MPa
Fracture Toughness	3.68MPa	3.72MPa
Abrasion	≤ 0.47cm <sup>3</sup>	≤ 0.42cm <sup>3</sup>

### 4.3 Coal Plant Tiling Specification

Conveyor	Quantity and Chute Type	Ceramic Tile Specification	Ceramic Tile Thickness	Estimated m <sup>2</sup> / section
9A to 9F	Tripper Car Chutes (24 off)	Ivory 350 epoxy mortar fairing & coving compound	25 mm	24 m <sup>2</sup>
9A – 9F feed 10A - 10F	Incline Chutes with Bonnets (6)	Ivory 350 epoxy mortar fairing & coving compound	25mm, 2mm and Bonnet: 25mm	36 m <sup>2</sup>
10A & 10B 10C & 10D 10E & 10F	Flopper gate Chutes with Bonnets (3).	Ivory 350 epoxy mortar fairing & coving compound	25mm and Bonnet: 25mm	27 m <sup>2</sup>
11 Short	Feed Chute with Bonnet (6)	Ivory 350 epoxy mortar fairing & coving compound	25mm	24 m <sup>2</sup>
11 Long	Feed Chute with Bonnets & Discharge Chute (6)	Ivory 350 epoxy mortar fairing & coving compound	25mm	30 m <sup>2</sup>
Tripper Car	Chutes (12)	Ivory 350 epoxy mortar fairing & coving compound	25mm	84 m <sup>2</sup>
2A & B	Chutes with bonnet (2)	Ivory 350 epoxy mortar fairing & coving compound	25mm	30 m <sup>2</sup>
3A & B	Chutes with bonnet (2)	Ivory 350 epoxy mortar fairing & coving compound	25mm	30 m <sup>2</sup>
4A & B	Chutes with	Ivory 350 epoxy mortar fairing &	25mm	20 m <sup>2</sup>

	bonnet (2)	coving compound		
5A & B	Chutes with bonnet (4)	Ivory 350 epoxy mortar fairing & coving compound	25mm	90 m <sup>2</sup>
6A & B Tripper car	Chutes with bonnet (2)	Ivory 350 epoxy mortar fairing & coving compound	25mm	22 m <sup>2</sup>
7A & B	Chutes with bonnet (2)	Ivory 350 epoxy mortar fairing & coving compound	25mm	12 m <sup>2</sup>
8A & B Tripper car	Chutes with bonnet (2)	Ivory 350 epoxy mortar fairing & coving compound	25mm	22 m <sup>2</sup>
Reclaim	Chutes with bonnet (2)	Ivory 350 epoxy mortar fairing & coving compound	25mm	9 m <sup>2</sup>
Cross	Chutes with bonnet (2)	Ivory 350 epoxy mortar fairing & coving compound	25mm	24 m <sup>2</sup>
Link	Chutes with bonnet (2)	Ivory 350 epoxy mortar fairing & coving compound	25mm	30 m <sup>2</sup>

**Total estimated square meters for coal plant = 514m<sup>2</sup>**  
**Estimate to be replaced yearly = 300m<sup>2</sup>**

## **MILLING PLANT SYSTEM**

### **5.1 Description of work**

The service will be required as an when required basis. All the required service in the plant will be pre-scheduled and the work will have to be completed within the required mill outage duration  
The Milling Plant at Duvha Power Station is structured as follows:

- Number of Boilers            Six
- Number of Mills per Boiler   Six
- Number of PF Pipes per mill Six

The following strategy will be followed on the mill, classifier, PF pipes tiling and PF Burners:

- All mills, classifier,PF pipes , Distribution-box, Mixing Head and PF Burners will be assessed to determine condition of the existing tiles as well as to identify the areas where tiles are missing
- In the areas on the specific mills, classifier, PF Pipes, Distribution box, Mixing head and PF Burners that will require re-tiling sectional replacement of the tiles, will be done to ensure the integrity of the final surface
- A scope of work or an Engineering Instruction will be compiled for each specific mill which clearly states the areas that will be retiled
- A quality control plan will be drawn up by the Contractor to be supplied to the client for approval before work will be allowed to start.
- Once all the tile surface in the mill, classifier, PF Pipes, Distribution box, Mixing head and PF Burners has been restored, tiles replacement will only be done when:
  - Tiles are found missing or broken
  - Minimum thickness of the tiles is reached as a result of wear

The contractor shall be responsible for the following:

- Supply of all wear resistant material, adhesive, tiles and consumable required for installation as per required specification.
- The accurate measuring of the total amount of tiles required per specific area that requires tiling.
- The removal of all old tiles as per SOW or Engineer instruction to: specific mill classifier and PF pipe and Burner System.
- The surface prepared before the installer
- The work shall be conducted by a competent team under the supervision of an experienced supervisor.
- The Contractor must supply all the necessary equipment and tools required to complete the tiling
- The Contractor shall ensure that they complied with all the Eskom safety and permit to work procedures

- The Contractor shall ensure that they conform to the ceramic lined pulverized fuel pipe work standard **240-56239143** If any discrepancies are found the contractor shall communicate with the system engineer prior to planning for the tiling activity

## 5.2 Specification of ceramic tiles

The ceramic tile used in the mill and classifier internal must meet the following minimum specification

Properties	Quantity	Unit
Alumina content	92	%
Density	3600	Kg/m <sup>3</sup>
Porosity	0	%
Modulus of rupture	270	MPa
Modulus of elasticity	260	GPa
Fracture Toughness	3	MNm <sup>-3/2</sup>
Hardness (Vickers)	1023	Kg/mm <sup>2</sup>
Abrasion	0.3	cm <sup>3</sup> /h
Thermal expansion	666	10 <sup>-5</sup> K <sup>-1</sup> (400°C)
Thermal conductivity	15	W/mK

## 5.3 Approximation of tiled surface area and tile type for mill internals and classifier, PF pipes system

The following approximates the tiled areas in the mill and classifier internal, PF Pipe System description of the tiles used in the specific areas.

Note, this is only an approximation of the total area that requires tiling and, in most cases will be done on a lesser area depending on the inspection of the tiles as tiles are to be replaced if their thickness is out of specification or tiles are damaged.

Description of Component	Ceramic Tiles Thickness	Ceramic Tile Specification	Square Metres per Mill (m <sup>2</sup> )
Mill Internal	Weld-on: 20mm thick alumina ceramic tiles	Ivory 350 epoxy mortar fairing & coving compound	30
Outlet Ducting	Flat Surface: 20mm thick alumina ceramic tiles	Ivory 350 epoxy mortar fairing & coving compound	15
Pf Pipe-Straight	Flat Surface: 6 mm thick	Ivory 350 epoxy mortar fairing & coving compound	12
Pf Pipe-Bends (3-off)	Cone shape: 12mm thick plain tiles	Ivory 350 epoxy mortar fairing &	12

		coving compound	
Distribution Box	Flat Surface: 6mm thick plain tiles	Ivory 350 epoxy mortar fairing & coving compound	6
Mixing Heads	Flat Surface: 6mm thick plain tiles	Ivory 350 epoxy mortar fairing & coving compound	12
PF Burner	Flat Surface: 6mm thick alumina ceramic tiles	Ivory 350 epoxy mortar fairing & coving compound	20

## **6. DESIGN**

### **6.1 Design pressure**

All ceramic lined pulverised fuel pipework shall be capable of withstanding an internal pressure of 0.35 MPa, with no detrimental effect on either the lining material or the attachment of such.

### **6.2 Compatibility with existing pipework**

When replacing cast iron pipework with ceramic lined pipework, all ceramic lined assemblies shall be fully compatible with the existing configuration of pulverised fuel pipework. The inside diameter of the existing pipework shall be maintained in the ceramic lined assembly.

Full details of proposed flanges, to ensure compatibility with existing flanges, shall be fully explained in the supplier's quote

Final responsibility for ensuring compatibility with existing pipework shall remain with the ceramic lined assembly supplier. The supplier at no additional cost to Employer/Eskom shall carry out any additional modifications required, once the ceramic lined assembly has been delivered to site.

### **6.3 Lobster back pulverised fuel bends**

Fabricated lobster back bends shall be fabricated from segments having an includes angle not greater than 18°.

## **MATERIAL**

### **7.1 Casing**

The casing of all assemblies shall be manufactured from steel to BS 4360 Grade 43A, or equivalent approved material, and shall be designed with adequate structural strength to ensure compatibility with the existing support system.

The following shall be the minimum requirements for casing thickness:

**Table 1: Casing Thickness**

Internal Diameter	Casing thickness	Flange thickness
Up to 360mm	3mm	20 mm
361 mm to 450 mm	5 mm	25 mm
451 mm to 800 mm	6 mm	25 mm
Greater than 800 mm	8 mm	30 mm

## **7.2 Lining-pulverised fuel pipe bends**

Ceramic lining shall conform to either of the following alternatives

Sintered type, containing not less than 89% alumina.

Composite type, consisting of a lining conforming to clause 8.2 (a) covering not less than 150° on diameter on the extrados of the bend, plus an abrasion resistant lining covering not more than 210° on diameter on the intrados of the bend.

## **7.3 Lining- other assemblies**

Ceramic linings shall be alumina based and shall be of the sintered type, containing not less than 89% alumina

# **CONSTRUCTION**

## **8.1 Welding**

All welding shall be carried out in accordance with BS 2971. Where welding is carried out in accordance with other National or International standard, such standard shall be subjected to Employer/Eskom approval, and the latest edition of such approved standards shall be used.

## **8.2 Flanges**

Flanges shall be in accordance with BS 4504 Table 6/2 or 6/3 for all new systems. Flanges for existing systems shall be compatible with the existing pipework and flanges.

## **8.3 Lining method**

Pulverised fuel pipe bends and Coal chutes

- Linings for pulverised fuel pipe, shall be in the form of ceramic key pieces built up to form a ring such that a complete ring is self-supporting when fitted inside the steel casing
- The ceramic tiles shall be chamfered where necessary so that each tile is in intimate contact with adjacent tiles.
- Gaps between tiles, caused by tolerances on the casing or tiles shall be a maximum of 1 mm provided that that such tiles are in intimate contact at at least one point.

- Joints in the direction of pulverised fuel or coal flow shall be staggered.
- Tile edges, including weld-on tile plugs, shall not protrude into the pulverised fuel or coal flow, and shall be a maximum of 1 mm below adjacent tiles downstream of the pulverised fuel or coal flow.

**NOTE: The use of weld-on ceramic tiles shall not be permitted in pulverised fuel bends of round section and coal chutes.**

Other assemblies

The lining procedure outlined in clause 9.3 (a) shall be followed where feasible.

**c. Fixing method**

- All adhesive and grouts employed in the construction of any ceramic lined assembly shall be non-flammable and capable of withstanding sustained operating temperature of 120°C. In addition, the fixing method employed in all ceramic lined assemblies shall ensure that the lining remains secure even in the event of a mill fire, or similar occurrence resulting in temperature excursions above 120°C.
- Internal preparation of pipework to ensure adequate adhesive/grout adhesion shall fulfil the specified requirements of the adhesive/grout supplier.

Size tolerance-pulverised fuel pipe bends and coal chutes

**Table 2: Size Tolerance**

<b>Nominal bore</b>	<b>Tolerance</b>
Up to 400 mm	±3 mm
401 mm to 600 mm	±4 mm
Greater than 600 mm	±5 mm

- The ceramic lining shall be flush with the flange face or within 3 mm of the face and lining shall not protrude above the flange face.

## **PAINTING**

Exposed pipework and chutes on all assemblies shall be painted as follows:

### **9.1 Surface preparation**

Prior to painting, pipework shall be mechanically wire-brushed to ST3 of SIS 055900.

### **9.2 Coating system**

Pipework and Chutes shall be painted with one coat of zinc chromate applied by brush or airless spray. Dry film thickness shall be 35 micrometers minimum.

### **9.3 Identification**

For identification purpose high gloss enamel paint to SABS 630 Grade 1 shall be used (refer clause 10.2). Dry film thickness shall be 30 micrometers minimum.

## **MARKING OF ASSEMBLIES**

### **10.1 Identification for erection purpose**

Ceramic lined assemblies shall be marked in the supplier's works. The following information shall be clearly marked on each assembly:

- a. Manufacturers name
- b. Power Station concerned
- c. Assembly reference number
- d. Direction of pulverised fuel and coal flow

The assembly reference numbers shall, whenever possible, correspond with reference numbers shown on original Eskom drawings.

### **10.2 Permanent identification**

An assembly reference number shall be permanently marked on each assembly. Details of the proposed method of permanent identification shall be submitted to Eskom for approval.

## **AUTHORISATION**

This document has been seen and accepted by:

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## **REVISIONS**

<b>Date</b>	<b>Rev.</b>	<b>Compiler</b>	<b>Remarks</b>
January 2022	0	Sanny Masombuka	Document created

## **DEVELOPMENT TEAM**

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

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