

Approve by

\_\_\_\_\_  
*(signature)*

« \_\_\_\_\_ » \_\_\_\_\_ 2024 г.

**CALL FOR TENDER**

**for**

**the Project “Plug & Grind” Station**

**with Cement Grinding Capacity 50 t/h**

**Elaborated by: Jaroslav STOUPA**  
**11.2024**

Dear all,

Herewith we call for tender participation for supply of 2 (two) "Plug & Grind" Cement Grinding Facilities with the capacity of 50 t/h under below conditions.

The Quotation minimum content

- Scope description
- Equipment specification
- Flow sheet
- Tentative arrangement and layout drawing
- Cost break down
- Delivery schedule
- List of references

The Applicant shall prepare the quotation on his own cost and send technical and commercial part to:

Mr. Denis Noskov

[d.noskov@akkermann.ru](mailto:d.noskov@akkermann.ru)

+79223433400

Tendering schedule:

10.12.2024 – asking questions and collecting data for technical clarification;

15.12.2024 – technical clarification completed (requested data delivered, questions answered);

31.12.2024 – Tender Closing Date (Quotation to be presented);

20.-30.01.2025 – negotiations with the Applicants, Quotations revised when needed;

15.02.2025 – final call with the shortlisted Applicant(s).

The Quotation validity to be till 31.03.2025.

For further information, please don't hesitate to contact us.

With kind regards,

AKKERMANN



**Jaroslav Stoupa, MSc., MBA**

Director Investments

Tel.: +7 925 804 0068

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**COMMERCIAL CONDITIONS****1 Summary of prices and payment****1.1 Price for engineering and supply**

The Applicants are required to present the price summary as per enclosed below cost break down table, the price to be indicated in USD, without VAT, DAP basis:

<b>No.</b>	<b>Description</b>	<b>Price</b> (USD, without VAT)	<b>Notes</b>
1	Design & Supply of the Equipment		Including mechanical, electrical, utility, steel structures as per Technical Conditions from feeding hoppers to packing unit.
2	Spare Parts for 2 Years Operation		
3	Delivery DAP Aktobe, Kazakhstan		
4	Supervision & Commissioning Training		Daily rates to be presented. The manpower requirements to be indicated [man-days].
	<b>Total</b>		

The above prices to be valid until 31.03. 2025.

**Not included**

- Construction and equipment installation;
- Laboratory equipment.

**1.2 Payment terms**

Applicants proposes the following payment terms:

## % of the Contract Price as advance payment shall be paid by the Client within ## days after Contract signature against a Performance Bond with the same amount issued by a first-class bank in favor of the Client.

## % of the Contract Price shall be paid by the Client upon delivery of the civil engineering drawings;

## % of the Contract Price shall be paid upon equipment DAP delivery by bank transfer, partial shipment is allowed.

## % of the Contract Price shall be paid after Performance Test is successfully completed.

### 1.3 Taxes and charges

The Contract price is net, excluding any taxes (VAT, withholding tax, professional tax, etc.) customs duties and charges, occurring outside of Kazakhstan are attributable to the Applicants, those occurring in connection with Client's execution of import, construction, installation and other services under the Contract are to be borne by the Client.

## 2 Terms of delivery

### 2.1 Delivery terms

Unless explicitly agreed otherwise, deliveries are based on DAP Aktobe, Kazakhstan in accordance with INCOTERMS 2010.

### 2.2 Delivery schedule

For the subject scope:

CS		Signing of the Contract
C0	CS+04W	Advance payment
C1	CS+05W	Delivery of geotechnical study by the Client
C2	C1+08W	Delivery of civil engineering by Applicant
C3	C0+34W	DAP Delivery

The above schedule is indicative and to be confirmed/adjusted by the Applicant, and subject to discussion during contract negotiation phase.

The delivery schedule is subject to variations in case:

- a) The Client is unable to hand over the technical documents or any other works on time, which are necessary to enable the execution of delivery, if any.
- b) Variations in the scope of supplies and services required by the Client.
- c) The Client fails to comply with its contractual obligations, such as, but not limited to, the obligations of payment.

## 3 Scope of Supplies and Services

Applicants scope of supplies and services includes the design and delivery of one complete set of Plug & Grind station as per the Technical Conditions below.

## 4 Inspections

The Client will be able to carry out, by its own staff or entrusting any third-party, at its own cost, the inspection of the works at any time during the execution of delivery, including, but not limited to, the manufacture of equipment or its components.

## 5 Performance guarantee and provisional acceptance

The performance guarantees of production, the environmental guarantee as well as the guarantee of power consumption are specified in Technical Conditions below. These guarantees of the performance of Plug & Grind station shall be subject to permanent supervision by Applicant's erection and commissioning supervisor or its sub-contractors.

The performance test of the Plug & Grind station shall be carried out under normal working conditions within 2 (two) months after Commissioning while observing Applicant's performance test procedures as detailed in Technical Conditions below. The Client's personnel shall be present for the entire period for the completion of the performance test.

The provisional acceptance shall be effected by means of the performance test. The performance test shall take place under normal working conditions for a duration as specified in Clause of Technical Conditions below. The Client shall, at its own cost, make available the operating personnel, its employees, working materials and equipment, electricity, heating materials, water and other auxiliary materials in sufficient quantity and quality for the performance test. The results of the performance test Run shall be recorded and signed by both representatives from the Client and Applicant.

Upon completion of the performance test, the provisional acceptance is regarded as achieved. This does not apply in case the Plug & Grind station, despite professional operation and conformity with all operating conditions, falls short of the performance guarantees as specified in the Technical Conditions below, whilst taking into consideration the measurement tolerances.

In case the results of the performance test fail to meet the guarantees of operation, Applicant shall advise adjustments to be made and/or take other remedial actions and the performance test shall be repeated thereafter without unreasonable delay. In the event that the second and a third performance test of the unit fail to meet one or more of said performance guarantees, the Client shall examine the reasons and confer to Applicant to determine possible corrective measures and clarify the responsibilities, which shall be settled in the following way:

- a) In case of Applicant's fault, Applicant shall pay liquidated damages as set forth in Clause 7.2.
- b) In case of the Client's fault, Applicant shall inform the Client of the corrective measures that it considers most practical and the Client shall perform the required measures at the Client's own cost to meet the performance guarantees.

Thereafter the performance test shall be repeated at the earliest possible date.

Provisional acceptance of the Plug & Grind station shall occur on the dates of one of the following events whichever comes first:

- (i) The performance guarantees have successfully been demonstrated in the first or a repeated performance test, or Applicant has paid liquidated damages as set forth in Clause 7.2 ; or
- (ii) In the event that within 3 months from Commissioning, or 12 months from the last DAP delivery of the Plug & Grind station, or 24 months from Commencement Date at the latest, no performance test has been performed for reasons not attributable to Applicant; or
- ii) The Client goes into commercial production while using the unit; or
- (iv) The Plug & Grind station has been erected or commissioned without permanent supervision of Applicant's supervisor.

The provisional acceptance shall be achieved by a Provisional Acceptance Certificate to be signed by both the Client's and Applicant's representative within seven (7) days after its occurrence.

#### **6 Warranty and warranty period**

The warranty period of the Plug & Grind station shall be of 24 (twenty-four) months from the date of DAP delivery or 18 (eighteen) months from issuance of PAC, whatever comes first. The

warranty period for the repaired or replaced parts of the unit is 12 months from the date of repair or replacement.

In the event that there is a justified notice of defects in material or workmanship of any parts of the unit, Applicant shall, at his own option, be entitled to supply defect-free replacement parts in accordance with the terms of delivery as per Clause 2.1 or shall be obliged to remedy the defects. Costs for replacement or repair shall be borne by Applicant.

Applicant' warranty shall not apply to natural wear and tear, as well as the damages of any kind which has occurred after the provisional acceptance due to reasons not attributable to Applicant, particularly for the following reasons: unsuitable or unprofessional use of the unit, faulty construction, erection works or maintenance by the Client or any third party, improper or negligent handling or storage, unsuitable operating materials and replacement parts, chemical or electrical influences which are not foreseen in the Contract.

At the end of the Warranty Period, a Final Acceptance Certificate shall be issued by the Client and Applicant shall be deemed to have completed all of its obligations.

## **7 Liquidated damages**

### **7.1 Liquidated damages for delay of delivery**

If the Plug & Grind station is not delivered in accordance with the contractual delivery schedule for reasons solely attributable to Applicant. The Client, shall, after a grace period of 7 days, be entitled to claim for liquidated damages for delay of delivery. The liquidated damages shall be calculated at the rate of 2 % (two percent) of the value of the delayed equipment for each full week of delay.

The maximum amount of liquidated damages for delayed delivery of the equipment payable by Applicant to the Client is limited to 10% of the contract price.

### **7.2 Liquidated damages for non-compliance with performance guarantees**

If the performance guarantees mentioned in the Technical Conditions below fall short of the relevant specified values for reasons attributable to Applicant and taking into consideration the specified measurement tolerances, Applicant is obliged to take remedial actions at its own cost in order to achieve the performance guarantees as specified in the Technical Conditions below.

In the event that the second and a third performance test of the unit fail to meet one or more of said performance guarantees, the Client shall be entitled to claim for a liquidated damages for less performance of production or for extra consumption of energy. The liquidated damages shall be calculated at the rate of 1 % (one percent) of the Contract Price for each full 1 t/h short fall in production output compared to the applicable output guarantee value; and 2% (two percents) for each full 1 kWh/t cement in excess of the applicable electrical energy consumption guarantee value.

The maximum amount of liquidated damages for reduced performance of the unit payable by Applicant to the Client is limited to 10% of the contract price.

### **7.3 Maximum overall liquidated damages for delay and reduced performance**

The aggregate of all liquidated damages for delay and reduced performance payable by Applicant under Clause 7.1 and Clause 7.2 shall not exceed 15% of the Contract Price.



## **8 Limitation of liabilities**

Except as expressly provided in the Contract or in case of fraud willful misconduct or illegal acts, Applicant shall in no event be liable for consequential and indirect damages, loss of profit, loss of production, loss of revenue, loss of orders, loss of interests or damages whatsoever that may be suffered by the Client.

The total cumulative liability of Applicant and its agents, employees, Applicant's and subcontractors to the Client with respect to any and all claims which may arise under the Contract in tort or otherwise, including but not limited to claims for liquidated damages, any material and immaterial claims from a third party, patent infringement, warranty and guarantee claims shall in no event exceed the price of the Contract.

## **9 Secrecy**

Each party shall treat the details of this offer and any information made available in relation thereto as private and confidential and neither of them shall publish or disclose the same or any particulars thereof, without the previous consent of the other party, save in so far as may be necessary for the purposes of the Contract signature.

## **10 Intellectual property rights**

Any and all intellectual property rights belong to Applicant. Applicant grants to the Client to use the technical information and documentation associated with the Plug & Grind station solely for the purpose of assembling, operating, maintaining and repairing of the unit. Any communication by the Client to a third party of the commercial information contained in this offer or related to the supply of the shall be strictly prohibited. Any communication by the Client to a third party of the information related to the Plug & Grind station without the written consent of Applicant shall be strictly prohibited.

The Client may not disclose the Engineering to any third party who is not actively involved. Applicant shall not be obliged to provide the manufacturing drawings of the unit or of the parts.

## **11 Exclusions**

The items listed below are specifically excluded from the scope of supply of Applicant.

1. Site data, permits, designs
  - a. Topographic survey and geotechnical studies.
  - b. Any type of study/authorization/environmental permits.
  - c. Any type of legalization of project, construction/installation permits, licenses of start-up and operation.
  - d. Any type of infrastructure design of urbanization: highways, roads, run off, drains, sewers, fences, gates, outdoor lighting and street lighting (can be an option).
  - e. Any type of local design approvals, including but not limited to review of civil calculations.
2. Civil works
  - a. Site clearing, levelling and piling works;
  - b. Access to the facilities.
  - c. Works of urbanization: highways, roads, runoff, drains, sewers, fences, gates, outdoor lighting, etc.
  - d. Embedded parts, anchor bolts and frameworks.
  - e. Foundations of civil works and any type of civil works. (The above items can be optional services).

### 3. Installation works

- a. Any type of assembly works at site;
- b. Coordination of security at the facilities.
- c. Scaffolding, cranes, hydraulic lines and any other erection equipment;
- d. Welding machines, welding rods and general tools and materials for erection;
- e. Any external and internal fences
- f. Security guards;
- g. Any insulation works except the hopper of the process filter; (The above items can be optional services).

### 4. Electricity

- a. Supply and wiring of the incoming power cable from secondary terminal of main transformer till the substation of Applicant.
- b. Diesel generator on stand-by.
- c. Main power transformer and their resistance to ground.
- d. The electrical distribution system AT/MT.
- e. Fire Network.
- f. Network of lands outside of the containers and modules of Applicant. It is the client's responsibility to provide a network of primary land whose resistance is less than 1 Ohm. g. Grounding and lightning protection.
- h. General erection tools. (The above items can be optional services).

### 5. Auxiliary

- a. Any analysis of the samples of cement and equipment for analytical test if any.
- b. Pre-shipment inspections by a third party if necessary.
- c. Customs clearance at the destination.
- d. Coordination of security at the facilities.
- e. Any external and internal fences.
- f. Security guards.
- g. Any type of site facilities including but not limited to the Client's offices (can be an optional service).;
- h. Supply of the first lubricant filling of the equipment.
- i. Any insurance subscriptions including but not limited to Construction and Erection All Risk Insurance (CEAR), Third-Party Liabilities, Professional Liabilities, Marine transportation policy, etc.

This above list of exclusions is indicative and may be subject to modification depending on the requirements of the Client.

## TECHINICAL CONDITIONS

### 1. General Description of Plug & Grind Station

The Plug & Grind station is developed for small/medium but growing markets, especially for markets that only limited cement production capacity, but also a highly flexible system capable of producing a whole range of cements. The Plug & Grind station is suited to producing any desired type of cement for local cement producers and market entrants as well as for large construction companies planning to expand their position by manufacture cement.

#### **\*to be filled by the Applicant!**

Rated Capacity	50tph (450 m <sup>2</sup> /kg)					
Land Area	100x150 m					
Climatic Conditions	Temperature-10 ~ 40°C; humidity highest 85%, average 60%; wind velocity average max. 6m/s, instant. max. 30m/s; basic seismic acceleration 0.15g, sea level ≤1100m.					
Cement Type	CEM I		CEM II /B-L		GGBFS	
Finess (cm <sup>2</sup> /g)	3500	4500	4000	5000	4000	5000
Mill Power Consumption (kwh/t)	*	*	*	*	*	*
Output (t/h)	*	*	*	*	*	*
System Power Consumption (kwh/t)	*	*	*	*	*	*
Max. Feeding Size (mm)	60					
Max. Annual output (tpa)	262,500	195,000	330,000	255,000	195,000	172,500
Mill Main Motor (kW)	*					
System Total Installation (kW)	*					
Water Consumption (m <sup>3</sup> /h)	*					
HGG (GJ/h)	*with diesel/natural gas					
CEM I: 95 % Clinker + 5 % Gypsum EN197-1; CEM II/B-L: 65 ~ 79 % (Clinker + Gypsum) + 21 ~ 35 % Limestone EN197-1						

### 2. Process Description

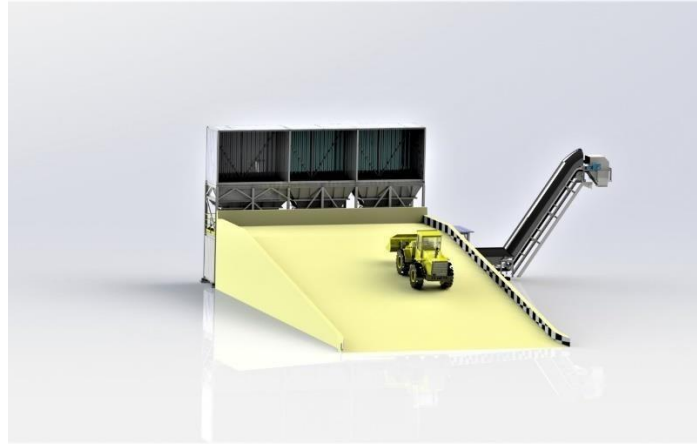
#### 2.1 Module 1: Dosing System

##### 2.1.1 General Description

Clinker/additives/gypsum are feeding by fork-lift truck to respective feeding bins. The feeding bins are installed in standardized containers.

Description	Capacity
Clinker bin	20m <sup>3</sup>
Additive bin	17m <sup>3</sup>
Gypsum bin	17m <sup>3</sup>

Under the feeding bins, needle gates are installed at the bin discharge end, together with the dosing devices, which will ensure a properly proportioned material feeding into the mill. After the dosing devices, the mixture of raw materials is collected from the dosers by means of a conveyor belt and is transported to the mill.



## 2.1.2 Specification of Process Equipment

**\*to be filled by the Applicant!**

Item	Description	Equipment No.	Specification
1	Rod gate		Type: 1200×500mm
2	Clinker belt weigh feeder		Size: *mm Capacity: 5~50t/h
3	Rod gate		Type: 1000×500mm
4	Pozzolan belt weigh feeder		Size: *mm Capacity: 1.5~15t/h
5	Rod gate		Type: 1000×500mm
7	Magnet separator		*
8	Metal detector		*
9	Gypsum belt weigh feeder		Size: *mm Capacity: 0.5~5t/h
10	Belt Conveyor		Size: *mm Capacity: 85t/h
11	Dust Collector		Gas flow: *m <sup>3</sup> /h Total filter area: *m <sup>2</sup> Pressure loss: to be 1500~1700Pa Air pressure: 0.5~0.7 MPa

## 2.2 Module 2: Feeding tower

### 2.2.1 General Description

The feeding tower consists of a conveying belt, a bucket elevator and a return belt. The mixed material enters the elevator through the conveying belt, and then lifted to a certain height by the elevator and enters the mill through the chute. The large particle material is discharged from the mill and enters the return belt to form a complete circulating feeding system.



### 2.2.2 Specification Of Process Equipment

**\*to be filled by the Applicant!**

Item	Description	Equipment No.	Specification
1	Bucket Elevator		Type: * Capacity: 65t/h Lift Height: 16560mm
2	Magnetic Separator		Type: 400*700mm
3	Vibrating Feeder		Type: B500*5000mm Capacity: 20t/h
4	Belt Conveyor		Type: * Capacity: 20t/h Speed: 1.25m/s
5	Belt Conveyor		Type: * Capacity: 20t/h Speed: 1.25m/s
6	Rotary Feeder		Type: *

### 2.3 Module 3: Mill & Separator and Filter

#### 2.3.1 General Description

The vertical roller mill is an air-swept vertical roller mill consisting of several components. The main components, i.e. mill and classifier, are firmly connected with each other, forming a compact unit. The main feature of the roller mill is that there are four stationary grinding rollers that roll on a slowly rotating grinding plate. The grinding rollers are pressed onto the grinding bed by a common hydropneumatic system, thus ensuring a uniform load distribution on the grinding bed and hence also on the segmented thrust bearings of the gearbox. For maintenance work, this roller can be swung out of the mill. In this case, the opposite grinding roller must be lifted for not being a load on the gearbox. It may, however, remain inside the mill.

The material is ground and conveyed towards the nozzle ring by compression and shear. The gas flowing up through the nozzle ring mixes with the material and so forms a rotating fluidized bed above the nozzle ring. The coarse particles fall back onto the grinding plate for being reground. The fine-ground particles are taken up by the gas stream and carried to the classifier. In the

classifying zone, a rotating separating wheel classifies the material into the fine finished product and coarse particles (grits). The separating wheel is fitted with a variable speed drive to adjust the rotation speed to the required finished product fineness. The separated finished product is carried by the gas stream to the dust collector installed after the mill. The coarse material falls back onto the grinding plate for being returned into the filter. Exhausted air goes through the fan after the bag filter. The bag filter dust goes into the cement transport system.

The circulating air of the mill dust collection system is provided by the process fan and the hot gas generator. Air enters the mill while the separator and the process filter go through the circulating air pipe, part of it is discharged from the chimney, and the rest continues to enter the next cycle.



**2.3.2 Specification of Process Equipment**  
**\*to be filled by the Applicant!**

Item	Description	Equipment No.	Specification
1	Cement Mill		Type *vertical roller mill
			Capacity 50 t/h(CEM IV )
			Inlet water content ≤4.3%
			Product Size CEM IV 4,500 cm <sup>2</sup> /g
			Moisture ≤0.3%
2	Motor of Mill		Capacity * kW
3	Separator		Type *
			Size *mm
			Speed *rpm
4	Motor of Separator		Capacity *kW
5	Process Fan		Gas Flow *m <sup>3</sup> /h
			Static pressure *Pa
6	Dust Collector		Gas Flow *m <sup>3</sup> /h
			Filter Area
			Pressure loss to be1000~1500Pa

## 2.4 Module 4: Storage & Bulking

### 2.4.1 General Description

After the dust collection of the cement is completed by the process dust collector, it is transported through the inclined chute to the elevator, where the quality of the finished product can be checked by a sampler at any time. The cement is transported from the hoist to the roof slanting chute, where the finished cement is pumped through the slanting chute fan to the cement store. The direction of the cement can be controlled by the roof divider valve.

A portion of the cement in the reservoir is transported via a screw conveyor at the bottom of the reservoir to a bulk loader for bulk sales. The rest part is conveyed via other screw conveyors to the electro-vibration screens of the packing unit. A roots fan aids the discharge of cement from the bottom of the depot and a flow control valve is installed to control the flow of cement into the screw conveyor.



### 2.4.2 Specification of Process Equipment

**\*to be filled by the Applicant!**

Item	Description	Equipment No.	Specification
1	Cement Silo		Capacity: 1000 t
2	Cement Silo		Capacity: 1000 t
3	Bag Filter		Gas Flow: * m <sup>3</sup> /h Filter Area: * m <sup>2</sup> Pressure loss: to be 1500~1700Pa
4	Bag Filter		Gas Flow: *m <sup>3</sup> /h Filter Area: *m <sup>2</sup> Pressure loss: to be 1500~1700Pa
5	Screw Conveyor		Φ500x*mm
6	Screw Conveyor		Φ500x*mm
7	Screw Conveyor		Φ400x*mm
8	Screw Conveyor		Φ400x*mm
9	Screw Conveyor		Φ500x*mm
10	Bulk Loading Device		Capacity: 100 t/h

## 2.5 Module 5: Industrial water pumping station

### 2.5.1 General Description

Here the water system is for the new production line, which includes only the industrial water system.

Potable water system, firefighting water system and sewage system are not in Applicant's scope.

## 2.5.2 Water consumption

### **\*to be filled by the Applicant!**

Circulating water flow	*m <sup>3</sup> /h
Circulation rate	*%
Direct water loss	3%
Feed up water consumption	*m <sup>3</sup> /h
Process water spray flow	*m <sup>3</sup> /h

## 2.5.3 Water flow

Raw water from the Client (in scope of the Client) will flow into the new circulating water tank directly. Cooling water from the circulating steel water tank (15 m<sup>3</sup>) will be sent to cooling water consumption points through circulating water pump. When the temperature of the return water is higher than 32 °C, return hot water will first be cooled by the opening cooling tower, when the return water is lower than 32 °C, the water will flow into the circulating water tank directly. Water quantity losses will be complemented by raw water treatment station from the Client. Drain and overflow water from water tank will flow to rain drainage system.

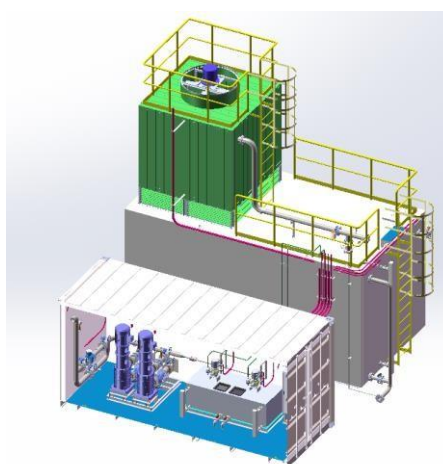
## 2.5.4 Scope of supply

In the combined water pump station, there to be installed 2 circulating water pumps (Q=30 m<sup>3</sup>/h, H=48m), 1 circulating water tank (15m<sup>3</sup>), 1 opening cooling tower (50m<sup>3</sup>/h), 1 corrosion & scale inhibitor injection unit and 1 biocide injection unit.

Flow sight, pressure gauge, and temperature gauge will be installed at cooling water pipes; mechanical water meter will be installed on incoming general pipe at each department.

## 2.5.5 Function

Two circulating water pumps (including one standby) will run for 24 hours. The opening cooling towers will operate when the temperature of circulating return water is up to 32°C.



## 2.5.6 Specification of Process Equipment

Item	Description	Equipment No.	Specification
1	Horizontal circulating water tank		Size: 15 m <sup>3</sup>
2	Circulating water pump		Capacity: 50m <sup>3</sup> /h, 60m
3	Circulating water pump		Capacity: 50m <sup>3</sup> /h, 60m
4	Electromagnetic flow meter		Capacity: 0-70m <sup>3</sup> /h,



5	Liquor corrosion inhibitor injection unit		Size: $\phi 800 \times 1000 \text{mm}$
6	Liquor corrosion inhibitor injection unit		Size: $\phi 800 \times 1000 \text{mm}$
7	Exhaust axial fan		Capacity: $800 \text{m}^3/\text{h}$
<b>Item</b>	<b>Description</b>	<b>Equipment No.</b>	<b>Specification</b>
8	Opening cooling tower		Flow: $75 \text{m}^3/\text{h}$
9	Standard container		Size : $12192 \times 2438 \times 2591$

## 2.6 Module 6: Compressed air station

### 2.6.1 General Description

This system supplies compressed air for the new cement mill. Furthermore, refrigerated dryers to be foreseen.

The primary compressor to be 0.75 MPa at the output. Two integrate oil screw air compressors are installed (including one standby). Air filters are supplied as well for purifying process. The main pipelines for compressed air are steel pipes. Condensate water from air compressors, air filters and air receivers will flow into oil separator, and then drain outside directly.

For adequate ventilation in air compressor container, the compressor rooms will be positive pressure ventilation and ventilated to allow environment temperature at about  $+10 \text{ }^\circ\text{C}$ . Wall louver will be installed on the side of the container.

### 2.6.2 Specification of Process Equipment

**\*to be filled by the Applicant!**

Item	Description	Equipment No.	Specification
1.	Integrated oil screw air compressor		Atlas Copco GA*, $\text{m}^3/\text{min}$
2.	Integrated oil screw air compressor		Atlas Copco GA*, $\text{m}^3/\text{min}$
3.	Final air filter		$\text{m}^3/\text{min}$
4.	Final air filter		$\text{m}^3/\text{min}$
5.	Oil Separator		
6.	Air receiver		$1 \text{ m}^3$
7.	Pressurized axial fan		$\text{m}^3/\text{h}$
8.	Wall louver		
9.	Air receiver		$2 \text{ m}^3$
10.	Standard container		$6058 \times 2438 \times 2896$

## 2.7 Module 7: Electrical and automation system

### 2.7.1 General Description

Modular electrical room will be included in Applicant's supply. All panels and auxiliary equipment will be preassembled to decrease the construction period.

MV module consists of two combined 40 feet containers which locates on the first floor in which MV switchgear, MV compensation unit and distribution transformer will be installed. LV module includes MCC panel and other LV panels installed in two 40 feet containers which locates on the second floor. And different function zones will be separated by proper materials. The center control system will be integrated into a 30 feet container separately.

### 2.7.2 Specification of Process Equipment

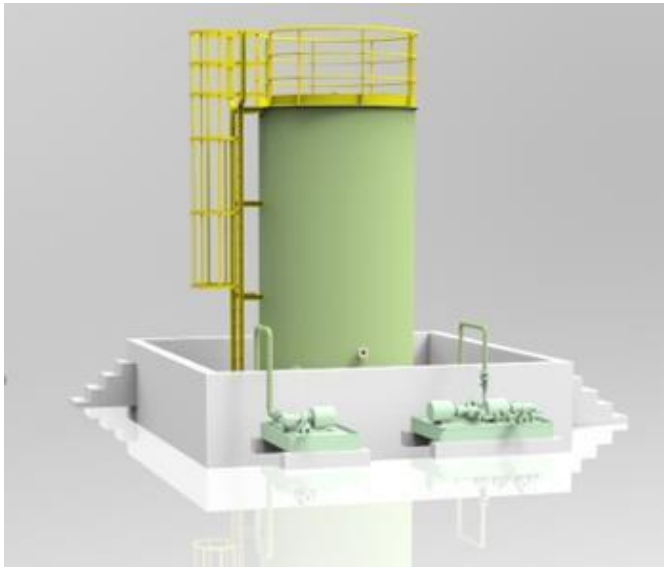
Item	Description	Specification	
1.	MV cabinet incomer	Type Nominal Voltage Current	Vacuum 12 kV 25 kA/1s 630 A
2.	MV cabinet feeder	Type Nominal Voltage Current	Vacuum 12 kV 25 kA/1s 630 A
3.	MV cabinet PT	Type Nominal Voltage PT	Vacuum 12 kV 25 kA/1s 11/√3 / 0.1/√3 / 0.1/3 kV
4.	MV compensation panel	Voltage Capacity	11kV 450 kVar
5.	MV compensation panel	Voltage Capacity	11kV 250 kVar
6.	Distribute transformer	11/0.42kV, 1000 kVA	
7.	LV/VSD cabinet	Power 2.5kW, 400V	
		Power 3kW, 400V	
		Power 15kW, 400V	
		Power 132kW, 400V (with braking resistor)	
8.	Lighting distribution panel	Type Voltage	Fixed (1000*600*2200mm) 400 VAC/230 VAC
9.	MCC cabinet	Rated voltage Breaking capacity	400 V, 50 HZ 50 kA
10.	LV compensation unit	Type Voltage Capacity	Automatic 400V 350 kVar
11.	DC Bank	110V DC	40AH
12.	ACC cabinet	Type Voltage	Fixed 230 VAC, 50 HZ

## 2.8 Module 8: Diesel oil tank

### 2.8.1 General Description

The diesel tank contains a tank and two oil pumps. The capacity of the tank capacity is 20 m<sup>3</sup>. One oil pump is used to unload oil at 12 m<sup>3</sup>/h; the other oil pump is used for remote transportation, and is

equipped with two motors, with a transportation capacity at 2m<sup>3</sup>/h, providing fuel for the hot gas generator through the transportation pipeline.



## 2.8.2 Specification Of Process Equipment

Item	Description	Equipment No.	Specification
1	Diesel oil tank		20m <sup>3</sup>
2	Diesel oil unloading pump set		12m <sup>3</sup> /h
3	Diesel oil unloading pump set		3.3 m <sup>3</sup> /h

## 3. PERFORMANCE GUARANTEES

### 3.1 Performance Guarantees

Notwithstanding any equipment requirements, APPLICANT will guarantee the Performance Target Values of the Plant or the various plant groups as specified and stipulated hereinafter.

The performances will be checked in accordance with these provisions according to the Commissioning and Performances tests procedures to be agreed as part of the Contract Documents.

The product specifications describe the criteria, which must be respected during plant operation and in particular during the performance tests. Test will be considered only if the products manufactured comply with the herein defined specifications.

A result below a Performance or Reliability Rejection Value (herein defined as a percentage of the Target Values) will require APPLICANT to “Make Good” the corresponding failed part or plant performance. For measured performance values between the Refusal and the Target Values, if APPLICANT is not able to improve, the Client may decide to apply the Liquidated Damages as agreed in the Commercial Conditions.

#### 3.1.1 Cement Grinding

- **Operating conditions:**

1	
Type of cement	Type CEM I (4000 cm <sup>2</sup> /g)
Clinker and additives grain size	: 95% < 60 mm
Additives moisture	: < 15%
- **Performance guarantees target value:**

Output –Type CEM I -dry basis	: 40 t/h
Energy consumption –Type CEM I	: 35.5 kWh/t

Modules 1, 2 and 3. From dosing system to top of cement silo.

- **Product specifications:** CEM I  
Fineness (dry sieving) :  $\geq 4000$  Blaine  
Moisture maximum :  $< 0.3\%$   
CEM I (Clinker: 95% + Gypsum: 5% + HG Limestone: 5%).
  
- **Operating conditions:** 2  
Type of cement Type CEM II/B-L (4500  $\text{cm}^2/\text{g}$ )  
  
Clinker and additives grain size :  $95\% < 60$  mm  
Additives moisture :  $< 15\%$
  
- **Performance guarantees target value:**  
Output –Type CEM II/B-L -dry basis : 50 t/h  
Energy consumption –Type CEM II/B-L : 34 kWh/t  
Modules 1, 2 and 3. From dosing system to top of cement silo.
  
- **Product specifications:** CEM II/B-L  
Fineness (dry sieving) :  $\geq 4500$  Blaine  
Moisture maximum :  $< 0.3\%$   
CEM II/B-L (Clinker: 70% + Gypsum: 5% + HG Limestone: 25%).

The Client will decide the exact fineness of cement for the performance guarantee test based on the market requirements. Above data provided by Applicant shall form the basis for arriving at mill capacity and power consumption figures. Raw materials available in quantity and with the chemical composition corresponding to the specifications of the cements to be produced by the system. Granulometry at the entrance of the cement mill, additions, clinker: 0-35 mm, 5%  $> 60$  mm. The feeders will be calibrated before the start of the tests and the production of cement will be deduced from the indications of these feeders. The fineness and humidity of the cement will be measured by the factory laboratory every hour. The fineness will be determined by the Blaine method according to the standard method.

### 3.1.2 Environmental guarantees

#### Gas Emissions

- **Performance guarantees:**

The plant must conform to the most stringent regulations between local and the following:

- Dust emissions of cement grinding : 10  $\text{mg}/\text{Nm}^3$  dry
- Dust emissions of bagging and loading : 10  $\text{mg}/\text{Nm}^3$  dry

#### Noise Emissions

- **Performance guarantees:**

- Noise at limit of sanitary zone  $\leq 65$  dB (A)  
i.e. 0,5 km from plant fence  
 $\leq 85$  dB (A) at 1 m. from any single equipment except for:  
1) Ball mill  
2) Vertical Mill  
3) Roller press – not applicable  
4) Process fans with motor above 100KW  $< 95$  dBA at one meter.  
5) MV motors  $< 95$  dBA at one meter.  
6) Clinker, limestone & clay crushers

- 7) Roots blower or compressor motor above 45KW <100dBA at 1m; need to be enclosed; noise out of enclosure < 85dBA  
 \*The noise level of each equipment is measured individually.

### 3.1.3 Electrical and automation guarantees

#### Power/distribution transformer:

Power transformers efficiency shall not be less than values given in following table. Efficiency will be measured during factory tests with a tolerance equal to: 0.1 (1efficiency).

For oil-immersed and dry transformers			
Rated power (kVA)	P < 250	250 < P < 2500	P > 2500
Efficiency (%) at ¾ load and 97.5 power factor = 1		98.5	98.9

#### Motors:

MV squirrel cage motor with 4 or 6 poles				
Rated power (kW)	160<P<500	500<P<1000	1000<P<2500	P>2500
Efficiency at 4/4 load (%)	95.5	94.5	NA	NA
Efficiency at ¾ load (%)	94.2	93.8	NA	NA
MV slip ring motor with 4 or 6 poles				
Rated power (kW)	160<P< 500	500<P<1000	1000<P<2500	P>2500
Efficiency at 4/4 load (%)	94.0	95.0	95.1	95.2
Efficiency at ¾ load (%)	93.7	94.3	94.8	95.0

#### PCS:

PCS response time:

- < 0.2s to accomplish task of program execution
- < 0.3 sec for task involving level 0 and level1
- < 1 sec for the complete system from level 0 to level 2 signaling
- < 2 sec for the complete system from level 0 to level 2 signaling and back (control loop...)

Plant earthing resistance: <= 1 Ohm

Plant lightning resistance: <= 4 Ohm

Rejection value/Make Good:

Motor and transformer efficiency: ≤ guaranteed value

PCS response time: ≥ guaranteed value

Power factor: ≤ guaranteed value Earthing resistance: ≥ guaranteed value

Lightning resistance: ≥ guaranteed value

### 3.1.4 Tolerances of measures

The total measuring tolerance to be applied shall be:

- 1% for capacities and output
- 3% for electrical consumption
- 2 % for heat consumption
- 0.1 % for moisture (absolute value)
- 2°C for temperatures

- 50 cm<sup>2</sup>/g for Blaine
- 0.2% absolute value for rejects at 90 microns
- no tolerances of measures for gases emission

### 3.2 Equipment Specific Guarantees

#### Cement Grinding – Extended Warranty Period

Equipment	Description	Duration	Comments
Cement Mill (Vertical Mill)	Gearbox bearings	36 months	
	Gearbox gears	36 months	
	Gearbox thrust bearing	36 months	
	Gearbox vibration (RMS)	36 months	
	Rollers shafts and bearings, hydraulic unit	36 months	

#### Process Fans

Equipment	Description	Duration	Comments
Fans (Process) > 300 Kw	Vibration (RMS)	≤5 mm/s	

### 3.3 Wear and Tears Guarantees

Wear and breakage definition may be higher if the full function or quality of equipment is not reached any more.

Warranty periods, when indicated in months, are calendar based. Warranty periods, when indicated in hours, are operating hours.

#### **\*to be filled by the Applicant!**

Cement mill (Vertical roller mill)	Specific Warranty Period	Target	Wear/breakage rate (%)	Wear /breakage definition
Roller tyres liners	*h	10,000h	~5	
Table liners	*h	10,000h	~5	
Others wear parts (Casing liners & Nozzles)	*h(casing liners) *h(nozzles)	30,000h (casing liners) 15,000h (nozzles)	~30 (casing liners) ~20 (nozzles)	
Rotor liners (of classifier)	*h	25,000h	~15	
Separator rotor blades and guide vanes	*h	25,000h	~5	

The duration can be modified according to a new test report for slag.

Filters bags	Specific Warranty Period	Target	Wear/breakage rate (%)	Wear /breakage definition
Process filters	*h	20 000 h	5%	Bag with holes

Cages	*h	32 000 h	5%	
Dedusting filters/Other filters	*h	16 000 h	5%	Bag with holes

### 3.4 Performance Test Durations

Performance tests will be performed during the following durations.

	Duration	Max number of stops per test	Max duration of all stops per test
Cement grinding	24 h	2	20 min

The duration of a stoppage is defined as the effective stop duration plus the time needed to recover a normal operating condition. If the stop is beyond Applicants responsibility, the duration of the stoppage will be neutralized.

Each performance test should be performed for the duration mentioned in the table and the performances calculated as an average all along the test duration. (Total duration minus neutralization if any)

The total duration and the number of stoppages due to Applicants fault should not exceed the duration and the number of stoppages Max mentioned in the table otherwise the test will be declared as failed and to be re-performed.

### 3.5 Performance Test Procedure

The performances will be assessed on the measurement basis without application of the measurement tolerances. In case of failure in the achievement of the performance guarantees, the tolerances will be taken into account for the calculation of the liquidated damages.

During the tests the necessary data for the measurement of the performances will be recorded at least once per hour

#### • Measurements Methods:

- The flow rates will be measured by weighing using the weighing devices after being calibrated or using trucks and weighbridges.
- The power consumption for LV and MV consumers will be measured in the related sub-stations on the MV or MCC panels.
- Calorific consumption (not applicable):
  - The flow of solid fuel will be measured by weighing using the weighing devices after being calibrated.
- Calorific Value (not applicable):
  - The calorific value will be calculated by a third party on 3 samples taken during the testing period.
- Dust emission:
  - The dust content in the cleaned gas will be measured 3 times in a normal condition but close to the nominal conditions
  - The measurement will be done according the method described in the standard: VDI 2066/2094
- Cement Temperature at filter outlet:
  - Measured with a thermometer or thermocouple placed at the discharge of sampler.
- Ambient Temperature:
  - Measured with a thermometer or thermocouple placed at a fan air inlet.

**3.6 Guarantee of Specific Power Consumption at Guaranteed Capacity**
**\*to be filled by the Applicant!**

Department	Guarantee Values		Remarks
	kWh/t cement (For CEM I Clinker 90% + Gypsum 5%+ HGLS 5%)	kWh/t cement (For CEM II Clinker 70% + HGLS 25% + Gypsum 5%)	
1. Cement Manufacture	* kWh/t	* kWh/t	From dosing system to top of cement silo
2. Cement Dispatch	*	*	From bottom of cement silo to cement bulk dispatch
3. Compressed air system in cement grinding	*	*	
4. Combined water pump station	*	*	
5. Combined water pump station	*	*	
<b>Total</b>	<b>35,5</b>	<b>34,0</b>	

**Note:**
**1. Pre-Conditions:**

 Cement composition: CEM I : clinker : HGLS : gypsum: = 90:5:5; cement Blaine: 4000 cm<sup>2</sup>/g;

 CEM II: clinker : HGLS : gypsum: = 70:25:5; cement Blaine: 4500 cm<sup>2</sup>/g

Applicant only guarantees the total power consumption (CEM I, CEM II).