

**BHILAI STEEL PLANT  
BHILAI**

**REPLACEMENT OF DC MOTOR TO AC MOTOR WITH VVFD  
DRIVE FOR MIXER CUM NODULISING DRUM  
SINTER PLANT-3**

**TENDER SPECIFICATION  
FOR  
MAIN PACKAGE**



**STEEL AUTHORITY OF INDIA LIMITED  
CENTRE FOR ENGINEERING & TECHNOLOGY  
RANCHI – 834002**

**JUNE, 2023**

**CET/01/BH/5041/TS/EE/01/R=0**



## CONTENTS - CHAPTERS

Chapter No.	Description	Page No.
1	Introduction	1.1 - 1.2
2	Scope of Work	2.1 - 2.12
3	Technical Specification	3.1 - 3.52
4.	Commissioning and Performance Guarantee	4.1 - 4.3
	Annexures	
	Schedules	

PACKAGE LEADER(PL)	TASK FORCE LEADER(TFL)	HOD (PL)
Paramita Mohanti DGM(Elect)	Paramita Mohanti DGM(Elect)	Pranay Kumar CGM & I/c

## CONTENTS - ANNEXURES

Annexure No.	Description	No. of Pages
2.1.4-1	List of Acceptable Makes of Equipment and Supplies	57
1.2.1-1	Location of existing and proposed facilities at SP-3	1
2.1.9.2-1	Implementation Schedule	1
2.4.4-1	Existing motor foundation	4
3.2.2.1-1	Datasheet & GA of existing MND motor	7

## CONTENTS - SCHEDULES

Schedule No.	Description	No. of Pages
1.8-1	Declaration of Site Visit	1
1.8-2	List of Exclusions	1
1.8-3	List of Deviations	1
1.8-4	List of operation & maintenance spares for 2 years	1
1.8-5	List of Commissioning Spares	1
1.8-6	List of Special Tools and Tackles	1
1.8-7	List of first fill of oils and lubricants	
1.8-8	Details of authorized person of bidder during tender evaluation	1
1.8-9	Requirement of construction water & power	1



## 1 INTRODUCTION

### 1.1 GENERAL:

- 1.1.1 There are two Sinter Plants in operation at Bhilai Steel Plant (BSP), namely, Sinter Plant-2 and Sinter Plant-3 (Sinter Plant-1 has been phased out). Sinter Plant-2 (SP2) is having 4 machines (3x75 m<sup>2</sup> & 1x80 m<sup>2</sup>) whereas Sinter Plant-3 (SP-3) is having two machines (1st machine) of 320 m<sup>2</sup> sintering area, and (2nd machine) of 360 m<sup>2</sup> machine area.
- 1.1.2 Sinter Plant- 3 was commissioned in the year 2001 with Sinter Machine-1. Sinter Machine-2 at SP-3 was installed and commissioned in the year 2014.
- 1.1.3 Sinter machine -1 has Mixer cum Nodulising Drum (MND) for preparing raw charge mix required for sintering process. This was installed by M/s. BHEL in the year 1996. The DC drive for the motor was supplied by M/s Siemens.

### 1.2 EXISTING FACILITIES

- 1.2.1 MND has 730KW DC motor of BHEL make and the speed variation is done through DC drive Siemens Sinamics 6RA80. The DC motor as well as the DC drive has frequent breakdowns calling for frequent maintenance. The drive cards have become obsolete and spares for the same are not available. The expertise for maintain DC motor is also gradually depleting. Bidder to refer "Location of existing and proposed facilities" attached as **Annexure-1.2.1-1**

### 1.3 OVERVIEW OF THE PROJECT

In view of the above problems, it is proposed to replace the existing DC motor with state of the art AC squirrel cage induction motor with variable frequency drive for the Mixer cum Nodulising Drum of machine -1. This will improve the reliability of the overall system and reduce the down time required now for frequent maintenance.

It is suggested to go for AC motor with variable voltage drive system along with replacement of input transformer.

The existing gearbox will be retained. The existing civil foundation of DC motor and foundation plates will be retained to the extent possible. In case minor modification is required same is to be done by the Bidder. However, base frames can be modified/ new base frame can be installed by the Bidder to suit the mounting arrangement of the new AC motor, such that motors could be coupled with gear box and centre line of the existing gearbox input shaft & motor shaft are in the same axis.

Dismantling work:

Existing motor (DC motor 730 kW) along with the respective coupling shall be dismantled. Existing base frames of the motor shall be modified to suit the new AC motor. All the power and control cables shall be disconnected from motor end as well thyristor converter end. Field devices connected with the motor shall be also be disconnected and removed. The motors, brakes and couplings shall be dismantled without damaging the equipment and shall be handed over to BSP for future use. All the foundation bolts, coupling bolts shall be opened through tools. No gas cutting shall be allowed during dismantling of motors and coupling.

VFD panel shall be installed in existing Electrical control building.

#### 1.4 **IMPLEMENTATION STRATEGY**

1.4.1 The complete job of "Replacement of DC motor with AC motor and VFD for Mixer cum Nodulising Drum of Sinter Machine-1, Sinter Plant-3" is envisaged to be executed through single package on Turnkey basis.

1.4.2 This tender specification pertains to be executed through single package on turnkey basis which includes installation of AC motor, Variable Frequency drive for MND motor, necessary cabling, interfacing with existing system, air conditioning and minor modification of civil foundation for placing motor drive etc.

#### 1.4.3 **Details Of Pre-Shutdown And Shutdown Activities With Duration**

1.4.3.1 Details of activities pre-shutdown as well as during shutdown and their duration shall be mentioned by the bidder in their offer and also to be shown in the implementation schedule.

- Employer shall give need based shutdown without affecting the shop operation.
- Major jobs including interfacing with existing system shall be done by the bidder during one week of capital repair shut down of sinter machine 1.

1) Following are major pre shutdown activities: -

- Tapping power from Substation 41
- Cabling between Substation 41 to drive and from drive to new motor
- Panel enclosure for drive system along with ventilation system
- Installation and parameterization of drive
- Earthing



1.4.3.2 Shutdown activities during 7 days annual/planned shutdown shall be as shown below:

Sl. No	Activity	Day 1 of Shutdown	Day 2 - 5 of Shutdown	Day 6-7 Shutdown
1	<ul style="list-style-type: none"> <li>Preliminary shut down to take out major portion of existing MND motor.</li> </ul>	Shop / planned shutdown		
2	<ul style="list-style-type: none"> <li>Chipping/Dismantling of existing Motor foundation as per requirement to match the shaft height of the gear box.</li> <li>Drilling &amp; grouting of dowels &amp; RCC concreting with epoxy/non-shrink grouts to integrate the old concrete suiting to incoming load of proposed motor.</li> <li>Necessary curing</li> </ul>		Civil activities during shutdown	
3	<ul style="list-style-type: none"> <li>Inline Installation of new motor</li> <li>Cable termination &amp; Drives System Interfacing etc.</li> </ul>			Motor installation, cable termination, drive interfacing etc
4	<ul style="list-style-type: none"> <li>Preliminary shutdown to take out existing transformer by disconnecting cable etc.</li> <li>Installation of new transformer in existing transformer</li> </ul>	Shop / planned shutdown		

	pane			
	<ul style="list-style-type: none"> <li>Cable termination to new transformer</li> </ul>			

#### 1.4.4 Other site related details

1.4.4.1 Details of over ground facilities at erection site which may need diversion and special handling equipment to be deployed at site, if any, are to be clearly brought out by the bidder in their offer.

#### 1.5 INTENT OF SPECIFICATION

1.5.1 The intent of this tender specification is to furnish required details for enabling the bidder to submit their best offers (technical & commercial) as per the scope of work mentioned at chapter 2.0, technical specifications at chapter 3.0, and commissioning & performance guarantee at chapter 4.0.

1.5.2 This tender specification shall be read in conjunction with other documents enclosed with the NIT.

#### 1.6 SITE VISIT AND OTHER REQUIREMENTS

1.6.1 The bidder shall visit the site, study drawings/ documents and discuss with the employer/ consultant, if required, regarding any technical clarification and get satisfied with respect to the nature and extent of work involved. The bidder shall also obtain first-hand information regarding location, work terrain, climate condition, railways, roads, airports and communication etc. before offering the bid for the job.

1.6.2 All materials/ equipment/ machinery/ fabricated items used in the subject package shall be according to the specification given herein and any deviation should be clearly brought-out in schedules of exclusions and deviations attached with this TS. No mention of exclusions and deviations will mean that the bidder has accepted the scope and specification given herein.

#### 1.7 DRAWINGS AND TECHNICAL DOCUMENTS TO BE SUBMITTED WITH THE OFFER

1.7.1 The Bidder shall submit along with the bid, drawings / documents / data as per the following details:

- 1) kW rating calculation & Data sheet & GA drawing of proposed motor
- 2) Single line diagram.