




TD-106-1 Rev No. 5	Form No. 	PRODUCT STANDARD FOUNDRY AND PATTERN SHOP HYDERABAD		Product STD no Rev No. 00 Page 1 of 12	BA35016
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FOR REVISIONS REFER TO RECORD OF REVISIONS		<u>PREPARED BY</u> AMAN SURIN	<u>CHECKED BY</u> S GHATGE	<u>DATE</u> 14.08.2013	

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Table-1
TYPICAL COAL ANALYSIS (INDIAN COAL):
Parameter Unit Coal Analysis Data (as available)

Proximate Analysis (as recd)	Coal 1	Coal 2	Coal 3	Coal 4	Coal 5	Coal 6
Moisture%	18	14	18	16	15	15
Ash%	46	45	38	45	45	45
Volatile Matter %	16	20	20	19	20	19.5
Fixed Carbon %	20	21	24	20	20	20.5
Hard Grove Index	45	47	60	50	47	42
Abrasion Index (YGP) mg steel/kg coal	85	80	80	80	80	80

Ash Analysis (as recd)						
Silica (SiO ₂) %	64.86	62.4	59.79	59.54	62.5	59.6
Alumina (Al ₂ O ₃) %	23.8	27.31	25.36	29	27.3	30.75
Iron Oxide (Fe ₂ O ₃) %	6.52	4.96	7.2	6.42	4.9	6.5
Balance %						

Remark: The shale and sand stone content of coal may be as high as 20% with alpha quartz contamination up to 5.0 mm size. The effect of these shale, sand stone and alpha quartz content shall be considered for wear life guarantees of Mill wear parts.

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ANNEXURE I

SCOPE AND QUALIFICATION CRITERIA FOR TECHNICAL ASSISTANCE IN

MANUFACTURE OF CERAMIC METAL MATRIX INSERTED GRINDING ROLLS

AT BHEL

1.0 GENERAL:


This tender is intended to:

- 1.1 Evaluate the bidders technically and commercially for procurement of CERAMIC METAL MATRIX INSERTS required for manufacture of Grinding Rolls and matching Bull Ring Segments.
- 1.2 Enter into an MOU for establishing manufacturing and testing of CERAMIC METAL MATRIX INSERTED GRINDING ROLL & MATCHING BULL RING SEGMENTS by procuring critical components such as Ceramic Metal Matrix Inserts using centrifugal Casting Facilities at BHEL.
- 1.3 Create an expertise in the areas of Installation, Commissioning and trouble-shooting.
- 1.4 Enter into an MOU with the successful bidder for rate contract and complete technology transfer of manufacturing Ceramic Metal Matrix Inserts and corresponding manufacture of Grinding rolls and Bull Ring Segments.

The bidders shall clearly indicate the expression of interest for transfer of technology and entering into rate contract.

2.0 QUALIFYING REQUIREMENTS:

- 2.1 Ceramic Insert supplier should be regular manufacturer of Ceramic Inserts which are used for manufacture of grinding rolls for Pulverisers in the product range of XRP Bowl Mills. The supplier must be in the field of manufacturing and supplying of Grinding Rolls. Details of manufacturing facilities, test facilities to be submitted.
- 2.2 Evidence of the established performance of wear life of minimum **10000** hours (without repair or rebuild of the wear area) for 28" to 72" size Grinding Rolls with matching bull ring segments.
The above should be for XRP 623 to HP 1203 type BHEL make or other similar design (Raymond Mill) coal mills for power plant applications with typical high ash Indian coal as given in Table 1
- 2.3 Bidder should have supplied minimum of 13 sets of Grinding rolls & Bull ring segments in the above range in India and must have achieved a proven life of 10000 hours under the coal condition of Table 1, under following conditions
 - 2.3.1 Size Distribution : At least
 - 4 Sets (out of 13 Sets) should be from 42" and above.
 - 4 Sets (Out of 13 Sets) should be from 37" and below.
 - 2.3.2 From at least two different sites
 - 2.3.3 Located at least at two (out of five) geographically different locations (North/East/South/West/Central)
 - 2.3.4 Preferably with coal from different collieries.
 - 2.3.5 Data should be from last five years from the date of issue of the present enquiry.

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2.3.6 The evidences shall be submitted in the following format.

Name of Site	Mill type	Size of grinding roll	Date of supply	Life achieved in hrs.	Coal Type as Per table I
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2.4 The Grinding Roll design shall ensure that it shall be guaranteed for trouble free operation/running hours of not less than 10000 hrs. (Documentary evidence to be submitted)

3.0 TECHNICAL ASSISTANCE:


- 3.1 The bidder has to study the facilities available at BHEL and adapt the process to the existing facilities.
- 3.2 The successful bidder shall extend technical assistance by deputing their concerned experts in the areas of engineering, manufacturing, quality control and testing to identify the facilities required for manufacturing and testing at BHEL.
- 3.3 The rate contract will be valid for 2 years from the date of signing of MOU and it may be extended on mutually agreed terms and conditions.
- 3.4 Successful bidder shall agree to offer the services of their expert personnel to the extent of 100 man-days free of cost to BHEL in establishing manufacturing and resolving site problems. BHEL will provide suitable accommodation and food free of cost to the personnel deputed under this clause.
- 3.5 Successful bidder shall agree to impart necessary training to BHEL Engineers deputed to their works limiting to 150 man-days in the area of Engineering, manufacturing, quality control, assembly testing and trouble shooting. BHEL will bear the expenses for the travel, Lodging, boarding etc.
- 3.6 The successful bidder shall provide all the clarifications and various aspects of the products as and when referred during MOU period.
- 3.7 The scope of technical assistance is listed out at Clause no. 8.0
- 3.8 The MOU will be for technical assistance in manufacture and supply of Ceramic Cast Grinding Rolls for Mills as per Annexure-II with partial critical components procured from the bidder. Unit price of the critical components to be given as asked in this enquiry:
 1. Complete Ceramic Inserts set for one set of grinding rolls (3Nos)
 2. Ceramic inserts for one set of matching bull ring segments.


Note: The technical details of Roll size etc suitable for above mills shall be provided by BHEL
- 3.9 During the term of this agreement the successful bidder must agree to furnish to BHEL promptly and free of charge all Technical improvements and inventions related to the Licensed product that are covered under this contract.
- 3.10 The MOU will be for complete Technology Transfer of manufacture of Ceramic Metal Matrix Inserts used for manufacture of Grinding Rolls along with matching Bull Ring Segments.


4.0 RIGHTS FOR SELL:

4.1 RIGHTS TO MANUFACTURE AND SELL.

The Successful bidder would grant to BHEL, non-transferable and exclusive rights to Manufacture, sell, repair and service the Products and Components in India. In

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<p style="text-align: center;"> COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company. </p>			<p>addition, BHEL should be free to export grinding rolls to any country provided the licensed product form part of a bowl mill package being exported from India by BHEL directly or through a third party. Further BHEL should be allowed to export the licensed product as a standalone licensed product on non-exclusive basis to certain countries. The list of such countries is to be mutually discussed and agreed upon. After expiry of M O U, BHEL should be free to manufacture & sell the licensed product without any restriction or purchase of components whatsoever.</p> <p>4.2 PATENTS The bidder has to declare that no third party has raised any patent claim against Bidder with respect to the product up to the date of this bid. The bidder, once successful, must further declares that in case such claims be raised during the validity of this agreement which cannot be settled with such third party it will make such efforts which bidder deems reasonable to make available to BHEL a technical solution which will not violate such patent.</p> <p>4.3 ARBITRATION. All disputes arising in connection with the contract shall be settled by mutual consultation. If no agreement is reached the dispute shall be settled in accordance with the provisions of the Arbitration and Conciliation Act, 1996 and the rules made there under. The dispute shall be referred for arbitration to any arbitrator to be appointed by the Head of the Unit. The award of the arbitrator shall be final and binding on both the Parties. The venue of the Arbitration shall be Hyderabad in India. The Award to be given by the Arbitration shall be a speaking award and in English language. All questions, disputes, differences arising under, out of or in connection with this contract shall be exclusive jurisdiction of Sangareddy/Hyderabad Courts, Andhra Pradesh.</p> <p>5.0 ESTABLISHMENT OF MANUFACTURE: The successful bidder shall undertake that they will extend full cooperation to BHEL in establishing manufacture, testing/servicing of the Ceramic Inserted Grinding Rolls.</p> <p>6.0 BACK UP GUARANTEES AND VETTING: The successful bidder shall have to guarantee to BHEL on their share of the Grinding Rolls the DESIGN, MANUFACTURE AND PERFORMANCE and also any additional requests as reasonably required by BHEL's customers for the Ceramic Grinding Rolls. The successful bidder shall have to guarantee to BHEL the performance and reliability of products when they are manufactured in strict conformity with the confidential proprietary information disclosed to M/s. BHEL. All deviations from the specifications, drawings, methods and standards will be reported in writing to the successful bidder for approval. Non reported and / or non-approved deviations will exempt the successful bidder of any kind of responsibility. The successful bidder shall have to provide necessary assistance for vetting of BHEL's design/ drawing etc.</p> <p>7.0 PERIOD OF MOU AND TERMINATION: The memorandum of understanding will be in force concurrently with the rate contract, i.e., for the initial period of two years. MOU can be extended along with the</p>		

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9.0 STAGES OF TECHNICAL ASSISTANCE & DOCUMENTATION SCHEDULE

9.1 STAGE-I

The complete details of facilities required for manufacture of Grinding Rolls and Bull ring segments must be provided to BHEL within one month of signing the agreement.

The supplier has to study BHEL facilities and recommend and assist in modifications, if any.

9.1.1 DOCUMENTATION

The following documents are to be submitted within one month of signing of the MOU document.

- 9.1.1.1 List of modifications in the facility envisaged.
- 9.1.1.2 Detailed specifications, Drawings and data sheets for all tools and accessories including jigs and fixtures necessary for manufacture of the Grinding elements.
- 9.1.1.3 Inspection and test plans, procedures, log sheets and check lists for components and assemblies with acceptable levels/ Standards.
- 9.1.1.4 Specification of testing and Quality check equipment.

The second stage would commence after completion of this stage.

9.2 STAGE-II


The inserts for the Grinding rolls and Bull Ring segments will be procured from the Bidder's works and the Grinding rolls would be manufactured in BHEL.

The complete details and procedure of manufacture of Grinding Rolls and Bull ring segments must be provided to BHEL within one month of firm Purchase order placement for BHEL to synchronise the manufacture of the Grinding Elements with the supply of the inserts.

9.2.1 DOCUMENTATION

The following documents are to be submitted within one month of the placement of the first firm order,

- 9.2.1.1 Sub-assembly and general assembly drawings.
- 9.2.1.2 Detailed specifications, Drawings and data sheets for all the bought-out components to be used in manufacture of the Grinding elements.
- 9.2.1.3 Technological Process.
- 9.2.1.4 Inspection and test plans, procedures, log sheets and check lists for components and assemblies with acceptable levels/ Standards.
- 9.2.1.5 Specification of testing and Quality check equipment.
- 9.2.1.6 Ordering drawings for components with material specification.
- 9.2.1.7 Quality checks for components and assemblies with acceptance levels/ Standards.
- 9.2.1.8 Specification of Rolls and the matching bull ring segments.
- 9.2.1.9 Specification for other components or consumables used.

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9.3 STAGE-III

This stage would start after 25% of the estimated orders had been placed on the bidder under stage II of the contract.

The ceramics would be procured from the bidder and the inserts would be manufactured at BHEL works under guidance from the winning bidder. In this case the winning bidder is expected to provide the technical as well as manpower (supervisory) support.

9.3.1 DOCUMENTATION

- 9.3.1.1 Component Drawings and Casting detailed drawings (including assembly drawing).
- 9.3.1.2 Material specifications with Heat treatment details.
- 9.3.1.3 Purchase specifications for vendor items and their sources
- 9.3.1.4 Inspection and test plans, procedures, log sheets and check lists for individual components.
- 9.3.1.5 Design Criteria for accepting alternative material/ Deviations, acceptable stress levels and other working criteria on case-to-case basis.
- 9.3.1.6 Specification of Material of Tools including special tools and source.
- 9.3.1.7 Details of experience with respect to manufacturing problems, site problems and the recommendations.
- 9.3.1.8 Certification of completeness of supply of the documentation.


9.4 STAGE-IV

The ceramics would be manufactured at BHEL and used for manufacture of the inserts as well as the Grinding Rolls as well as Bull ring segments at BHEL. All the necessary technical support will be provided by the partner as and when asked for by BHEL.

9.4.1 DOCUMENTATION

The following documents are to be submitted within one month of placement of 50% of the orders as envisaged under this rate contract.

- 9.4.1.1 Component Drawings for inserts.
- 9.4.1.2 Material specifications with Heat treatment details.
- 9.4.1.3 Purchase specifications for vendor items and their sources
- 9.4.1.4 Inspection and test plans, procedures, log sheets and check lists for individual components.
- 9.4.1.5 Design Criteria for accepting alternative material/ Deviations, acceptable stress levels and other working criteria on case-to-case basis.
- 9.4.1.6 Specification of Material of Tools and source
- 9.4.1.7 Details of experience with respect to manufacturing problems, site problems and the recommendations.
- 9.4.1.8 Certification of completeness of supply of the documentation.

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The bidders must note that the Guarantee and vetting of the product would be applicable for the grinding elements manufactured in all the four stages.

10.0 TESTING DOCUMENTATION:

- 10.1 Standards for Test
- 10.2 Detailed description of tests to be carried out.
- 10.3 List of facilities/ layout for testing.

11.0 CATALOGUES FOR VENDOR ITEMS.

- 11.1 Technical specification along with vendor catalogues shall be furnished.

12.0 BUSINESS SCENARIO

BHEL is committed to implement Grinding Rolls technology for most of the future projects.
 Initially the Ceramic Inserts will be procured from MOU partner and grinding roll will be cast in BHEL then other items (Inserts and Bull Ring Segments) can be manufactured in BHEL with technical support from MOU partner.

13.0 STATEMENT OF COMPLIANCE

The vendor shall complete the following statement of compliance without which the offer will not be considered for evaluation:

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ANNEXURE – II
GRINDING ELEMENTS FOR BHEL MILLS

Material Code	Material Description	Mill Type	Drawing No
BA9735011018	Grinding rolls 28"	623 XRP	16106201889
BA9735011026	Bull ring segment set	623 XRP	16116201261
BA9735015196	Grinding rolls 29"	663 XRP	26106603330
BA9735011204	Bull ring segment set	663 XRP	26116601356
BA9735015161	Grinding rolls 32"	703 XRP	36107003329
BA9735011174	Bull ring segment set	703 XRP	26117090134
BA9735011328	Grinding rolls 42"	703 HP	26107003334
BA9735011140	Bull ring segment set	703 HP	26117001080
BA9735011301	Grinding rolls 37"	803 XRP, 803 HHP	26108003327
BA9735011050	Bull ring segment set	803 XRP	26118000286
BA9735011310	Grinding rolls 46"	803 HP	46108003627
BA9735011093	Bull ring segment set	803 HHP, 803 HP	26118001105
BA9735011263	Grinding rolls 43"	883 XRP	26108803328
BA9735011115	Bull ring segment set	883 XRP	26118802336
BA9735011255	Grinding rolls 50"	1003 XRP	16100001890
BA9735011239	Bull ring segment set	1003 XRP	26110090116
BA9735011352	Grinding rolls 62"	1103 XRP	16100401891
BA9735011280	Bull ring segment set	1103 XRP	26110402603
BA9735015293	Grinding rolls 62"	HP 1103	26111003331
BA9735015307	Grinding rolls 62" (Small Bore)	HP 1103	26111003332
BA9735015315	Bull ring segment set	HP 1103	16111001564
BA9735015323	Grinding rolls 72"	HP 1203	26112003333
BA9735015331	Bull ring segment set	HP 1203	16112001565

[illegible]