



**PRODUCT STANDARD  
PULVERISERS  
HYDERABAD**

Product  
STD no.

BA35011

Rev No. 02

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**GRINDING ELEMENTS FOR BHEL XRP BOWL MILLS**

**1.0 GENERAL:**

This specification governs the procurement of grinding elements consisting of Grinding Rolls and matching Bull Ring Segments for XRP-1103 Bowl Mill. The guaranteed wear life is 6000 running hours without repair or rebuild of the wear area.

**2.0 QUANTITY REQUIRED PER MILL**

- 1) 3 Nos. Grinding Rolls.
- 2) 1 set of matching Bull Ring Segments( As per assembly drawing, 44 plain segment, 4 keyed segments, 1 quarter segments, side shims and end shims )

**3.0 MANUFACTURING FACILITIES AND PROVEN PROCESS:**

Vendors to note that at present BHEL is using the Grinding elements as per the following details:

Rolls and Bull ring segments are manufactured using proven casting process.

The Inserts of the rolls and bull ring segments are made up of hard metal matrix composite comprising of high chrome and ceramic, the high chrome iron having following Chemical composition:

C = 2.5-3.4 %, Cr = 18.0-27.0 %, Mo= 0.5-1.3 %, Ni-0.3-1.3%,  
Mn = 0.5 - 1.5 %, Si = 1.0 % max., S-0.1% Max, P-0.1% Max

This High-Chrome alloy is reinforced with ceramic particles, evenly distributed. The hardness of inserts is in the range of 58 – 66 RC.

These inserts are embedded into a base metal, which is either ductile iron (SG iron) / Hi-Chrome / any other equivalent material, forming a roll by Static / centrifugal process with overall dimensions as per BHEL drawing.

The Chemical composition of SG iron: C- 3.2-3.5%, Si-2.5-3.0%, Mn-0.3% max.  
Mg-0.04-0.07%.

However, the above Chemical Composition/Process/ technology do not absolve the supplier from guarantee responsibility. The Heat treatment procedure shall be established by the vendor and shall be indicated in Quality Plan.



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The bidder shall have all the necessary facilities for the manufacture of Grinding rolls and bull ring segments. The process used for manufacture shall be a proven one. Details of their manufacturing facilities shall be submitted.

**The information given by the bidder is liable for evaluation by BHEL**

**Traders / stockiest / mediators are not allowed to quote. Only manufacturers who are having relevant facilities, proven process and experience will be considered for the supply.**

**INFRASTRUCTURE FOR PROVIDING TECHNICAL SERVICE FOR:**

Bidder shall have the sufficient infrastructure for the following after sales services

- Supervision of erection and commissioning.
- Performance monitoring with respect to wear life, output, fineness, coal characteristic etc.

Documentary evidences/confirmation for the above shall be submitted.

**4.0 MATERIAL CODE: See Table**

**5.0 MANUFACTURING PROCESS AND QUALITY PLAN:**

- 5.1** Dimensions: The overall dimensions of the Grinding Roll and Bull Ring Segments shall be as per BHEL Drawings.
- 5.2** A detailed manufacturing process (along with the process control parameters) and manufacturing and test facilities data shall be submitted for review by BHEL.
- 5.3** Material used for the manufacture of the Grinding rolls and Bull ring segments shall be specified along with the technical details. The specifications shall be submitted for acceptance by BHEL. The details of the patented portion of the technology need not be provided, however the generic name of the proven patented technology along with the broad details shall be provided.
- 5.4** A Quality plan with stage wise inspection and acceptance criteria shall be submitted for approval by BHEL and/or customer.



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#### 6.0 INSPECTION:

- 6.1 The inspection of items will be as per the approved Quality plan.
- 6.2 Inspection of the material will be based on the applicable process of manufacture acceptable to BHEL. The tests like chemical composition, microstructure, hardness and NDT etc as applicable will be part of the approved Quality plan.
- 6.3 The overall dimension of the grinding roll and bull ring segments shall be as per BHEL drawing.
- 6.4 The bullring segments shall be assembled in Check Bowl. After assembling of the segments, final gap should not be more than 20 mm. The drawing for the check Bowl and the arrangement for segment assembly on Check Bowl shall be furnished by BHEL.
- 6.5 The number of segments i.e. Plain, Half, Quarter, Keyed & Shim for each size of the mill shall be shown on Check Bowl drg. However, additional shims/ segment to fill the gap upto 20 mm shall be supplied by the vendor which may be required at site during assembly.

#### 7.0 GUARANTEES:

**Wear Life:** The minimum guaranteed wear life shall be 6000 hours without repair or rebuild of the wear area for typical Indian coal indicated in Annexure-I .

- 7.1 The supplier shall give back to back guarantee for wear life of grinding elements. In case of short fall, supplier shall make one to one replacement of grinding elements to meet guaranteed wear life.
- 7.2 Consistency in mill output to minimum 90% of the rated capacity and pulverized fuel fineness of minimum 70% through 200 mesh and 99% through 50 mesh at the end of guaranteed wear life.
- 7.3 Failure due to manufacturing defects (generally leading to breakage/ catastrophic failure of grinding elements) shall be replaced and installed immediately.



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**8.0 INSPECTION AT SUPPLIERS WORK**

Tests and inspection are to be conducted in the presence of BHEL/ customer representatives as per approved Quality plan. The representatives shall have free access at all times while the work on the contract is being performed. The supplier shall offer all the tools and tackles required for inspection to the inspection agency.

**9.0 TEST CERTIFICATE:**

All the rolls shall be identified with a serial number punched. The Bull ring segments set shall be numbered by paint for each set. Supplier shall supply 3 copies of Test certificates with following information for rolls and bull ring segments.

1. BHEL order number
2. Supplier's reference and name.
3. Heat No. / Roll no.
4. Results of chemical analysis, Hardness Test and all other tests or any other tests as per approved QAP
5. Drawing no., Material Code
6. Consignment/ Identification no.



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#### 10.0 ACCESSORIES

Wear measurement gauge for project site, and any other items/consumables required shall be supplied by the supplier at no extra charge to BHEL.

#### 11.0 DOCUMENTS

11.1 Three Copies of test certificates are to be provided.

#### 12.0 PACKING:

Bull ring segments shall be suitably packed in metallic boxes set wise to prevent Corrosion and damage during transit. Machined/ Ground surfaces shall be properly protected with suitable anti-corrosive compound. Each package shall be legibly marked with following information.

1. BHEL Order No.
2. Consignment/ Identification No.
3. Roll No. / Set No.
4. Drawing no., Material Code
5. Weight in Kg
6. Suppliers Name

Separate identification mark shall be given for spare grinding rolls and bull ring segments .

#### 13.0 SUPERVISION & SERVICES:

13.1 Personnel for supervision for Erection and commissioning shall be deputed within a period of one week from the notice given by BHEL.

#### 14.0 TABLE FOR MATERIAL CODE

Var No.	Mill Type	Item Description	Drawing No.	Malt. Code
01	XRP-1043-1103	GRINDING ROLL 62" FOR XRP-1043-1103	16100401317	BA9735011271
02	XRP-1043-1103	BULL RING SEGMENT SET FOR XRP 1043-1103	26110402603	BA9735011280



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**ANNEXURE – I**

**TYPICAL COAL ANALYSIS (INDIAN COAL):**

Parameter	Unit	Coal Analysis Data (as available)					
		Coal 1	Coal 2	Coal 3	Coal 4	Coal 5	Coal 6
<b>Proximate Analysis (as recd)</b>							
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
<b>Hard Grove Index</b>		45	47	60	50	47	42
<b>Abrasion Index (YGP)</b>	mg steel/ kg coal	85	80	80	80	80	80
<b>Ash Analysis (as recd)</b>							
Silica (SiO <sub>2</sub> )	%	64.86	62.4	59.79	59.54	62.5	59.6
Alumina (Al <sub>2</sub> O <sub>3</sub> )	%	23.8	27.31	25.36	29	27.3	30.75
Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> )	%	6.52	4.96	7.2	6.42	4.9	6.5
Balance	%						

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