

TD-106-1 Form No.		PRODUCT STANDARD PULVERISERS HYDERABAD		Product STD no.	BA89001
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<u>SPECIFICATION OF MILL CIRCUIT PUMP FOR WBM 4074</u> 1. <u>DESCRIPTION:</u> Single stage centrifugal type slurry pump. 2. <u>APPLICATION:</u> The pumps shall be designed for continuous operation capable of delivering the rated flow at rated head with margins as specified in the clause no: 06. The mill circuit slurry pump is used to feed the limestone slurry (mixture of limestone and water) to hydrocyclone in wet ball milling system. 3. <u>SLURRY CONCENTRATION</u> : Solids (limestone) Concentration (w/w)% : 55 4. <u>DISCHARGE HEAD:</u> 62 metres of slurry. 5. <u>FLOW RATE OF SLURRY:</u> 280 m³/Hr. 6. <u>MARGINS:</u> Flow 5% (minimum) Head 10% (minimum). 7. <u>WEAR PROTECTION:</u> 7.1 The Bidder shall offer a Hi-chrome alloy liner for the casing and the Bidder shall have previous experience of the same for same/similar applications. The material used by the bidder shall be proven in previous installations. 7.2 The material and thickness of the liners shall ensure a minimum service life of 2 years before replacement. 7.3 All the wear parts of the pump shall be guaranteed for a minimum wear life of not less than 14000 hrs. 8. <u>COMPONENTS OF SLURRY PUMP:</u> 8.1 PUMP CASING : 8.1.1 Pump casing shall be Radial Split, Close/Semi-open, Over-hang, End Suction type, Back Pull-out design, and Vertical Discharge type for Horizontal Centrifugal Pump. 8.1.2 The casing shall be designed to withstand the maximum shut-off pressure developed by the pump at the pumping temperature. 8.1.3 Pump casing shall be provided with a vent connection and piping with					
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	8.1.4 Casing drain as required shall be provided complete with drain valves, piping and plugs.			
	8.1.5 It shall be provided with a connection for suction and discharge pressure gauge as standard feature.			
	8.1.6 It shall be structurally sound to provide housing for the pump assembly and shall be designed hydraulically to minimum radial load at part load operation.			
	8.1.7 MOC of Casing: ASTM A 216 Grade WCC			
8.1.8 MOC of Casing Liner :Hi Chrome alloy				
8.2 IMPELLER :				
8.2.1 Impeller shall be closed, semi-closed or open type as specified elsewhere and designed in conformance with the detailed analysis of the liquid being handled.				
8.2.2 The impeller shall be secured to the shaft, and shall be retained against circumferential movement by keying, pinning or lock rings.				
8.2.3 On pumps with overhung shaft, impellers shall be secured to the shaft by a lockout or cap screw with tightness in the direction of normal rotation.				
8.2.4 MOC of impeller: ASTM 532 Grade IIIA (Hi Chrome) with minimum hardness of 650 BHN.				
8.3 IMPELLER/CASING WEARING RINGS :				
8.3.1 Replaceable type wearing rings shall be provided at suitable locations of pumps.				
8.3.2 Suitable method of locking the wearing ring shall be used. Wearing rings shall be provided in pump casing and/or impeller as per manufacturer's standard practice.				
8.4 SHAFT AND SHAFT SLEEVES :				
8.4.1 The critical speed shall be well away from the operating speed and in no case less than 130% of the rated speed.				
8.4.2 The shaft shall be ground and polished to final dimensions and shall be adequately sized to withstand all stresses from rotor weight, hydraulic loads, vibration and torques coming in during operation.				
8.4.3 Renewable type fine finished shaft sleeves shall be provided at mechanical seals.				
8.4.4 Shaft sleeves shall be fastened to the shaft to prevent any leakage or loosening. Shaft and shaft sleeve assembly should ensure concentric rotation.				
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8.4.5 MOC of shaft: EN8 or Equivalent. 8.4.6 MOC of shaft sleeve : ASTM A743 Grade CD4MCu with a minimum hardness of 275 BHN. 8.5 BEARINGS : 8.5.1 Heavy duty bearings, adequately designed for this type of service shall be specified in the enclosed pump data sheet and for long, trouble free operation shall be furnished. 8.5.2 The bearings offered shall be capable of taking both the radial and axial thrust coming into play during operation. 8.5.3 Antifriction bearings of standard type shall be provided for continuous operation at rated head and rated speed. 8.5.4 Proper lubricating arrangement for the bearings shall be provided. The design shall be such that the bearing lubricating element does not contaminate the liquid pumped. 8.5.5 Where there is a possibility of liquid entering the bearings suitable arrangement in the form of deflectors or any other suitable arrangement must be provided ahead of bearings assembly. 8.5.6 Bearings shall be easily accessible without disturbing the pump assembly. 8.5.7 A drain plug shall be provided at the bottom of each bearings housing. 8.6 MECHANICAL SEALS : 8.6.1 Mechanical seals shall be of single type with either sliding gasket or bellows between the axially moving face and shaft sleeves or any other suitable type. 8.6.2 The sealing faces should be highly lapped surfaces of materials known for their low frictional coefficient and resistance to corrosion against the liquid being pumped. 8.6.3 The pump supplier shall coordinate with the seal maker in establishing the seal chamber of circulation for maintaining a stable film at the seal face. 8.6.4 The seal piping system shall form an integral part of the pump assembly. 8.6.5 For the seals under vacuum service, the seal design must ensure sealing against atmospheric pressure even when the pumps are not operating. Seals shall be fleshless type. 8.7 BASE PLATE : 8.7.1 A common base plate mounting both for the pump and motor shall be furnished.					
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED,	8.7.2 The base plate shall be fabricated steel and of rigid construction, suitably ribbed and reinforced. 8.7.3 Base plate and pump supports shall be so constructed and the piping unit so mounted as to minimize misalignment caused by mechanical forces such as normal piping strain, internal differential thermal expansion and hydraulic piping thrust. Suitable drain troughs and drip lip shall be provided. 8.7.4 MOC of base plate: Carbon steel epoxy coated. 9. <u>GENERAL:</u> 9.1 The slurry pump shall be provided with motorized suction and discharge valves. 9.2 In addition, flushing water lines with motorized valves shall be provided for each pump for automatic flushing of the pump after each shut down. 9.3 Motor and Belt and pulley arrangement for Mill Circuit pump shall be in the vendor scope of supply. 9.4 Supervision for commissioning shall be included in this scope. This shall be 7 mandays. This amount to be quoted separately. This will be paid on receipt of site certification for completion of activity. 9.5 Vendor should furnish the list of recommended commissioning / operational spares of the pump with prices along with the offer. 9.6 Vendor shall furnish technical data as per Annexure I and GA drawings with the offer. 9.7 Quality plan should be furnished for BHEL approval on placement of purchase order. BHEL hold points of inspection will be indicated. 10. <u>INSPECTION & TEST REQUIREMENTS:</u> 10.1 UT on shaft forgings (greater or equal to 40mm) and MPI, DPT shall be done on Shafts, impeller and casings to ensure freedom from defects. 10.2 The pump casing shall be hydraulically tested at 200% of pump rated head or at 150% of shut off head, whichever is higher. The test pressure shall be maintained for at least half an hour. 10.3 The pump rotating parts shall be subjected to static and dynamic balancing. 10.4 Noise and vibration shall be measured during the performance testing at shop. Noise level at a distance of 1.0 meter horizontally from the equipment and 1.5 m above the operating floor at site shall be less than or equal to 85 dB(A). 10.5 Pumps shall be tested at shop for capacity, head efficiency and brake horse power at rated speed as per relevant/applicable standard.				
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11. TEST CERTIFICATES: The following test certificates should be furnished in triplicate along with the consignment: 11.1 Non-Destructive test over and above the material test along with results of the following components: 11.1.1 Mechanical Seal- Manufacturer's recommendation. 11.1.2 Shaft Sleeve-DPT and Hardness test/Manufacturer's recommendation 11.1.3 Shaft, Shaft sleeve Impeller, Casing: material test, DPT, MPI and UT as applicable. 11.2 Test certificates shall be issued for each lot of raw material used in the coating, corresponding to specific weight and traction resistance. 12. PACKING: The pump shall be packed in closed wooden cases to prevent damages during transit and storage at BHEL. The flanged openings shall be protected properly to prevent entry of foreign matter in to the pump. Rain water should not enter into the internals during storage in the outer yard of power plant. 13. PAINTING: 13.1 SURFACE PREPARATION : Power Tool Cleaning to St3 (SSPC-SP3) 13.2 PRIMER COAT: 13.2.1 PRIMER: Red Oxide Zinc Phosphate Primer to IS:12744 (Two coats) DFT 60 microns. 13.2.2 INTERMEDIATE: One coat of synthetic Enamel intermediate coat to IS 2932, DFT-50 microns. 13.3 FINISH COAT : One coat of Synthetic Enamel to IS 2932,DFT-50Microns/coat Total DFT: 50 microns 13.4 Corrosion protection, coating and galvanizing, painting shall be taken care by the bidder. Bidder shall submit the painting scheme during detail Engg in line with the specification and shall be subject to approval of BHEL.					
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