



# Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

MATERIALS MANAGEMENT / CAPITAL EQUIPMENT

An ISO 9001  
Company

<b>ENQUIRY</b>	Phone: +91 431 257 70 49
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	<b>Enquiry Number:</b>	<b>Enquiry Date:</b>	<b>Due date for submission of quotation:</b>
	<b>2620800088</b>	<b>03.09.2008</b>	<b>06.10.2008</b>

You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order

Item	Description	Quantity	Delivery (Item required at BHEL on)
10	Cylindrical Grinding Machine as per the technical specification & commercial conditions applicable (to be downloaded from web site <a href="http://www.bhel.com">www.bhel.com</a> or <a href="http://tenders.gov.in">http://tenders.gov.in</a> )	01 No.	31.07.2009

**BHEL commercial terms & conditions with Price Bid and Bank Guarantee formats can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference “2620800088”.**

Tenders should reach us before 14:00 hours on the due date  
Tenders will be opened at 14:30 hours on the due date  
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present

Yours faithfully,  
For BHARAT HEAVY ELECTRICALS LIMITED

Sr.Manager / MM / Capital Equipment

**PART A****CYLINDRICAL GRINDING MACHINE****SECTION – I : QUALIFYING CRITERIA**

The BIDDER has to compulsorily meet the following requirements to get qualified for considering the technical offer for the CYLINDRICAL GRINDING MACHINE.

S. No.	REQUIREMENTS	Vendor's Response
1	<p>Only those vendors (OEMs), who have supplied and commissioned at least one <b>CYLINDRICAL GRINDING MACHINE</b> with</p> <p><b>1. Admit between centers of 1500 mm or more and</b></p> <p><b>2. Swing over bed of 300 mm or more</b> in the past ten years and such machine should be working satisfactorily for a minimum period of one year after commissioning, as on the date of opening of this Tender are eligible to quote.</p> <p><i>(However, if such machine is already supplied to BHEL, then that machine should be working satisfactorily for a minimum period of six months after commissioning, as on the date of opening of this Tender.)</i></p>	
<b>The vendor should submit the following information where similar machine has been supplied, for qualification of this offer.</b>		
1.1	Name and postal address of the customer or company where similar machine is installed.	
1.2	Name and designation of the contact person of the customer.	
1.3	Phone, FAX no and email address of the contact person of the customer.	
1.4	Month and Year of commissioning of the machine.	
1.5	Parameters of machine supplied, viz. Wheel size, Grinding diameter range, Admit between centers and the application for which the machine is supplied.	

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1.6	Along with the Technical offer, the Vendor should submit one Performance certificate from the customer for the satisfactory performance of the machine supplied to them. For obtaining the Performance certificate, a suggestive format is provided in <b>SECTION – IV</b> .	
2.0	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	

## **SECTION – I I**

The BIDDER / VENDOR is requested to provide the following information:

<b>S. No.</b>	<b>REQUIREMENTS</b>	<b>Vendor's Response</b>
3.0	The BIDDER/VENDOR to furnish Reference List of Customers, with full address, details of contact person, where <b>CYLINDRICAL GRINDING MACHINES</b> have been supplied in the past.	
4.0	Details of <b>CYLINDRICAL GRINDING MACHINES</b> supplied to other BHEL units, if any. (Year of commissioning, Wheel size, Grinding diameter range, Admit between centers).	
5.0	Details on <b>SERVICE-AFTER-SALES</b> Set-Up in India including the Address of Agents / Service Centers in South India.	
6.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

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**SECTION – III**

The BIDDER to note:

S. No.	PARTICULARS	Vendor's Response
7.0	<p>The BIDDER / VENDOR shall submit the offer in TWO PARTS.</p> <ol style="list-style-type: none"> <li>1. Technical Offer [with PART A &amp; PART B] and Commercial offer.</li> <li>2. Price Bid.</li> </ol>	
8.0	<p>The Technical Offer shall contain a comparative statement of Technical <b>Specifications demanded by BHEL</b> and <b>Offer Details submitted by the Bidder</b>, against each clause.</p> <p>A just 'CONFIRMED' or 'COMPLIED' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.</p>	
9.0	<p>The Technical Offer shall be supported by product Catalogues &amp; Data Sheets and also technical details of Bought-Out-Items with copies of Product Catalogue to the extent possible.</p>	
10.0	<p>The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation.</p>	

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**SECTION – IV**

The performance certificate should be produced **on Customer's Letter Head.**

**PERFORMANCE CERTIFICATE**

1. Supplier of the machine		
2. Make & Model of the M/C		
3. Month & Year of Commissioning		
4. Application for which M/C is used		
5	a) Wheel Size b) Grinding diameter range c) Admit between centers	
6. Performance of the Equipment (Tick whichever is applicable)		<b>Best in the market</b>
		<b>Satisfactory</b>
		<b>Good</b>
		<b>Average</b>
7. Any Other remarks		
Date:		Signature & Seal of the Authority Issuing the Performance Certificate

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**PART-B****TECHNICAL SPECIFICATION FOR CYLINDRICAL GRINDING MACHINE**

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
1.0	<b>PURPOSE:</b> The machine is intended to grind spindles, shafts, coupling gear shafts, disc, disc holder, guide of valves and soot blowers.	Vendor to confirm
1.1	<b>OPERATION:</b> 1.Grinding shall be done on outside / inside diameter of the components. 2.The surface to be ground may be cylindrical or conical.  Note: After grinding, the surface finish should be 0.8 micron (Ra).	Vendor to confirm
1.2	<b>WORK PIECE DETAILS:</b>	
1.2.1	The material shall be either AISI 4140 with a hardness of 425 BHN or Stainless steel E 410 with a hardness of 350 BHN.	Vendor to confirm
2.0	<b>SPECIFICATION OF MACHINE:</b>	
2.0.1	<b>CONFIGURATION:</b>	
2.0.2	Vendor to furnish construction details of the machine including Grinding wheel head, Work head, Tailstock, Table, Hydraulic system, Lubrication system etc. Explanatory drawings of various components and sub-assemblies of the machine.	Vendor to furnish
2.0.3	Video images on CD / Literature with photographs, drawings explaining the technical features should be enclosed with the offer.	Vendor to specify
2.1	<b>CONSTRUCTION:</b>	
2.1.1	Machine should be Metric execution.	Vendor to confirm

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
<b>2.2</b>	<b>GRINDING WHEEL HEAD:</b>	
2.2.1	Grinding wheel Diameter: Max 450 / Min 320	Vendor to specify
2.2.2	Grinding wheel Width: 60 mm	Vendor to specify
2.2.3	Wheel head Spindle diameter	Vendor to specify
2.2.4	Grinding wheel speed (RPM): 1060 / 1320	Vendor to specify
2.2.5	Swivel of wheel head: <b>+ 45° to - 45°</b>	Vendor to specify
2.2.6	Hand movement (1 revolution of wheel= 0.5 mm): <b>40 mm</b>	Vendor to specify
2.2.7	Rapid movement: <b>45 mm</b>	Vendor to specify
2.2.8	Plunge feed (infinitely variable): <b>0 – 0.05 mm/sec</b>	Vendor to specify
2.2.9	Plunge travel: <b>0.4 mm</b>	Vendor to specify
2.2.10	Bearing details of wheel head Spindle.	Vendor to specify
<b>2.3</b>	<b>MAIN PARAMETERS:</b>	
2.3.1	Maximum possible Grinding Diameter	Vendor to specify
2.3.2	Swing over Bed: <b>minimum 450 mm</b>	Vendor to specify
2.3.3	Maximum possible Grinding length:	Vendor to specify
2.3.4	Admit between centers: <b>minimum 2000 mm</b>	Vendor to specify
2.3.5	Internal Grinding Diameter range: <b>25 – 200 mm</b>	Vendor to specify
2.3.6	Maximum Internal Grinding depth: <b>200 mm</b>	Vendor to specify
2.3.7	Weight of work piece without steady rest: <b>minimum 100 Kg</b>	Vendor to specify
2.3.8	Open steady rest diameter range: <b>5 to 80 mm</b>	Vendor to specify
2.3.9	Power of Wheel head motor: <b>minimum 5 Kw</b>	Vendor to specify
2.3.10	Power of Work head motor: <b>minimum 1 Kw</b>	Vendor to specify
<b>2.4</b>	<b>WORK HEAD &amp; TAILSTOCK:</b>	
2.4.1	3 jaw self centering chuck (For job holding dia up to 250 mm)	1 no
2.4.2	Speed range of work head: <b>30 to 310 RPM</b>	Vendor to specify

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
2.4.3	Number of Steps for the speed range:	Vendor to specify
2.4.4	Taper No. of work head Center:	MT5
2.4.5	Taper No. of Tailstock Quill:	MT5
2.4.6	Tail stock operation by hydraulic:	Vendor to confirm
2.4.6	Tail stock Quill Travel:	Vendor to specify
<b>2.5</b>	<b>TABLE:</b>	
2.5.1	Table Max / Min Travel (automatic): <b>2010 mm / 2.5 mm</b>	Vendor to specify
2.5.2	Dwell at table reversal (range in seconds):	Vendor to specify
2.5.3	Table Travel speed (Infinitely variable): around <b>0.14 – 4 Mtrs/min</b>	Vendor to specify
2.5.4	Fine hand feed attachment of table	Vendor to confirm
<b>2.6</b>	<b>MACHINE GUIDEWAYS:</b>	
2.6.1	Details of Guide ways for Wheel Head and Table traverse.	Vendor to specify
2.6.2	Hardness of guide ways	Vendor to specify
<b>2.7</b>	<b>STANDARD ACCESSORIES:</b>	
2.7.1	Grinding wheel for external grinding	Vendor to specify
2.7.2	Wheel Balancing mandrel	Vendor to specify
2.7.3	Wheel Balancing stand	Vendor to specify
2.7.4	Carbide tipped centers for tailstock	Vendor to specify
2.7.5	Carbide tipped centers for work head	Vendor to specify
2.7.6	Wheel dresser	Vendor to specify
2.7.7	Open steady	Vendor to specify
2.7.8	Draw bar for collets	Vendor to specify
2.7.9	Adaptor for centers	Vendor to specify
2.7.10	Internal grinding spindle with a set of quills (grinding depth up to 200 mm)	Vendor to specify
2.7.11	Any other standard accessories not specified above	Vendor to specify

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
<b>2.8</b>	<b>SPECIAL ACCESSORIES:</b>	
2.8.1	Collets from dia 5 to 35 mm (in steps of 1 mm)	31 nos
2.8.2	Adaptor sleeve for collets in 2.8.1 above	1 set
2.8.3	Drivers from dia 5 to 85 mm (in steps of 10 mm)	9 nos
2.8.4	Face plate (minimum dia 240 mm)	1 no
2.8.5	Closed steady rest (dia 5-80 mm)	1 no
2.8.6	Closed steady rest (dia 80-190 mm)	1 no
2.8.7	Radius dresser (Max convex radius 20 mm Max concave radius 15 mm)	1 no
2.8.8	Spring actuated work support	1 no
2.8.9	Internal grinding spindle for depth up to 200 mm (additional qty)	1 no
2.8.10	Wheel balancing stand	1 no
2.8.11	Additional standard wheel flanges with balancing blocks	1 set
2.8.12	Any other special accessories not specified above	Vendor to specify
<b>2.9</b>	<b>OPERATION AND CONTROL SYSTEM:</b>	
<b>2.9.1</b>	<b>OPERATOR'S PANEL:</b> Operator's panel having complete machine control knobs/buttons/keys/levers shall be provided at a suitable location, ergonomically. All switches on the Operator's panel shall be convenient for safe operation. All displays/indications should also be conveniently placed accordingly.	Vendor to confirm
<b>2.10</b>	<b>MACHINE LIGHTS:</b>	
2.10.1	Machine Lights for sufficient illumination of complete working area should be provided for clear visibility.	Vendor to confirm
2.10.2	A magnetic base portable spotlight with sufficiently long cable should also be provided.	Vendor to confirm

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
2.10.3	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents	Vendor to confirm
2.10.4	Voltage shall be 24V for the hand lamp	Vendor to confirm
<b>2.11</b>	<b>HYDRAULIC SYSTEM:</b>	
2.11.1	<b>Make:</b> Rexroth / Vickers Sperry or any other reputed make acceptable to BHEL.	Vendor to confirm
2.11.2	Hydraulic system should be centralized. Hydraulic Tank shall preferably be located at floor level All hydraulic pipelines to be neatly laid out. (Details should be furnished at contract stage)	Vendor to confirm
2.11.3	Hydraulic circuits shall be designed with minimum number of control valves and to suit oil of ISO VG 46 or 68 only. Also minimum number of check- points to be provided wherever pressure is required to be measured for setting and trouble shooting. MINIMESS Pressure Gauge - 1 No with Connecting Hose to be provided.	Vendor to confirm
2.11.4	The control voltage for all solenoid operated valves shall be 24V DC	Vendor to confirm
2.11.5	Filtration System:	Vendor to specify
2.11.6	Failure indication:	Vendor to specify
2.11.7	Automatic shut off provision.	Vendor to specify
2.11.8	Refrigerated type cooling system of sufficient capacity to maintain complete Hydraulic System, including lubrication oil, hydraulic oil and gearbox oil, etc. at a temperature not exceeding 50 °C irrespective of the ambient conditions. Vendor should submit complete details.	Vendor to specify
2.11.9	Hydraulic pump capacity (flow / pressure):	Vendor to specify
2.11.10	Each pump should have an independent motor.	Vendor to confirm

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Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
2.11.11	<b>First filling of all required Oils &amp; Grease etc.</b> Should be supplied by vendor. <b>Oil grade:</b> ISO VG46 or 68 <b>Grease:</b> Servo gem grade 2 (preferred.) Indigenous (Indian) source or Indian equivalent and specifications of oils/ greases are also to be provided by the vendor.	Vendor to specify
2.12	<b>COOLANT SYSTEM:</b>	
2.12.1	Type: Re-circulating type Flood Coolant System with all accessories.	Vendor to confirm
2.12.2	Coolant Pressure to be furnished	Vendor to specify
2.12.3	Coolant flow rate to be furnished	Vendor to specify
2.12.4	Coolant collection and re-circulation system should be leak proof to avoid spillage on shop floor.	Vendor to confirm
2.12.5	<b>Coolant Filtration System:</b> Re-circulating type with suitable magnetic filtration system. Vendor shall give details of offered filtration unit.	Vendor to furnish
2.12.6	Coolant flow diagram showing filters, pumps, valves, tanks etc. to be submitted with the offer.	Vendor to submit
2.12.7	Coolant Tank Capacity:	Vendor to specify
2.12.8	Coolant pump & motor details:	Vendor to specify
2.12.9	The coolant tank should be fitted with skimmer for regular cleaning of coolant from contamination with tramp oil.	Vendor to Confirm
2.12.10	Splash Guard with transparent windows should be provided to view progress of grinding and to avoid splash of Coolant.	Vendor to specify

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
<b>2.13</b>	<b>ELECTRICAL:</b>	
2.13.1	415V $\pm$ 10%, 50 HZ $\pm$ 3 HZ, 3 Phase AC (3 wire system with out neutral) Power Supply will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets, shall be the responsibility of vendor. Requirement of grounding/earthing with required material details is to be informed by vendor well in advance so that the same could be incorporated during construction of foundation	Vendor to Confirm
<b>2.14</b>	<b>Tropicalisation:</b> All electrical / electronic equipment shall be tropicalized.	Vendor to Confirm
2.14.1	All electrical & electronic control cabinets & panels should be dust and vermin proof and shall have IP 54 protection.	Vendor to Confirm
2.14.2	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to Confirm
2.14.3	All electrical and electronic panels including operator's panel should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220Volts, 5/15 Amp AC. All adapters/receptacles should have compatibility with Indian equivalents.	Vendor to Confirm
2.14.4	Motors shall conform to IEC or Indian Standards	Vendor to Confirm
2.14.5	All cables moving with traversing axes should be installed in caterpillar / Drag chain. Additionally, all the cable trays required for laying of cables should be included in the offer.	Vendor to Confirm
2.14.6	Vendor should ensure proper earthing for the machine and its peripherals.	Vendor to Confirm

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
<b>2.15</b>	<b>SAFETY ARRANGEMENTS:</b>	
2.15.1	Machine should have adequate and reliable safety interlocks or devices to avoid damage to the machine, work piece and the operator due to the malfunctioning or mistakes.	Vendor to Confirm
2.15.2	All the pipes, cables etc. on the machine should be well supported and protected. These should not create any hindrance to machine operator's movement for effective use of machine.	
2.15.3	All rotating parts of the machine should be with proper guarding and statically & dynamically balanced to avoid undue vibrations.	Vendor to Confirm
2.15.4	Emergency Switches at suitable locations as per Norms should be provided.	Vendor to Confirm
2.15.5	Oil & water lines should not run with electrical cable in the same tray / trench.	Vendor to Confirm
<b>2.16</b>	<b>ENVIRONMENTAL PERFORMANCE OF THE MACHINE:</b>	
2.16.1	Noise level shall not exceed 85 dB(A) at normal load condition, 1 meter away from the machine.	Vendor to Confirm
2.16.2	There shall not be any emissions from the machine except fumes of cutting fluid during grinding.	Vendor to Confirm
2.16.3	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to Confirm
2.16.4	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to Confirm
<b>3.0</b>	<b>COMPRESSED AIR POINTS:</b>	
3.1	Compressed air at 60 to 70 psi will be made available at one point. The vendor shall indicate the inlet point for compressed air in the layout drawing of the machine.	Vendor to Confirm

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
<b>4.0</b>	<b>LEVELING &amp; ANCHORING SYSTEM</b>	
4.1	Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc should be supplied.	Vendor to confirm
<b>5.0</b>	<b>TOOLS FOR OPERATION &amp; MAINTENANCE</b>	
5.1	Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer.	Vendor to confirm Vendor to submit
<b>6</b>	<b>SPARES:</b>	
6.1	<p><b>1)</b> The Vendor shall recommend and submit list of spares required for the machine for two years of trouble free operation on three shifts /day basis under two headings as</p> <ul style="list-style-type: none"> <li>a) <b>Mechanical &amp; hydraulic spares</b> and</li> <li>b) <b>Electrical &amp; electronic spares.</b></li> </ul> <p>The list shall generally include the following items.</p> <p><b>a) Mechanical &amp; Hydraulic Spares:</b> All types of pumps, All types of Valves, All types of pressure switches / transducers, All types of filters, All types of seals</p> <p><b>b) Electrical &amp; Electronic Spares:</b> All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch, I/O Cards for PLC, &amp; Control Cards for Main Drive as well as Feed Drives etc.</p> <p><b>c)</b> Un-priced list of spares with quantities, specified at <b>a&amp;b</b> above, should be submitted with this technical offer.</p> <p><b>d)</b> Unit Price of each item figuring in <b>c</b> shall be submitted with the price bid.</p>	Vendor to Submit

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER With Technical details
6.2	All types of spares for the total machine and its accessories should be available for minimum ten years, after supply of the machine. If any spares or controls are likely to become obsolete within this period, the vendor should inform BHEL and provide details of it's suppliers to enable BHEL to procure them in advance.	Vendor to Confirm	
6.3	In case of ordering, a complete list of spares for the machine and its accessories along with spares specification / type / model, and name & address of the spare supplier shall be submitted along with documentation while supplying the machine.	Vendor to confirm	
<b>7.0</b>	<b>DOCUMENTATION:</b>		
7.1	3 sets of following documents (3 Hard copies) in English language should be supplied along with the machine	Vendor to confirm	
7.2	Operating manuals of Machine	Vendor to confirm	
7.3	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic/ Coolant / Hydraulic circuit diagrams.	Vendor to confirm	
7.4	Commissioning manuals for spindle & feed drives.	Vendor to confirm	
7.5	Catalogues / O&M Manuals of all bought out items.	Vendor to confirm	
7.6	Detailed specification of all rubber items and hydraulic/lube fittings	Vendor to confirm	
7.7	<b>Bearings:</b> Make& Specification of all bearings in the machine.	Vendor to Specify	
7.8	PLC hardware, software manual	Vendor to confirm	
7.9	PLC I /O, flag details	Vendor to confirm	
7.10	PLC Ladder diagram & Statement list with comments in English.	Vendor to confirm	
7.11	PLC data on CD	Vendor to confirm	
7.12	The vendor shall submit complete Master List of parts used in the machine.	Vendor to Submit	
7.13	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to confirm	

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
<b>8.0</b>	<b>TRAINING:</b>	
8.1	The Vendor shall train Two BHEL Engineers in Operation and Maintenance (Mechanical, Electrical/ Electronics) of the Machine at Vendor's works for a period not exceeding 5 working days.	Vendor to confirm
8.2	Airfare, boarding & lodging for the BHEL Engineers shall be borne by BHEL	
8.3	The Vendor shall impart training to BHEL's Machine Operators and Maintenance crew in Operation and Maintenance after the commissioning of the Machine at BHEL works for not less than 6 working days	Vendor to confirm
8.4	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel	Vendor to confirm
8.5	Vendor to quote on the basis of per man per day for the training at vendor's works.	Vendor to specify
<b>9.0</b>	<b>FOUNDATION:</b>	
9.1	Vendor shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI). Vendor shall submit complete foundation details including static and dynamic loads within three months after getting BHEL's approval. The layout should consist of all requirements pertaining to complete machine including space requirement & other accessories. BHEL will construct complete foundation for the machine.	Vendor to confirm
9.2	The Vendor shall indicate detailed specifications of grouting compound and Grouting procedure etc. for foundation bolts of the machine.	Vendor to Specify

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<b>10.0</b>	<b>ERECTION &amp; COMMISSIONING</b>	
10.1	<p>1. Supplier to take full responsibility for supervision of the erection. Start up, testing of machine, it's control system &amp; all types of other supplied equipment, grinding of test pieces etc. are the responsibility of the supplier.</p> <p>2. Service requirement like power, air &amp; water shall be provided by BHEL at only one point to be indicated by supplier in their foundation/layout drawings.</p> <p>3. Other requirements like crane and helping personnel shall also be provided by BHEL, free of cost.</p>	Vendor to confirm
10.2	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, mentioned under clause ( <b>Machine Acceptance</b> ) shall form part of the commissioning activity.	Vendor to confirm
10.3	Tools, Tackles, instruments and other necessary equipments should be brought by the supplier to carry out erection and commissioning.	Vendor to confirm
10.4	The supplier shall arrange commissioning spares required for commissioning of the machine.	Vendor to confirm
10.5	Portion, if any, of the machine, accessories and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colors of paint used.	Vendor to confirm
10.6	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to confirm
10.7	<p>Duration, terms &amp; conditions for E&amp;C should be furnished with this technical offer in detail.</p> <p>Charges for the same shall be submitted with the price bid.</p>	Vendor to confirm

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
11.0	<b>ACCURACY TESTS:</b>	
11.1	<b>GEOMETRICAL ACCURACY:</b>	
11.1.1	Geometrical Accuracy Tests shall be in accordance with ISO 3875 standard or equivalent applicable standard. Detailed Test Charts for the same, clearly showing the accuracies to be achieved on the machine, shall also be submitted with the offer.	Vendor to confirm
11.1.2	All the above accuracies to be demonstrated to BHEL engineers during pre-acceptance tests at Suppliers works and during Erection & Commissioning at BHEL Works.	Vendor to confirm
12.0	<b>AMBIENT CONDITIONS &amp; THERMAL STABILITY:</b>	
12.1	Power Supply : AC 415 V $\pm$ 10% Frequency : 50 Hz $\pm$ 3HZ Phases : 3 phase 3 wire system Compressed air supply: 60-70 psi Ambient Temperature: max 45 °C Relative Humidity = 85% Vendor to confirm that machine is suitable for above conditions	Vendor to confirm
12.2	Weather conditions are tropical. Atmosphere may be dust laden during some part of the year. Machine will be installed in the normal shop floor condition. Vendor to confirm that machine is suitable for above	Vendor to confirm
12.3	Thermal Stability of the machine shall be good enough to withstand the specified ambient conditions in order to meet the accuracy requirements of BHEL components. Vendor to confirm for trouble-free operation of the machine.	Vendor to confirm
12.4	The Vendor should confirm that the machine and its accessories is suitable for continuous operation at its full capacity for 24 hours a day and 7 days a week through out	Vendor to confirm

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
<b>13.0</b>	<b>PROVEOUT OF BHEL COMPONENTS:</b>	
13.1	<p><b>1.</b> Drawings of prove-out components are enclosed. Components will be supplied by BHEL for prove-out at BHEL. Please refer <b>Annexure 1</b> for List of prove- out components and operations.</p> <p><b>2.</b> For grinding of prove-out components, Job setting plan, grinding process plan etc. shall be discussed and agreed mutually. <i>(Final prove out component drawing number may change, however, the grinding features of the changed components shall be in line with the original component drawing.)</i></p> <p><b>3.</b> Vendor shall be fully responsible for grinding of prove-out components as per drawing.</p>	Vendor to Confirm
<b>14.0</b>	<b>MACHINE ACCEPTANCE:</b> (Tests/Activities should be Performed by Vendor)	
<b>14.1</b>	<b>Tests/Activities should be carried out at supplier's works on the machine before dispatch:</b>	
14.1.1	Geometrical accuracies as per test chart.	Vendor to confirm
14.1.2	The machine should be tested for continuous running of 48 hrs. If any break down occurs during this test, the test should be repeated for 48 hrs from restarting.	Vendor to confirm
14.1.3	Demonstration of all features of the machine, control system & accessories.	Vendor to confirm
14.1.4	The vendor to arrange 3 test pieces for inspection of grinding machine at vendor works.	Vendor to confirm

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical details
<b>14.2</b>	<b>Tests/Activities should be carried out at BHEL works while commissioning the machine:</b>	
14.2.1	Geometrical accuracies as per test chart.	Vendor to confirm
14.2.2	The machine should be tested for continuous running of 48 hrs. If any break down occurs during this test, the test should be repeated for 48 hrs from restarting.	Vendor to confirm
14.2.3	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine	Vendor to confirm
14.2.4	Prove-out grinding with BHEL components.	Vendor to confirm
<b>15.0</b>	<b>PACKING</b>	
15.1	Sea worthy & rigid packing for all items of complete machine, all Accessories and other supplied items to avoid any damage/loss in transit. When machine is dispatched in containers, all small loose items shall be suitably packed in boxes.	Vendor to specify
<b>16.0</b>	<b>GUARANTEE</b>	
16.1	24 months from the date of acceptance of the machine at BHEL.	Vendor to confirm
<b>17.0</b>	<b>GENERAL</b>	
17.1	Machine Model:	Vendor to specify
17.2	Total connected load (KVA): Vendor to specify	Vendor to specify
17.3	Floor area required (L x W x H) for complete machine & accessories.	Vendor to specify
17.4	Painting of Machine / Electrical Panels: RAL 6011 Apple Green (Polyurethane Paint)	Vendor to specify
17.5	Total weight of the machine: Vendor to specify	Vendor to specify
17.6	Weight of heaviest part of machine: Vendor to specify	Vendor to specify

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER With Technical details
17.7	Weight of the heaviest assembly / sub-assembly of the Machine:	Vendor to specify	
17.8	Dimensions of largest part/ sub-assembly/ assembly of the machine: Vendor to specify	Vendor to specify	

### ANNEXURE - I

#### Prove out Job details for CYLINDRICAL GRINDING

Sl. No	Drawing Title	Drawing No.	Prove out Qty	Operation
1	Piston	2-V-4C32-04864-00	1	O.D Grinding $\text{Ø}380.95^{-0.020}$
2	Disc Holder	3-V-7000-10007-03	1	O.D Grinding $\text{Ø}87.190^{-0.025}$
3	Disc Holder	3-V-7012-10139-02	1	O.D Grinding $\text{Ø}206.12^{-0.100}$
4	Guide	3-V-7007-10079-01	1	I.D Grinding $\text{Ø}182.170^{+0.15}$
5	Upper adjusting ring	3-V-7816-10369-02	1	I.D Grinding $\text{Ø}63.500^{\pm 0.075}$ and $\text{Ø}62.355^{+0.100}$

PRR

KPL

SSP

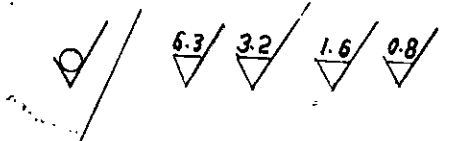
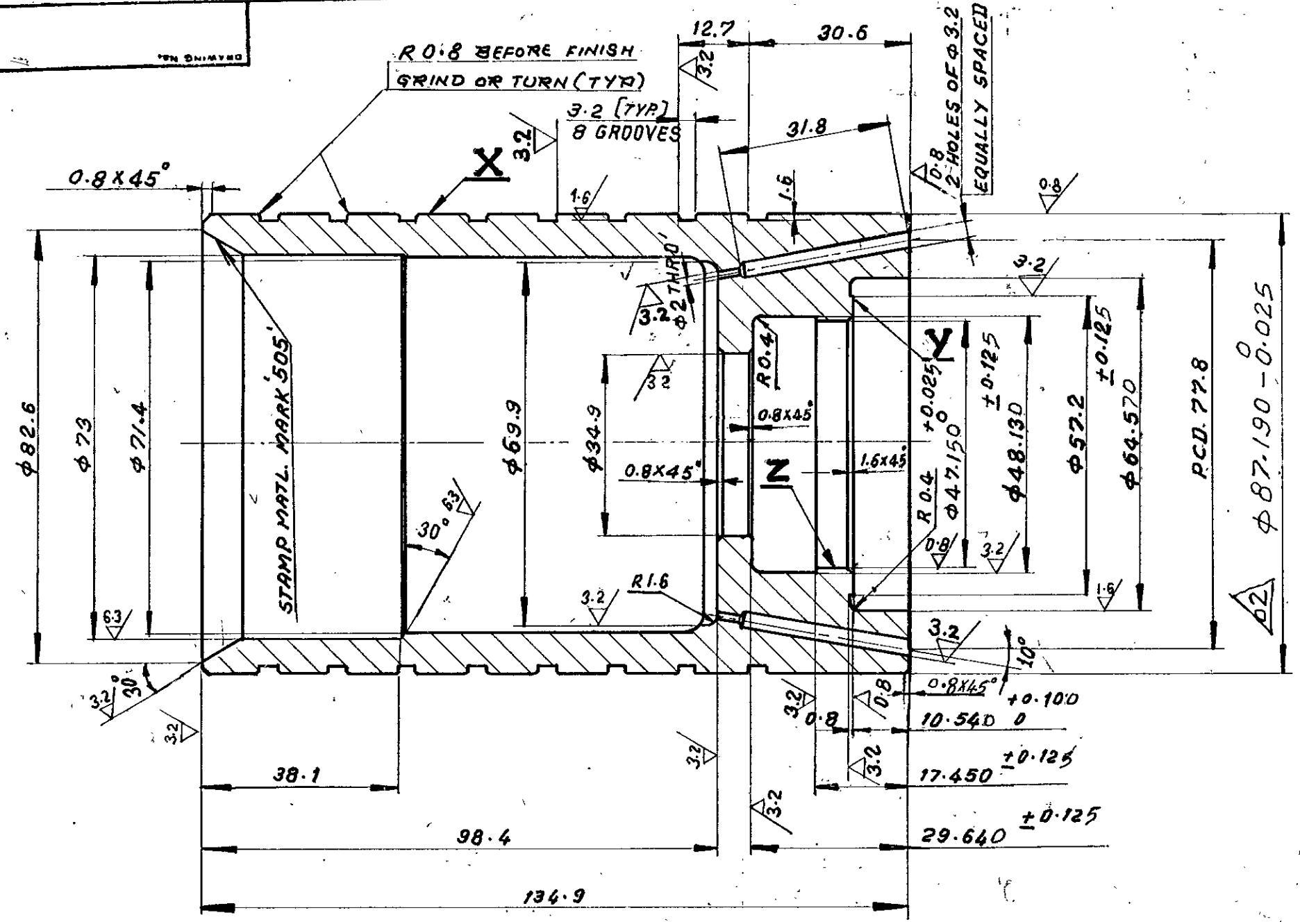
RDR

AVC

NRM



FIRST ANGLE PROJECTION (ALL DIMENSIONS IN MILLIMETRES)



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**NOTES :-**

1. WHEN INDICATED AT DIAMETER 'X' AND SURFACE 'Y' RUNOUT AT DIAMETRE 'Z' NOT TO EXCEED 0.076 T.I.R.
2. SHARP CORNERS TO BE REMOVED.
3. UNSPECIFIED ANGLE TOLERANCES  $\pm \frac{1}{2}^\circ$
4. HEAT TREAT, IF NECESSARY, TO ACHIEVE SPECIFIED HARDNESS

REV. 03	DATE 9-3-96	ALTD: V. Bhandari	02	DATE 06-10-95	ALTERED: CHD & APPD: V.P.	REV 01	DATE 23/11/87	ALTERED: [Signature]	CHECKED: [Signature]
FINAL MATL. SPN. CERTIFY WAS AMENDED CERTIFY DCN No.: SV:0372		NOTE NO. 4 ADDED. DIMENSION 87.190-0.025 WAS 87.325-0.025 DCN No.: SV:0347		ADDED 0.8 RADIUS TO 0.8 GROOVES.					

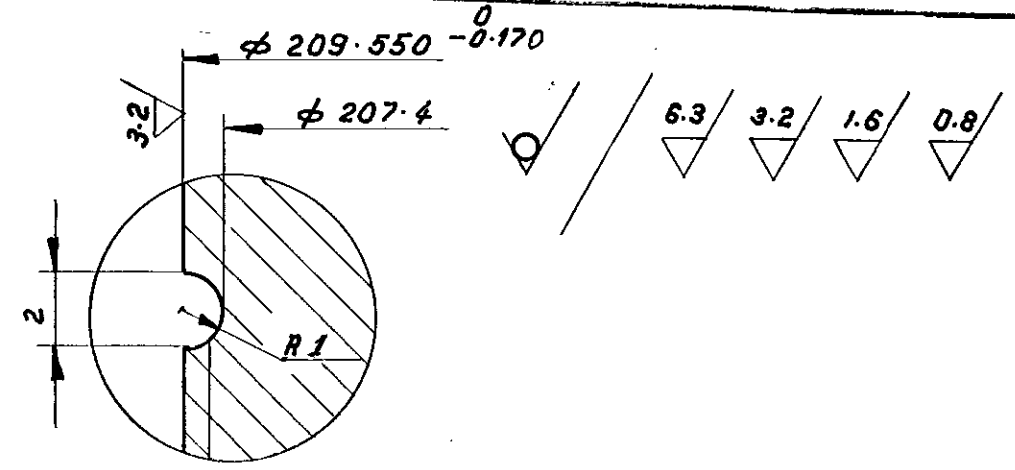
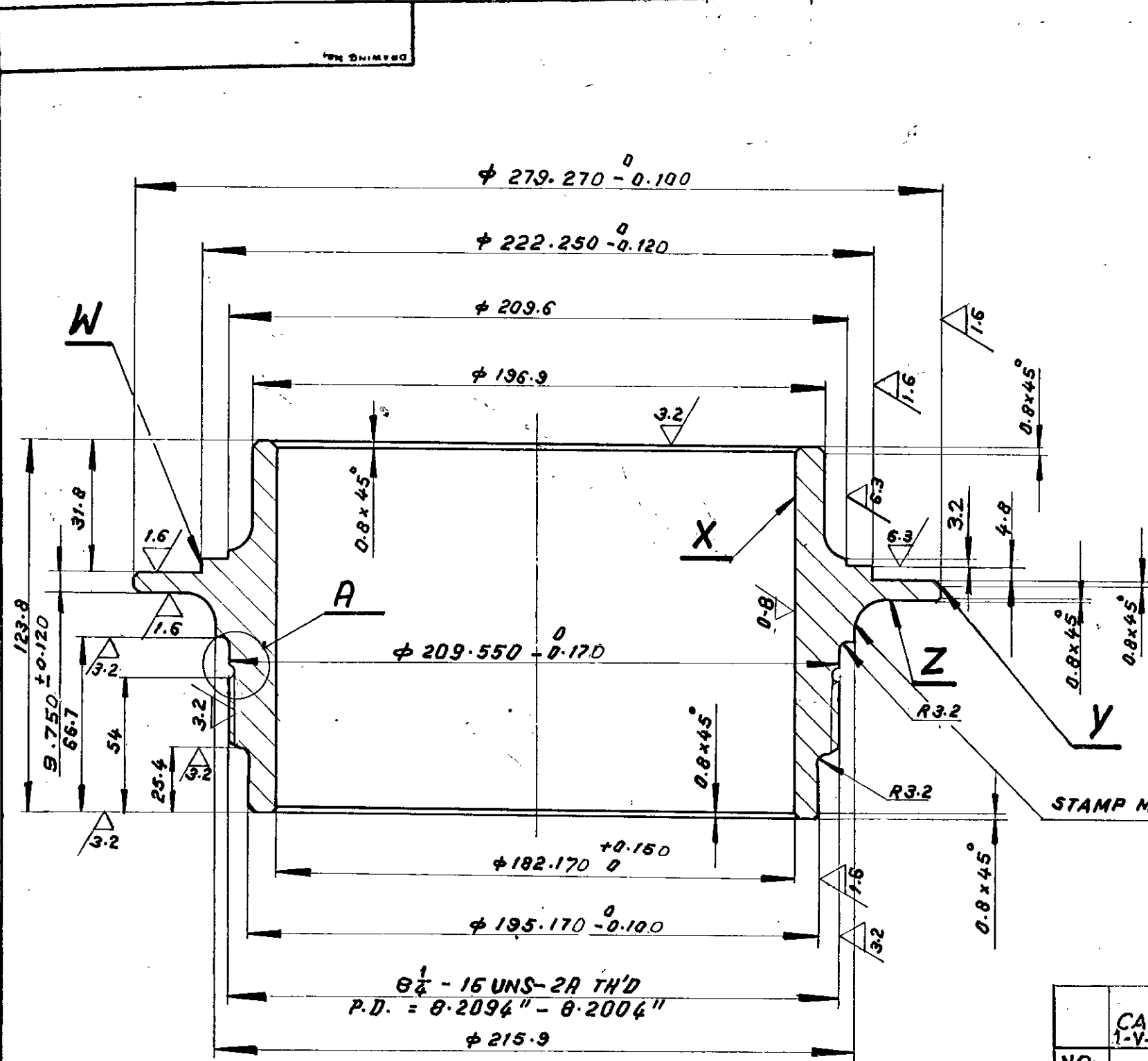
MICROFILMED ON 20/1/87  
ROLL 00532 P. 10970

CASTING DRG. 1-V-7000-192037/02	92017478	MONEL ALLOY 505 CERTIFY	NOTE-4 PRECIPITATE HARDENING 32 HRC (MIN)	60	2.0	3-91	028
NO DESCRIPTION	MATL CODE	FINAL MATL	HEAT TREATMENT	SCRAP CODE	NET WT	GROSS WT	DRG. NO
DEPT V/L		CODE 340	SCALE NTS	WEIGHT (kg.)	PART NO 4347801-51-NO 10573 DR. DRG. NO. 343478		
TITLE DISC HOLDER				DRAWN K.R.	SIGN [Signature]	DATE 15/6/79	
DIMENSIONS TO BE CONTROLLED WITHIN LIMITS AS SHOWN. MACHINING TOLERANCE $\pm 0.25$ mm UNLESS OTHERWISE SHOWN NON-MACHINING TOLERANCE $\pm$				CARD CODE 1739 WD	DRAWING NO. 3-V-7000-10007 03		

DMAC CODE: 93070013 0000

SIZE A-3

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**DETAIL-A**

**NOTE:-**

1. DIAMETERS W, X & Y TO BE CONCENTRIC WITHIN 0.075 T.I.R
2. WHEN INDICATING AT DIAMETER 'X' AND SURFACE 'Z' RUNOUT AT DIAMETER W & Y NOT TO EXCEED 0.075 T.I.R
3. SHARP CORNERS TO BE REMOVED
4. 45° CHAMFER FIRST THREAD.
5. HEATTREAT, IF NECESSARY, TO ACHIEVE SPECIFIED HARDNESS.

STAMP MATL MARK 505

MICROFILMED ON 20.1.84  
ROLL 05533 008

NO. OFF	DESCRIPTION	MATL. CODE	FINAL MATL.	HEAT TREATMENT	SCRAP NET WT (kg)	Gross WT (kg)	DRG. NO.	ITEM No.
	CASTING 1-V-7007-10238/02	97017496	MONEL ALLOY 505 CERTIFY	PRECIPITATE HARDENING 32 HRC (MIN)	60	8.37	15.96	031

**BHARAT HEAVY ELECTRICALS LIMITED**  
BOILER PLANT UNIT, TIRUCHIRAPALLI-620014

DEPT	CODE	SCALE	WEIGHT (kg)	DR. DRG. NO. 316079/CD516	SL No. 1085
TITLE			PART NO: 1607902		
<b>GUIDE</b>			DRAWN	NAME	DATE
			CHECKED	SIGN	DATE
DIMENSIONS TO BE CONTROLLED WITHIN LIMITS AS SHOWN. MACHINING TOLERANCE ± 0.25 mm UNLESS OTHERWISE SHOWN NON-MACHINING TOLERANCE ±			DRAWING NO. <b>3-V-7007-10079 01</b>		
DCN. No: SV: 0373			1775 QWD		

OMAC CODE: 930702430000



