

|  <b>BHARAT HEAVY ELECTRICALS LIMITED</b><br><b>Heavy Power Equipment Plant</b><br><b>Hyderabad – 502032, INDIA</b><br><b>Phones:</b><br><b>Fax No.s : 040-23021910 &amp; 23021954</b><br><b>E-Mail :</b> |                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                              |                           |         |         |
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| <b>TENDER DOCUMENTS TO BE FILLED BY THE SUPPLIER FOR SUPPLY OF CRANE SUSPENDED 15TON BOTTOM POURING LADLE WITH SLIDE GATE MECHANISM (Pneumatically Operated/Hydraulic Operated)</b>                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                              |                           |         |         |
| <b>ADDRESS OF THE SUPPLIER:</b>                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                              |                           |         |         |
| <b>TELEPHONE NOS :</b>                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                              |                           |         |         |
| <b>FAX NOS :</b>                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                              |                           |         |         |
| <b>E MAIL ADDRESS :</b>                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                              |                           |         |         |
| Sl. No.                                                                                                                                                                                                                                                                                   | DESCRIPTION OF BHEL REQURIMENT                                                                                                                                                                                                                                                                                                                                    | BHEL SPEC.                                                                                                                                                                                                   | Specified/To be Confirmed | OFFERED | REMARKS |
| 1                                                                                                                                                                                                                                                                                         | <b>PURPOSE</b>                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                              |                           |         |         |
|                                                                                                                                                                                                                                                                                           | a)Bottom pouring ladle of 15 Ton capacity is required to handle molten Steel and to carry out pouring operations in Foundry.                                                                                                                                                                                                                                      |                                                                                                                                                                                                              | Vendor to confirm         |         |         |
|                                                                                                                                                                                                                                                                                           | b)Collection of liquid metal from furnace and carrying it to the moulding area for pouring of liquid metal to the moulds.                                                                                                                                                                                                                                         |                                                                                                                                                                                                              | Vendor to confirm         |         |         |
| 2                                                                                                                                                                                                                                                                                         | <b>TECHINICAL DETAILS</b>                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                              |                           |         |         |
| 2.1                                                                                                                                                                                                                                                                                       | <b>Liquid Metal Holding Capacity of Ladle</b>                                                                                                                                                                                                                                                                                                                     | 15Ton                                                                                                                                                                                                        | Vendor to confirm         |         |         |
| 2.2                                                                                                                                                                                                                                                                                       | <b>Quantity required</b>                                                                                                                                                                                                                                                                                                                                          | 1 No.                                                                                                                                                                                                        | Vendor to confirm         |         |         |
| 2.3                                                                                                                                                                                                                                                                                       | <b>Type of Ladle</b>                                                                                                                                                                                                                                                                                                                                              | Bottom pouring of Tapered body ladle with Slide Gate Mechanism along with integrated gear box assembly for tilting arrangement.(Pneumatically operated with manual operation provision in case of emergency) | Vendor to confirm         |         |         |
| 2.4                                                                                                                                                                                                                                                                                       | <b>DIMENSIONS</b>                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                              |                           |         |         |
|                                                                                                                                                                                                                                                                                           | Supplier has to get the type and dimensions of the ladle approved by M/s BHEL after placement of Order and adopt the necessary changes if any.<br><br>The tentative dimensional details of the ladle can be as follows                                                                                                                                            |                                                                                                                                                                                                              | Vendor to confirm         |         |         |
| 2.4.1                                                                                                                                                                                                                                                                                     | <b>Shell Dimensions</b>                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                              |                           |         |         |
|                                                                                                                                                                                                                                                                                           | Top Dia                                                                                                                                                                                                                                                                                                                                                           | 1900 mm                                                                                                                                                                                                      | Vendor to Specify         |         |         |
|                                                                                                                                                                                                                                                                                           | Bottom Dia                                                                                                                                                                                                                                                                                                                                                        | 1700 mm                                                                                                                                                                                                      | Vendor to Specify         |         |         |
| 2.4.2                                                                                                                                                                                                                                                                                     | <b>Plate or Shell Thickness</b>                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                              |                           |         |         |
|                                                                                                                                                                                                                                                                                           | Side                                                                                                                                                                                                                                                                                                                                                              | 16 mm                                                                                                                                                                                                        | Vendor to Specify         |         |         |
|                                                                                                                                                                                                                                                                                           | Bottom                                                                                                                                                                                                                                                                                                                                                            | 20 mm                                                                                                                                                                                                        | Vendor to Specify         |         |         |
| 2.4.3                                                                                                                                                                                                                                                                                     | <b>Refractory Lining thickness</b>                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                              |                           |         |         |
|                                                                                                                                                                                                                                                                                           | Side                                                                                                                                                                                                                                                                                                                                                              | 150 mm                                                                                                                                                                                                       | Vendor to Specify         |         |         |
|                                                                                                                                                                                                                                                                                           | Bottom                                                                                                                                                                                                                                                                                                                                                            | 180 mm                                                                                                                                                                                                       | Vendor to Specify         |         |         |
| 2.4.4                                                                                                                                                                                                                                                                                     | Top Clearance for slag Portion                                                                                                                                                                                                                                                                                                                                    | 280 mm                                                                                                                                                                                                       | Vendor to Specify         |         |         |
| 3                                                                                                                                                                                                                                                                                         | <b>FEATURES :</b>                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                              |                           |         |         |
| 3.1                                                                                                                                                                                                                                                                                       | <b>DOUBLE LIP</b>                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                              |                           |         |         |
| 3.1.1                                                                                                                                                                                                                                                                                     | Lip to be provided on both sides of the ladle for pouring on either left or right as per mold requirement/location.                                                                                                                                                                                                                                               |                                                                                                                                                                                                              | Vendor to Confirm         |         |         |
| 3.1.2                                                                                                                                                                                                                                                                                     | Bottom pouring ladle shall be supplied with Slide Gate Mechanism (pneumatically operated /hydraulically operated ) for opening & pouring of molten metal , gear mechanism with hand wheel for tilting the ladle, trunions, trunion shaft , heat shield, Crane hook eye / shackle for lifting with EOT crane lop, legs, refractory lining ring, locking lever etc. |                                                                                                                                                                                                              | Vendor to Confirm         |         |         |
| 3.1.3                                                                                                                                                                                                                                                                                     | <b>Gear Box Assembly Details:</b>                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                              |                           |         |         |
|                                                                                                                                                                                                                                                                                           | <b>It should be robustly and accurately designed.</b>                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                              | Vendor to Confirm         |         |         |
|                                                                                                                                                                                                                                                                                           | Gear Box Tilting Arrangement:                                                                                                                                                                                                                                                                                                                                     | Worm & Worm Wheel                                                                                                                                                                                            | Vendor to Confirm         |         |         |
|                                                                                                                                                                                                                                                                                           | Body                                                                                                                                                                                                                                                                                                                                                              | Steel                                                                                                                                                                                                        | Vendor to Confirm         |         |         |
|                                                                                                                                                                                                                                                                                           | Worm Wheel                                                                                                                                                                                                                                                                                                                                                        | Phosphorous Bronze                                                                                                                                                                                           | Vendor to Confirm         |         |         |
|                                                                                                                                                                                                                                                                                           | Worm Shaft                                                                                                                                                                                                                                                                                                                                                        | EN-8 Bar                                                                                                                                                                                                     | Vendor to Confirm         |         |         |
|                                                                                                                                                                                                                                                                                           | Bevel Gears                                                                                                                                                                                                                                                                                                                                                       | EN-8 Bar                                                                                                                                                                                                     | Vendor to Confirm         |         |         |

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| 3.1.4 | <b>Crane hook eye</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                   |  |  |
|       | Crane hook eye should be in single Piece design                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | Vendor to Confirm |  |  |
|       | Standard Test to be done so as to avoid cracks/damage to the Crane hook eye during usage of ladle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  | Vendor to Confirm |  |  |
|       | Provision for adjustment to balance the ladle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | Vendor to Specify |  |  |
| 3.1.5 | <b>Heat/Splash</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                   |  |  |
|       | Ladle should be furnished with a heat shield fixed to the underside of the bail to aid in deflecting heat away from the Crane hook eye and hoist Crane hook eye"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | Vendor to Confirm |  |  |
|       | SPLASH Guard to be provided over the rotating parts of gear box which are exposed to outside atmosphere.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | Vendor to Confirm |  |  |
| 3.1.6 | <b>Handle Wheel</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                   |  |  |
|       | It should be sufficiently large for easy tilting of ladle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | Vendor to Confirm |  |  |
| 3.1.7 | <b>Locking Arrangement</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                   |  |  |
|       | Lock should be provided to avoid tilting while transporting the liquid metal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | Vendor to Confirm |  |  |
| 3.1.8 | <b>Slide Gate System Mechanism</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                   |  |  |
|       | a)Slide gate mechanism is adopted for pouring of steel from bottom portion of the ladle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | Vendor to Confirm |  |  |
|       | b)Slide gate mechanism is fixed/fitted to the bottom portion of ladle.Slide Gate System should be operated in a such a way that where uniform flow of molten liquid is maintained and achieved.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | Vendor to Confirm |  |  |
|       | c)Slide Gate system shall be opened pneumatically/hydraulically and also it should have provision for manual operation, in case of emergency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | Vendor to Confirm |  |  |
|       | d) Minimum no of openings ensured with the design of the slide gate mechanism along with the specification provided for the refractory plates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | Vendor to specify |  |  |
|       | e) Complete accessories like hose pipe ,hose pipe nipple, valves, opening and closing of slide gate mechanism opener etc.which are required for prove out of operation of slide gate mechanism is in vendor's scope (except compressor).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | Vendor to Confirm |  |  |
| 3.1.9 | <b>Safety</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                   |  |  |
|       | a)Bidder should ensure to design & manufacture the ladle with relevant standard norms and condition.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | Vendor to Confirm |  |  |
|       | b)Bidder should ensure to provide all safety interlocks such as Safety Locks for Both Arms, Secondary Locking Assembly fitted to the Gearbox Handle which is intended to be used to lock the gearbox when the ladle is being moved with the shell in partly rotated position.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | Vendor to Confirm |  |  |
|       | c)Bidder should ensure to use all hardware and fasteners are of High tensile materials.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  | Vendor to Confirm |  |  |
| 3.2   | <b>a)Features:</b> The Bottom pouring ladle -15 ton capacity for Steel should have a robust gear box for easy manual tilting of ladle. The trunnion shaft should be welded integral to the ladle shell through trunnion pads and be mounted on ball bearings. Ladles should be fabricated from heavy steel plates and should be provided with stiffener rings to avoid any distortion of shell. Ladles should be designed to have proper stability when emptied in all positions.Proper lock shall be provided to avoid tilting of ladle when the liquid metal is filled in the ladle.Lips shall be provided on both sides of the ladle . Ladle to remain stable at all the angles and should not move forward or backword due to its own weight and weight of the metal. |  | Vendor to Specify |  |  |

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|     | <b>b)Control:</b> The Bottom pouring ladle should be capable of operating smoothly on regular basis in melting area. It must work at low maintenance level. There should be easy accessiblity for periodic greasing of the gear box.Flow to be controlled. Slide gate System Mechanism should be operated in a such a way that where uniform flow of molten liquid is maintained. |        | Vendor to Specify |  |  |
| 3.3 | <b>Spares</b><br><b>Spares for two years trouble free operation with item wise unit price</b>                                                                                                                                                                                                                                                                                     |        | Vendor to Confirm |  |  |
|     | i)Bevel Gear                                                                                                                                                                                                                                                                                                                                                                      |        | Vendor to Confirm |  |  |
|     | ii)Bevel pinion                                                                                                                                                                                                                                                                                                                                                                   |        | Vendor to Confirm |  |  |
|     | iii)Worm Wheel                                                                                                                                                                                                                                                                                                                                                                    |        | Vendor to Confirm |  |  |
|     | iv)Worm Shaft                                                                                                                                                                                                                                                                                                                                                                     |        | Vendor to Confirm |  |  |
| 3.4 | <b>V)Slide Gate Mechanism</b>                                                                                                                                                                                                                                                                                                                                                     |        | Vendor to Confirm |  |  |
|     | a) Refractory Plates.                                                                                                                                                                                                                                                                                                                                                             |        | Vendor to Confirm |  |  |
|     | b)Hose Pipe,Valves,                                                                                                                                                                                                                                                                                                                                                               |        | Vendor to Confirm |  |  |
|     | C)Any other material if any.                                                                                                                                                                                                                                                                                                                                                      |        | Vendor to Confirm |  |  |
| 3.5 | <b>Refractory Details</b>                                                                                                                                                                                                                                                                                                                                                         |        |                   |  |  |
|     | A)Side Brick Drawing                                                                                                                                                                                                                                                                                                                                                              |        | Vendor to confirm |  |  |
|     | B)Bottom Brick Drawing                                                                                                                                                                                                                                                                                                                                                            |        | Vendor to confirm |  |  |
|     | C)Specification of refractory brick & Motor                                                                                                                                                                                                                                                                                                                                       |        | Vendor to confirm |  |  |
| 3.6 | <b>Refractory Spares One Set(optional &amp; to be quoted Seperately)</b>                                                                                                                                                                                                                                                                                                          |        | Vendor to Confirm |  |  |
|     | A] Side Bricks                                                                                                                                                                                                                                                                                                                                                                    |        | Vendor to Confirm |  |  |
|     | B] Bottom Bricks                                                                                                                                                                                                                                                                                                                                                                  |        | Vendor to Confirm |  |  |
|     | C)Any other material if required for lining Purpose.                                                                                                                                                                                                                                                                                                                              |        | Vendor to Confirm |  |  |
| 4   | <b>DOCUMENTATION:</b>                                                                                                                                                                                                                                                                                                                                                             |        |                   |  |  |
| 4.1 | Supplier shall furnish constructional details of the Ladle. i.e. General arrangement drawing, volume to weight calculations for molten steel along with the quotation and also the gear box design details along with drawings.                                                                                                                                                   |        | Vendor to Confirm |  |  |
| 4.2 | Supplier shall furnish detailed dimensional sketches of ladle,Slide Gate way Mechanism, refractory materials etc.                                                                                                                                                                                                                                                                 |        | Vendor to Confirm |  |  |
| 4.3 | Three sets of each of the following documents to be furnished along with the Slide Gate Mechanism BP Ladle                                                                                                                                                                                                                                                                        |        | Vendor to Confirm |  |  |
|     | Operation Manual                                                                                                                                                                                                                                                                                                                                                                  | 3 sets | Vendor to Confirm |  |  |
|     | Maintenance Manual                                                                                                                                                                                                                                                                                                                                                                | 3 sets | Vendor to Confirm |  |  |
| 4.4 | List of customers for similar bottom pouring ladle shall be furnished along with the offer.                                                                                                                                                                                                                                                                                       |        | Vendor to Confirm |  |  |
| 5   | <b>PRE INSPECTION :</b>                                                                                                                                                                                                                                                                                                                                                           |        |                   |  |  |
|     | M/s BHEL Engineers will inspect the Ladle at suppliers works before dispatch and hence to be intimated sufficiently in advance to avoid delivery delays.                                                                                                                                                                                                                          |        | Vendor to Confirm |  |  |
| 5.1 | <b>TEST CERTIFICATE:</b> Test certificate for Body,Gear Box,Crane hook eye ,Slide Gate Mechansim and also for Welding procedure if adopted during manufacturing process.                                                                                                                                                                                                          |        | Vendor to Confirm |  |  |
| 6   | <b>GUARANTEE :</b>                                                                                                                                                                                                                                                                                                                                                                |        |                   |  |  |
|     | The Slide Gate way Mechanism BP pouring Ladle shall be guaranteed for a period of one year from date of commissioning.                                                                                                                                                                                                                                                            |        | Vendor to Confirm |  |  |
| 7   | <b>SPECIAL REMARKS:</b>                                                                                                                                                                                                                                                                                                                                                           |        |                   |  |  |
| 7.1 | Vendor shall submit technical offer and price offer separately in two sealed covers                                                                                                                                                                                                                                                                                               |        | Vendor to Confirm |  |  |
| 7.2 | They shall be original equipment manufacturers                                                                                                                                                                                                                                                                                                                                    |        | Vendor to Confirm |  |  |
| 7.3 | They shall be in line of manufacturing of similar Bottom pouring ladles with capacities greater than or equal to 5 Ton and up to 20 Ton for not less than 5years.                                                                                                                                                                                                                 |        | Vendor to Confirm |  |  |

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| 7.4 | <p>a) The above points are indicative, but not exhaustive. Hence any other essential accessories / parts that need to be incorporated to ensure safe operation with robust mechanism having all features for the ease of the operators to be considered and provided.</p> <p>b) Cost of refractories has to be mentioned separately in the price bid.</p> |  | Vendor to Confirm |  |  |
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