



**BHARAT HEAVY ELECTRICAL LIMITED**  
**CENTRAL FOUNDRY FORGE PLANT**  
**STEEL MELTING SHOP**






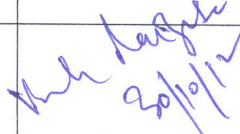
SMS/SP/05

Rev. No. 02

Date: 13/10/2012

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**TECHNICAL SPECIFICATION OF  
CARBON INJECTOR  
FOR RAISING CARBON CONTENT  
OF LIQUID STEEL IN ELECTRIC ARC FURNACE**

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Clause No	Description	Vendor's Acceptance /Remarks
1.0	<b>GENERAL DESCRIPTION:</b>	
1.1	This specification covers the supply of Carbon Injection System to be used in Electric Arc Furnaces in Steel Melting Shop. The equipment will be used for raising carbon of Liquid Steel.	
2.0	<b>TECHNICAL PARAMETERS</b>	
2.1	Type	Full Automatic control.
2.2	Application	For Addition of Graphite Powder in molten steel Through Lance Pipe Assembly.
2.3	Storage tank capacity	Minimum 750 Kg of Graphite Powder.
2.4	Number of outlet	One, Rubber Pipe with fixed flange and Lance Pipe adopter.
2.5	Material Hose	Rubber pipe ( Internal Diameter 32mm)
2.6	Injection Rate	20-100 Kg /minute.
2.7	Material for injection.	Graphite powder ( maximum grain size = 5mm)
2.8	Operating Pressure of compressed air.	2-4 Kg/
2.9	Test Pressure	8 Kg/
2.10	Dehumidifier with air filter.	To ensure moisture free and contamination free air.
2.11	Digital Display	Electronic weighing system with digital indication for total weight and fed weight.
2.12	Construction	Robust and incased in self standing steel frame with lifting lugs
2.13	Accuracy of the system	$\pm 3$ Kg.
2.14	Power Source	AC 415V, 50Hz 3 phase.
2.15	The distance between injector installed and furnace.	20 Meter (approx)
2.16	Climatic conditions	Tropical & Humid with Min. RH 20% to Max. RH 95 %, Ambient Temperature 50°C max.
3.0	<b>VENDOR'S QUALIFICATION CRITERIA</b>	
3.1	Only those vendors should quote who are "Original Equipment Manufacturer (OEM)" of Carbon Injector and have supplied & commissioned at least one equipment of the same or higher size in the past ten years (on the date of opening of Tender) and referred equipment is presently working satisfactorily for more than one year after commissioning (on date of opening tender).	



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3.2.0	Following information / documents should be submitted by the vendor about the companies where referred Carbon Injector has been supplied. This is required for all vendors for qualification of the offer.	
3.2.1	List of Customers with Equipments Capacity, Month & Year of commissioning.	
3.2.2	Un-priced Copy of Purchase orders of the referred Carbon Injector	
3.2.3	Name, Designation, Phone, FAX no. and e-mail address of the contact person of the customer.	
3.3	Performance certificate from the customer/company regarding satisfactory performance of Carbon Injector supplied to them (Original Certificate or Through E-mail directly from the customer). The original performance certificate may be returned after verification by BHEL, if required.	
3.4	BHEL reserves the right to verify information submitted by vendor including visit to the Customer's works and witnessing the operation of the Furnace. Vendor has to facilitate the same.	
4.0	<b>SITE VISIT AT CFFP, BHEL</b>	
4.1	<p>The Vendors who can qualify as per per Qualification criteria may visit the site to get a first hand idea about the location, application and layout. The Vendor must be very clear about the site conditions and scope of supply before submitting the tender.</p> <p>Any presumption by the Vendor shall not be entertained at a later stage.</p> <p>It shall be supplier's duty to satisfy himself about the site conditions before hand, to avoid any difficulty during installation &amp; commissioning of the equipment.</p>	
5.0	<b>SCOPE OF SUPPLY</b>	
5.1	<p>Scope of supply will cover Design, Engineering, Manufacture, Supply, Commissioning and training of operators for graphite powder injector system along with dehumidifier. It shall be simple, <b>robust &amp; reliable equipment</b>. It should operate trouble free in presence of dust, high temperatures and vibrations in steel plants.</p> <p>All Bought out Items shall be of Reputed Make.</p> <p>The equipment shall be incased in self standing steel frame with lifting lugs. The whole assembly shall be provided with necessary lifting arrangement so that the same can be lifted with the help of EOT Crane.</p>	
6.0	<b>PERFORMANCE GUARANTEE / WARRANTY:</b>	
6.1	The Performance of the Carbon Injector as per Technical Parameter as mentioned in Clause-2.0 to 2.16 shall be guaranteed for a minimum period of 12 months from the date of acceptance after successful commissioning of the Carbon Injector at CFFP-BHEL Works.	



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7.0	<b>DRAWINGS-DOCUMENTS-MANUALS</b>	
7.1.0	<b>The following Drawings/Documents are to be submitted along with the Technical Offer:</b>	
7.1.1	The vendors shall furnish full technical information of the equipment along with general Arrangement drawings, flow diagrams, list of spares and tools.	
7.1.2	List of Bought Out Items (BOI) with their make <b>Note:</b> BHEL's confirmation on make of BOI is required	
7.2.0	<b>The following Drawings/Documents are to be submitted after placement of Purchase Order prior to manufacture of the Carbon Injector for approval by CFFP-BHEL:</b>	
7.2.1	GA Drawing with component list, loading diagram, weighing system, dehumidifier system, flow diagram, details of solid flow control.	
7.2.2	Complete detailed drawing of the Machine and Electrical circuit Diagram.	
7.2.3	Details such as make, model No., and rating of Major bought out items e.g. motor, control panel, blower, coupling, valves, weighing system, dehumidifier system, gauges.	
7.2.4	Complete list of equipment detailing individual items with ratings, capacity, service etc.	
7.3.0	<b>The following Drawings, Documents and Manuals are to be Provided along with the supply of equipment of Carbon Injector.</b>	
7.3.1	Copy All approved drawings and documents as per Clause 7.2.0 to 7.2.4	
7.3.2	Manufacturing drawings of all parts.	
7.3.3	Instruction for operation and maintenance of the equipment and controls including lubrication charts.	
7.4.0	<b>The following Documents / Certificates are to be Provided after Erection and Commissioning of Carbon Injector.</b>	
7.4.1	operation and maintenance manual (Three copies)	
7.4.2	Guarantee Certificates of Carbon Injector	
7.4.3	Test Certificate and Inspection Reports of Carbon Injector	
7.4.4	Test certificates of all BOI Items.	
7.5.0	<b>All hard copies of Drawings/Documents/Manuals/Certificates as per Clause 7.2.0 to 7.4.4 shall be hard-bound in high quality leather folders, encased in decent individual boxes – in 5 Sets</b>	
7.6.0	<b>DVD/CD Containing all Drawings/Documents/Manuals/Certificates as per Clause 7.2.0 to 7.4.4 – in 5 Sets</b>	



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<b>8.0</b>	<b>SPARES</b>	
<b>8.1</b>	Rubber Hose 32 mm (internal dia), length = 20 mt.	
<b>8.2</b>	Lance pipe adaptor – 3 Nos.(inlet dia 32 mm, Outlet dia 20 mm)	
<b>8.3</b>	All Type of Valves- one number each.	
<b>9.0</b>	<b>UTILITIES TO BE PROVIDED BY BHEL</b>	
<b>9.1</b>	Compressed air : 5-6 Kg/	
<b>9.2</b>	Power Supply: 415V $\pm$ 5%, 3 phase, 4 wires, 50 c/s. $\pm$ 3% AC supply.	
<b>9.3</b>	Injecting material: Graphite Powder.	
<b>10.0</b>	<b>PRE DISPATCH INSPECTION OF EQUIPMENTS:</b>	
<b>10.1</b>	All items including Test Certificates shall be verified by BHEL for clearance of before dispatch. Full operation of the Equipment shall be verified.	
<b>11.0</b>	<b>ERECTION AND COMMISSIONING</b>	
<b>11.1</b>	Supplier shall take full responsibility for carrying out the erection, testing and commissioning of Carbon Injector. Erection & Commissioning spares and tools, required for commissioning of the Carbon Injector within stipulated time, shall be brought by the Supplier on returnable basis.	
<b>11.2</b>	Charges, duration, terms & conditions for Erection & Commissioning should be furnished in detail separately by vendor along with offer.	
<b>12.0</b>	<b>ACCEPTANCE CRITERIA FOR SUCCESSFUL COMMISSIONING</b>	
<b>12.1</b>	After erection and testing, the Carbon Injector should successfully operate in 30 heats without any breakdown. If any breakdown occurs during any heat, that heat shall not be counted.	
<b>13.0</b>	<b>TRAINING</b>	
<b>13.1</b>	Training is to be given to BHEL's Operators on operation and maintenance of Carbon Injector by the supplier's experts / engineers at BHEL works.	