SECTION-I Main Features and Description of Tender Requirements

Important features of the tender

Section-I

IMPORTANT FEATURES OF THE TENDER

1 INSTRUCTIONS TO BIDDERS FOR FILLING TECHNICAL BID

1.1 Unless otherwise stated, latest alterations/ revisions of specifications/ standards/ drawings shall be applicable. In respect of safety standards and environmental standards relevant to the machine, the machine manufacturers shall ensure compliance with International (CE/ISO/DIN/JIS)/National standards (IS) (wherever applicable).

1.2 Tenderers should offer and quote for all the specified concomitant accessories, as these are considered essential for commissioning and utilization of the machine. Even if bidder does not recommend the purchase of any of these accessories, the price must be quoted for comparison purposes and their recommendation/suggestion to be indicated in the offer. Tenderers should also quote for optional accessories, spares and consumable spares as asked in the specifications.

1.3 In case, any item is required in sets, please specify nos. /pieces per set. This is essential for proper technical evaluation of the offer. Offers received without this may be considered as incomplete and liable to be rejected.

1.4 The bidder should quote only for the specified make of sub-assemblies and equipment wherever specified. In case, some other make is quoted, specific reasons for the same including its features/ advantages over specified makes should be submitted. Past performance of a same/similar machine from two or more end users may be submitted to evaluate performance of other items offered. Details of industries/ entities/ Customers/ products using the offered brand, details of manufacturer, should be submitted to evaluate the market presence of the make quoted; in case details are not submitted alternate brand/ item will not be considered & offer will be evaluated accordingly.

1.5 In case there is a contradiction in any information provided (some parametric values given in the specification and those given in the brochure or some other document enclosed by the tenderer), unless specifically mentioned in the deviation cum confirmation statement under Annexure A of Section-III, the values as given in Bid shall be taken as confirmed by the tenderer and offer evaluated accordingly.

1.6 Bidder or his authorized agent, in their own interest, should visit the consignees listed in clause 3 Section-I with prior appointment with Controlling Officer of the consignee and acquaint themselves with existing process of manufacturing/remanufacturing, site conditions, availability of material handling facilities etc.

1.7 The Purchaser may accept internationally accepted alternative specifications which ensure equal or higher quality than the specifications mentioned in the Technical Specification. However, the decision of the Purchaser in this regard shall be final. A copy of the alternative specifications offered should be sent along with the offer. The Tenderer should also furnish “Statement of Deviations” from tender specifications (as per Annexure A of Section-III) along with the offer.

1.8 In order to assess the manufacturing capability of OEM and to be assured regarding OEM’s manufacturing facility/ facilities in India and hence the ability of its Authorized Distributor to supply the said machine, a self certified Capability Assessment report of the OEM as per Annexure-G must be submitted by the bidder along with their offer. In addition to above, if felt necessary by the Purchaser, an inspection by actual visit to his works/ office can be carried out by representative of Purchaser/ Third party agency as nominated by the purchaser (TPI cost to be borne by the bidder) to verify the details furnished vide Annexure-G. The bidder is bound to comply with the same, without fail.

2.	**Description:**
	Airless Centrifugal Shot Blasting machine capable of shot blasting of bogie frames & Bogie Bolster of LHB type Coaches as per Annexure-D (**Schedule-1A**) is required as per given main features and description of tender requirements in Section-I & technical specification Section-II.
2.1	The machines shall have following configurations:
2.1.1	The machine shall consist of blast cabinet along with blast wheel, service access doors, blow off arrangement, work spinner hanger, monorail overhead conveyor arrangement abrasive recovery and reclamation system, abrasive conveyor, bucket elevator, abrasive separator, automatic abrasive replenisher, shot controller of suitable design. The equipment should also have adequate capacity dust collection system, filter bags, ducting and exhaust system (**Schedule-1A**).

Schedule-1A

2.2	**Leading parameters**		
2.2.1	**Major parameters:** **(Note: No deviation in major parameter shall be accepted.)**		
2.2.1.1	Size of Job (Max dimensions)	Suitable to accommodate components of max. dimensions as below: L-4258 mm, B- 2947mm, H-733mm	
2.2.1.2	Weight of job (max)	1500 kg	
2.2.1.3	Load capacity of spinner hanger hook (min)	3000 Kg	
2.2.1.4	Surface finish after Shot blasting	SA-2½ of ISO: 8501 spec. No. MDTS-166 Rev-02	
2.2.1.5	Blast Wheel	4 nos	
2.2.1.6	Rotational speed range of hanger spinner	2 – 5 rpm	
2.2.2	**Other parameters**		
2.2.2.1	**Motor Power for**	**Quantity (In nos)**	**Minimum Capacity (In HP)**
i)	Blast Wheel	4	25 each
ii)	Spinner hanger	1	2
iii)	Exhaust fan	1	25
iv)	Elevator	1	7.5
v)	Screw conveyor	1	7.5
vi)	Rotary valve	1	1
2.2.2.2	Shot flow rate	180 – 200 kg/minute/ blast Wheel	
2.2.2.3	Ventilation requirement	8000 CFM	
2.2.2.4	Power supply	415V+10% -20%, 50Hz.+/-3%	

2.3	**Performance Standards:**
2.3.1	The plant shall be capable of cleaning the surface to a finish such that all visible rust, mill scale and foreign matter is removed and the original bare matter is exposed before painting. The plant shall be capable to uniformly shot blast the components, and cover all parts on the surface of the same. The blast pattern obtained shall be dense and uniform and cleanliness of the surface obtained from the shot blasting shall conform to SA 2 ½ (two and half) as per ISO 8501-1998. As regards coverage of the surface of a job, the machine shall be capable to cover all parts of the surface of a job which is to be shot blasted, however, for jobs of large and complex surfaces, the machine shall cover a minimum of 95% of the area on the surface
2.3.2	The design of the machine shall be overhead monorail spinner hanger type shot blasting machine in which the arrangement for rotating a spinner hanger during shot blasting operation shall be provided, and the spinner hanger conveyor loaded with the job, shall be entering/exiting the blast chamber through a hoist moving on overhead monorail. The machine shall be equipped with a minimum of 4 blasting turbine wheels which may be fixed at suitable angles in order to cover the whole area of a job for shot blasting uniformly. Rotation / spinning of hanger shall be in both the directions i.e. clock-wise and anticlockwise and its drive mechanism shall be well outside the blast cabinet (**Schedule-1A**).
2.3.3	The plant shall be capable of recycling and cleaning the used shots
2.3.4	The machine shall be capable of the operating under ambient conditions of 48 deg. C and 98% relative humidity

2.4	**Productivity**:
2.4.1	~~The bidder shall furnish the estimated floor to floor time of all operations for the components listed in Annexure-D of Section-III. Bidder shall also indicate the break up of total time, such as machine set up time, loading time, un-loading time, blasting time etc.~~
2.4.2	~~Floor to Floor cycle time for each cycle of Blasting operation of Bogie Frames (01 no.) or Bogie Bolster (02 nos.) shall not exceed 60 minutes including Blasting Time, Loading, unloading, setup time and Inspection time as per Annexure-D.~~
2.4.3	The successful bidder shall demonstrate the capacity and prove out the quantity and quality of surface finish achieved by the machine for the components mentioned in Annexure-D of Section-III.
2.4.4	The bidder shall quote for all necessary fixtures, (if required) for loading and unloading of all the components described in Annexure-D of Section-III.
2.4.5	The timing should be maintainable for regular 8 hrs shift for two shift working 6 days a week with the machine availability of 85%
2.5	**Prove out at Consignee's Works:**
2.5.1	The machine shall deemed to be commissioned after prove out of the each component as per the productivity requirement described in Annexure-D of Section-III. After such a successful demonstration, the consignee shall take over and watch the performance of the machine for a period of one month before issuing the final proving test certificate.
2.5.2	Productivity/ Performance test shall be performed for one/ two consecutive shifts for a period of 01 day covering the components as per clause 2.4 of Section-I within the time period for installation, commissioning and prove out, stipulated in the Delivery Schedule Chart (clause 7 of Section-I). The cycle time/ productivity per item/ component shall be arrived at by calculating the average of the time taken per products of the total numbers produced in a shift or over the time/Quantity specified for the test. If the cycle time/ Productivity is as per clause 2.4 of Section-I, the machine shall be considered as commissioned. Thereafter the performance shall be watched for a period of one month by the consignee before the final PTC is issued.
2.5.3	If the supplier fails to demonstrate during the first Performance/ Productivity Guarantee Test/, the Performance as per above Clause, the Railway shall permit the supplier to carryout necessary modifications and repairs to the equipment and to repeat the Performance/ Productivity Guarantee Test.
2.5.4	Extra cost incurred for retention of specialists and for modifications and repairs to the equipment in connection with the repetition of Performance/ Productivity/ Guarantee Test shall be borne by the contractor.
2.5.5	In case the supplier fails to demonstrate the performance Guarantee figures stipulated in clause as per clause 2.4 of Section-I above, even after repeated tests, the Railway reserves the right to reject the machine or accept it with lower performance. Railway shall be entitled to recover from the Contractor as penalty as given below, for accepting the machine with lower performance.

Productivity Drop	**Rate of penalty (% of the contract value) not cumulative**
Up to 2%	2%
More than 2 % to 5%	5%
More than 5 %	Rejection and Railways will have option to encash PBG, record poor performance other steps as per tender conditions like recovery etc.

2.5.6	The repetition of performance guarantee/ tests shall be completed within 90 days after the expiry of stipulated time period provided in the contract for Installation, commissioning and proving out of machine
2.5.7	Offers not meeting the cycle time at bid stage itself i.e. as per clause 2.4 shall not be considered even with loading penalty.
2.5.8	Any break down time caused by reasons beyond the control of contractor during prove out will not be reckoned for the purpose of levying the penalty.
2.5.9	If the supplier fails to demonstrate during the first Performance/ Productivity Guarantee Test/, the Performance as per Clause 2.4.1 above, the Railway shall permit the supplier to carryout necessary modifications and repairs to the equipment and to repeat the Performance/ Productivity Guarantee Test. Joint Inspection in presence of Inspecting agency, consignee and supplier, shall be carried out before permitting supplier for any modification/ repair (if any).
3.	**Quantity & Consignee:**

	S. No. / **Consignee** / **Qty.** / **Schedule** / **Specification No.** 1. / Dy. CME/Bogie / 01 / 1A /
4.	**Scope of Supply**
4.1	The scope of supply shall include design, manufacture, supply, installation, testing, commissioning and proving of machine on turnkey basis. It shall include all the concomitant accessories/equipments (Clause 4.2 of Section-I) as detailed in the specification and other concomitant accessories/ equipment, which the manufacturer considers essential to make the machine fully operational, when installed and commissioned. It shall also include installation and commissioning of related equipment (Clause 12 of Section-II), training of personnel in operation and maintenance of machine (Clause 10 of Section-II) and supply of technical documentation (Clause 4 of Section-II). The Preventive Maintenance during warranty and Comprehensive Annual Maintenance Contract after warranty shall be as per Clause no. 16 & 17 respectively of Section-II of specification of this tender
4.2	**Concomitant Accessories**
4.2.1	**The machine should be accompanied with the following concomitant accessories: (Quantity of each item shall be indicated in the bid).**

Applicable for Schedule-1A

S No	Description of Items	Quantity
i.	Abrasive Shots **Note**: Bidders shall indicate price per tonne in its offer.	4.5 MT
ii.	Electrical Wiring from main to control and from control panel to machine	20 m
iii.	Maintenance tools (List of tools indicating make, description & quantity shall be furnished in the bid)	1 set
iv.	Fixture for holding all the components mentioned in Anne.-F of Section-III	02 nos (for each type of component)
v.	Foundation and leveling bolts/components, Expansion bolts for installation on foundation/concrete floor	1 set
vi.	A monorail overhead conveyor arrangement without electric hoists as existing EOT Crane will be used for loading/ unloading of job	1 set
vii.	Voltage Stabilizer Suitable capacity as per clause 2.13.2 of Section-II[The bidder shall provide details of make, technical brochure etc.]	01 no.
viii.	Any other accessory/ equipment, which the manufacturer considers essential to make the machine fully operational, when installed and commissioned connected to power source and give the specified output/productivity	

Note: The bidder shall provide break-up cost of the concomitant accessories in its offer.

4.3	**Optional Accessories:** Following optional accessories will be quoted by the tenderer. Cost of optional accessories shall be quoted separately and shall not be included in the basic price of the machine
4.3.1	Any other accessory which can improve the productivity, performance, reliability, efficiency, or enhance the capability of the machine as a whole or part thereof
5	**Evaluation Criteria**
i)	Total value of the offer will be calculated based on
ii)	The cost of the basic machine.
iii)	Cost of the concomitant accessories according to tender specifications.
iv)	Cost of any other accessory which in the opinion of supplier is essentially required for making the machine fully functional.
v)	Cost of Turnkey Charges viz. foundation, installation & commissioning etc.
vi)	Cost of Preventive Maintenance during 1st & 2nd year of Warranty Period.
vii)	Cost of Spares for two years normal operation and maintenance as per clause 5 of Section-II.
viii)	Cost of CAMC for 10 years. However, CAMC quoted by the bidder will not form part of Contract Value.
ix)	Duties and taxes as quoted by the bidder, insurance and freight.

6. Other Items to be Quoted

The following items will need to be quoted additionally though will not be part of commercial evaluation:

i) Optional Accessories with break-up of individual items as specified in clause 4.3 of Section-I.

ii) Consumables as per clause 6 of Section-II with breakup of individual items as applicable.

7. Delivery Schedule Chart

In the event of acceptance of the offer, the machine(s) shall be supplied as per the following Milestone Chart:

Name of machine: Airless Centrifugal Shot Blasting machine (Schedule-1A) **Specification No**: **Mech/M&P/3700/7 Rev. Nil**

S. No	Activity	Activity Code	Outer Limit of Time Schedule
1.	Issue of LOA	D1	-
2.	Submission of PBG by Successful Bidder	D2	D1+30 days
3.	Issue of PO	D3	D2+30 days
4	Submission of GA drawings to consignee by Successful Bidder/Supplier along with information on power and other utilities required for machine.	D4	D3 + 45 days
5.	Approval of GA drawings by consignee (to be governed by clause 11.2 of Section-II)	D5	D4+ 45 days
6.	Confirmation of availability of clear site by consignee	D6	By D5 (i.e. at the time of approval of GA drg.
7	Completion of foundation	D7	D6+150 days or latest by D 8
8	Supply/ Delivery of machine	D8	D5+180 days
9	Power connection for the machine and other on-site requirement to be provided by railways	D9	D8 + 7 days
10	Railway to give call to supplier for the commissioning of machine	D10	D8+ 7 days
11	Installation, commissioning and proving out of machine by supplier	D11	D9 + 120 days or D10+ 120 days (whichever is later)
12	Issue of PTC by consignee	D12	D11 + 30 days
13	Warranty by supplier	D13	D11 + 2 years
14	CAMC	D14	D13 + 10 years

Note: Notwithstanding the delivery period indicated elsewhere in the tender document, the delivery indicated in this schedule shall be taken as overriding and final

Section-II

TECHNICAL SPECIFICATION
Specification No.: Mech/M&P/3700/7 Rev. Nil

1.	**Basic Design Features:**
1.1	**Safety features:**
1.1.1	The machine shall be suitably protected by necessary safety features against any accidental operation, overload, power fluctuations, power failure etc. Suitable interlocks, alarms and warning lights must be provided.
1.1.2	The machine and its accessories must ensure safety of the operator and the system at all times. **Details of the safety features shall be furnished in the bid.**
1.1.3	Emergency stop push buttons shall be provided at convenient locations to switch off the machine in case of emergency.
1.2	**Specific Characteristic**
	Applicable for Airless Centrifugal Shot Blasting machine (Schedule-1A)
1.2.1	**Blast Cabinet**
1.2.1.1	The blast cabinet shall be of sturdy fabricated construction of minimum 6 mm thick mild steel plate suitably reinforced to combine strength and rigidity. Suitable mounting arrangement for Blast Wheel units shall be provided. Blast cabinet roof shall be slot seal assembly with rubber seals and polypropylene brush for spinner hooks.
1.2.1.2	The whole inside area of blast cabinet except door shall be lined with complete overlapped hardened long life liners / wear plates of minimum 12mm thick 11-14% Austenitic Manganese Steel bolted with wear resistant fasteners. The liners shall be pre-hardened through work hardening process in order to avoid any warping during shot blasting operation. The thickness, material composition, and hardness of liners shall be indicated in the offer. The door area of the cabinet shall be lined with abrasion resistant vulcanized rubber sheets of minimum 10mm thickness and minimum 40-50 shore hardness for protection from rebounding abrasive
1.2.1.3	The cabinet floor shall be of MS perforated plate suitably protected to prevent wear. Spinner hanger / hook with minimum 3000 Kg. load carrying capacity shall be provided to hold the job. Work spinner motor of (2 HP minimum capacity) shall be provided on top of the blast cabinet. Safe and easy access shall be provided for inspection and maintenance of cabinet interior.
1.2.1.4	The blast cabinet size should be designed to accommodate 3-stage blasting for complete coverage of the job uniformly as detailed in clause 1.2.6.3.
1.2.2	**Service Access Door**
1.2.2.1	The service access doors shall be provided at strategic location so as to facilitate ease of servicing of the interior of the chamber. The door shall be equipped with safety limit switches so as to prevent accidental starting of the turbine with door in open position. These doors shall be fabricated from six mm thick mild steel and 10 mm thick rubber.
1.2.3	**Door:**
1.2.3.1	The cabinet door shall be sealed against the dust and abrasive leakage with rubber type seals. The doors shall be of heavy-duty type, fabricated from 6mm thick mild steel plate lined with 10mm thick rubber for protection from rebounding abrasive. Each door shall be fitted with two hinges and operated by a pneumatic cylinder connected to the control circuit. The arrangement shall be indicated in the offer with the help of drawing / sketch. A suitable electric safety system shall be provided to prevent unit from starting in case the door is not closed
1.2.4	**Blow off arrangement**
1.2.4.1	A suitable system for removal of abrasive and dust from the work piece should be provided. Bidder shall furnish the complete details of the offered equipment and system in their bid and also the location of the same
1.2.5	**Work spinner hanger**
1.2.5.1	The arrangement for providing a rotary motion to the work (job) spinner hanger shall be provided. The spinner hanger shall enter/exit the blast chamber before/after the shot blasting operation on the jobs. The spinner hanger shall be loaded hanging on the hoist and the load capacity of its hook shall be minimum

	3000kg. The drive unit for rotation of the spinner shall be powered by a motor of 2HP minimum and shall be capable of rotating the spinner at a fixed speed of a range 2 – 5 RPM
1.2.6	**Monorail overhead conveyor arrangement**
1.2.6.1	The plant shall be housed in a workshop structure.
1.2.6.2	The plant shall be equipped with a Y-type overhead monorail conveyor system with adequately rigid supporting structure. It shall have loading/unloading station without electric hoists, with work (job) carrying hanger arrangement. A pneumatically operated switch plate mechanism shall be provided at the junction of Y-conveyor to change tracks during entry/exit of the hanger into/from the blast chamber loaded with the job. The bidder shall furnish the complete details of the arrangement and also details of the following equipments: i.) Mono rail type and structural design ii.) Monorail support and suspension structure iii.) Hanger hook
1.2.7	**Abrasive Recovery and Reclamation System:**
1.2.7.1	The spent abrasive shall be collected through perforations in the table into the hopper. The hopper shall be of fabricated construction suitably reinforced to combine strength and rigidity. Screw conveyors shall transfer the abrasive to the bucket elevator, which shall discharge the shots to the abrasives separator where dust and fines shall be removed. The clean usable abrasive shall drop into a storage hopper after which the abrasive shall be fed to the turbine. The design of the system provided shall be clearly shown in detail through diagrams and schematic views in the offer
1.2.8	**Abrasive Conveyor**
1.2.8.1	This shall generally consist of two helicoids screw conveyors. The screw conveyors shall discharge the charge to the boot section of the elevator and shall be driven through chain and sprocket transmission. The number of screw conveyors used in the system shall be indicated in the offer
1.2.9	**Bucket Elevator**
1.2.9.1	The bucket elevator shall be of fabricated construction with suitable access for maintenance located at convenient points. Access door for bucket elevator shall be provided. The buckets shall be of MS fabricated construction and attached to belt with spike bolts. The elevator head shall have removable top cover for belt inspection or installation. The discharge spout shall also be provided with an inspection door. The bearings of the elevator in the head and boot area shall be pre-lubricated and sealed for life.
1.2.9.2	The elevator drive unit shall be located at the top
1.2.9.3	The abrasive shall be centrifugally discharged from the head through the discharge spout to the abrasive separator
1.2.9.4	A tensioning arrangement shall be provided at the top of the bucket elevator to facilitate ease of adjustment of belt tension
1.2.10	**Abrasive Separator**
1.2.10.1	The abrasive separator shall consist of wind sifting arrangement, which works on the principle of blowing air across the cascading stream of shots
1.2.10.2	The bucket elevator shall discharge shots and dust into the wind sifting arrangement through a screw, which removes large size particles. In the wind sifting arrangement, the material shall be allowed to fall by gravity. The shots shall be arranged to fall in several cascades so as to increase the contact time with the cleaning air through a series of baffles. The arrangement shall ensure even distribution of shots across the full width of the separator. The chamber shall be connected to the dust extractions system of ensure collection of thoroughly cleaned shots into storage hopper. The residual dust contents in the blasting abrasives after sifting must be indicated in the offer
1.2.10.3	The arrangement shall be such that wear and tear on the separator is negligible. An abrasive trap shall be provided to prevent small abrasives from being carried into dust collector
1.2.11	**Blasting Turbine Wheels**
1.2.11.1	The plant shall be provided with a minimum of 4 centrifugal blast wheels for propelling shots for blasting operation. The blast wheel shall be of heavy duty, provided suitably designed vanes for ensuring complete uniform blasting and effective coverage. The impeller and vanes shall be manufactured from suitable wear resistant material. The bidder shall provide details covering actual number of blast wheels used in the machine and their location in the same by way of schematic diagram

	as well
1.2.11.2	The turbine blades should be self-locking type to minimize time and effort during blade changing. The minimum abrasive blow rate shall be in the range of 180-200 kg per minute per blast wheel and velocity shall be in the range of 70 to 80 m/sec. However, the bidder should furnish H.P., RPM, shot throw speed and shot throw capacity per minute of turbine wheel with calculations etc in the offer. In case the values are less than that indicated as leading parameter, reasons shall be furnished. The bidder shall also indicate the number of blasting turbine actually proposed for the operation and their layout in the blasting cabinet through sketches
1.2.11.3	All parts of the turbine wheel coming into contact with shots should conform to the following: i) Bare Wheel – SAE 8620 / EN 351 or its equivalent. ii) Blade hardness – 64-66 HRC, a self-locking type blade. iii) Impellers/Accelerators – 52-56 HRC. iv) Control cage – 52-56 HRC The bidder shall identify the material used for the above parts and their method of hardening. **Note**: - The maximum variation in the hardness for the above components should be +/- 3 HRC
1.2.11.4	The wheel shaft should run on dust proof ball bearings.
1.2.11.5	The turbine wheel should be dynamically balanced
1.2.12	**Shot Controller**
1.2.12.1	The flow of shots to the turbine unit shall be controlled by an air cylinder operating shut off valve, which operates through a solenoid valve, and a selector switch located near the operator's control panel
1.2.12.2	**Automatic Abrasive Replenisher**
a)	One automatic abrasives replenisher shall be provided having suitable shot abrasive capacity complete with air operated abrasive gate, and diaphragm operated bin indicator for replenishing new abrasive to the system. Bidder shall indicate the capacity of abrasive replenisher
b)	In operation, when the level of abrasive in the main storage bin reaches a point below the bin indicator, the pneumatically operated abrasive control valve at the bottom of the abrasive replenisher shall automatically open thus, replenishing new abrasive to the system
c)	When the level of the abrasive reaches a point above the bin indicator in the main storage bin, the abrasive control valve shall automatically close.
1.2.13	**Dust Collector**
1.2.13.1	Dust collector and extraction unit of wear resistant design of suitable thickness of steel sheet and capacity should be provided. The air exhaust into atmosphere must not contain more than 70 - 80 mg dust per cubic meter of air. The discharge from the machine must be compliant to applicable PCB norms
1.2.13.2	The dust extraction unit shall be such, as to ensure that adequate fresh air circulation is maintained in the chamber for clear visibility and to prevent dust deposition on the blast cleaned surfaces
1.2.13.3	Complete technical details, specifications and make of the equipment like fans, filters, duct etc. working parameters like exhaust air capacity, static pressure at fan inlet, operating pressures and power equipments should be furnished in the offer.
1.2.13.4	The exhaust fans should be made of sturdy steel sheet construction of suitable thickness not less than 3mm. It should have dynamically balanced impeller. The air volume capacity, RPM, pressure and HP requirement should be indicated in the offer. In case the values are less than the indicative minimum at leading parameters clause 2.2 of Section-I, reasons have to be furnished
1.2.13.5	Facility for automatic continuous by Hi-Pulse jet cleaning of the filter bags shall be provided. The system should be explained in the offer in detail. The bidder shall provide drawers type of bin at the bottom of the hopper for removal of dust
1.2.13.6	Ducting between dust collector and cabin should be of minimum 2.5mm thickness galvanized steel sheets. The ducting provided should be from dust collector to fan and to chimney at least 3m above the roof of the shed which will be of about 8-10 meter height. The bidder shall indicate the cost of ducting per meter length and also the cost of chimney per meter height
1.2.14	**Shots**
1.2.14.1	The steel shots shall conform to S: 4606/1983 or its equivalent with hardness value ranging between 40 to 50 HRC. The bidder shall clearly indicate material composition of shots to be used, its density, hardness and size etc. in the bid

1.2.15	**Noise Level:**
1.2.15.1	The noise level of the plant shall not exceed 85 db at 1-meter distance in any case during working of the machine. The system adapted for controlling the noise level shall be indicated in details
1.2.16	**Maintainability**
1.2.16.1	The design of the equipment in the entire system shall be such that any item requiring replacement during preventive maintenance can be quickly and easily replaced
1.2.16.2	The plant should be provided with inspection platform with non-skid floor plates, safety ladders and railings for elevators and dust collectors
1.2.17	**Hour meter**
1.2.17.1	One hour meter for each centrifugal wheel shot blasting machine unit should be provided to record actual wheel operating hours
1.2.18	**Blast timer**
1.2.18.1	One adjustable blast timer with full cycle co-ordination by limit switch shall be provided.
1.2.19	**Life of wearing components**
1.2.19.1	Bidder shall indicate the life of above wearing components in their offer. However, the minimum life of the wearing components shall be in a range as mentioned below. Bidder shall also produce the documentary proof of their past supplies showing the life of the above wearing components in the offer. In the absence of above information, the tenderer is liable to be rejected

S.No.	**Description**	**Life in hours per set**	**Offered life**
1.	Blade (set of 8 nos.)	400-500	
2.	Impeller	400-500	
3.	Control cage	400-500	
4.	Impeller cap	400-500	
5.	Clamp for control cage	800-1000	
6.	Wheel hub	1600-2000	
7.	Centering plate	1600-2000	
8.	Feed spout	1600-2000	
9.	Feed spout sealing ring	800-1000	
10.	Wheel housing liner (side, top end)	800-1000	
11.	Bare wheel assembly	3600-4000	
12.	Elevator belt	2400-4000	
13.	Door liner	1000-1200	
14.	Blast cabinet liner	2000-2500	
15.	'O' rings	1000-1200	

2.0	**GENERAL ELECTRIC SPECIFICATION**		
2.1	The provision of this General Specification shall apply, where ever relevant.		
2.2	All equipments and material shall comply with appropriate Indian Standards (latest), International Standards or National Standards of the country of origin provided the latter are equivalent to or better than the former. The tenderer shall indicate the Standards applicable. Wherever IS specification are different from this specification theprovision made in this specification will prevail. The tenderer shall indicate the specifications to which the different equipments being supplied will conform, along withthe offer. The following standards are applicable in particular. (Corresponding International Standards like ASA, NEMA, BSS, DIN etc. may also be quoted).		
IS :	325-1979 (latest)	-	Three phase induction motors (corresponding to IEC pub-34-1)(Latest).
IS :	1248 (Latest)	-	Direct acting indicating analogue electrical measuring instruments and their accessories (corresponding to IEC Pub-51) (Latest).

IS :	1231-1974 (Latest)	-	Dimensions of three phase induction motors (corresponding to IEC Pub-72-1)(Latest).
IS :	1271-1985 (Latest)	-	Classification of insulation material for electrical machinery & apparatus in relation to their thermal stability in service (corresponding to IEC-Pub-85) (Latest).
IS :	6875 (Latest)	-	Push Buttons and related control switches corresponding to IEC Pub/73) (Latest).
IS :	375-1963 (Latest)	-	Marking and arrangement of switchgear, bus bars, main connection &auxiliary wiring.
IS :	996-1979 (Latest)	-	Single phase small AC and universalelectrical motors.
IS :	1356 (Latest)	-	Electrical equipment of machine tools.
IS :	2516 (Latest)	-	Circuit breakers (corresponding to IECPub-56) (Latest)
IS :	4691-1985(Latest)	-	Rotating electrical machine part 5 degree of protection provided byenclosure for rotating electricalmachinery.
IS :	2223-1983(Latest)	-	Dimensions of flange mounted AC induction motors
IS :	10118-1982(Latest)	-	Code of practice for selection installation and maintenance of switch gears & control gears
IS :	4889-1968(Latest)	-	Method of determination of efficiency of rotating electrical machine
IS :	13947-1993(Latest)	-	Low voltage switch gear and control gear circuit breakers

2.3	Unless specified in the main specification, the AC motors and starters shall be of the following type. Tenderer is, however, free to give alternative proposal along with justification, if in his view alternative proposal in warranted by site conditions. Type of motor type of starter.	
	TYPE OF MOTOR	**TYPE OF STARTER**
2.3.1	Any type of AC motor starting current of which does not exceed 75 amps.	Direct on line.
2.3.2	AC squirrel cage, introduction motors, starting current of which is above 75 amps. if started direct on line	Star delta or Autotransformer type.
2.3.3	AC slip ring type motor	Resistance typeair/fan Cooled
2.3.4	AC synchronous or synchronous induction motor.	Suitable makers standard.
2.3.5	DC motor	Resistance type/Thyristor type.
2.4	The control gear for AC/DC motors shall incorporate the following protection devices asconcomitant accessories.	
2.4.1	**No Voltage Protection** - No voltage protection shall be provided so that machine willnot start up again by itself when, following an interruption the supply is restored.	
2.4.2	**Short Circuit Protection -** To protect against short circuits due to insulation failure of faulty connections HRC fuses shall be provided for each motor. The rating of the fuse shall be such as to take care of the over current due to motor starting.	
2.4.3	**Over Load Protection -** To prevent motors from overloading, overload protection shall be provided separately for each motor. Three phase motors shall be protected by overload tripping devices on each phase.	
2.4.4	**Single Phasing Protection -** A separate current sensitive delayed action single phasing preventer shall be provided for each motor separately. Overload protection shall not be treated as single phasing preventer.	

2.5	Control equipment shall be mounted in separate drip proof enclosures. Control enclosures and compartments are to be so designed as to give adequate protection against ingress of dust, oil, coolant or chips. All control devices like contractors etc. shall be front mounted on a rigidly fabricated metal panel for ease of operation. All other electrics shall be installed that they are readily accessible when the doors and covers are opened. Hinged covers shall be interlocked with the machine tool control to prevent operation of the machine when cover is open.	
2.6	The motor shall be totally enclosed with or without fan cooled frame. Screen protected drip proof type motor may be provided if it is mounted inside protective enclosures.	
2.7	All electrical equipment shall comply with the latest Indian Electricity Rules Act and rules (latest) framed under the Act in respect of safety requirements and other essential provisions of the Act, applicable to installation and operation of the machine.	
2.8	All instruments shall be of the Industrial Grade "A" (IS-1248) switch board type the range of the instrument shall be such that the maximum load expected in the circuit shall produce a deflection of 60% to 80% of the full scale.	
2.9	The supplier shall furnish 3 sets of complete electrical and electronic wiring diagrams in full details to enable the maintenance staff to locate faults in the circuits, 3 sets of part	
	catalogues, maintenance manuals operating instructions with details of coils and windings, used in the equipment to facilitate repairs and maintenance should also be supplied.	
2.10	For main motor class minimum "B" Class insulation shall be provided. If any other class of insulation is proposed, detailed justification for providing different class of insulation shall be given.	
2.11	Motors shall be designed to withstand frequent starts, stops and reversals as demanded in the operation of the machine.	
2.12	Two ear thing terminals shall be provided on all electric motors including the control gear.	
2.13	**POWER SUPPLY**	
2.13.1	The machine shall be suitable for operation on 415 volts 3 phase 50 cycles AC 3 wire or 4 wire system with neutral solidity earthed. The supply voltage may very up to +10% -20%. The frequency may vary up to + 3%. However, full rated power of the motor shall be available at the lower voltage. Firm should confirm satisfactory performance of the machine at incoming power supply in the range 415V+10%-20% and 50HZ+3% frequency or should provide voltage stabilizer as specified against clause 2.13.2 below of required capacity.	
2.13.2	The voltage stabilizer, if required, shall conform to :	
i)	Input Voltage	320 to 460 volts 3 phase 4 wire supply.
ii)	Output Voltage	415 volts
iii)	Regulation	+ 1% from No load to Full load.
iv)	Rate of correction	20 volts per second per phase.
v)	Wave from distortion	NIL
vi)	Efficiency	Not less than 97%.
vii)	Winding and class of insulation	Copper wire wound with "B" class of insulation or better.
2.13.3	In case of machines equipped with NC, SS, CNC, PLC, Thyristor controlled devices and other sophisticated electronic gadgets including microprocessors etc. which are susceptible to power line spikes and surges, a suitable voltage stabilizer and ultra-isolation transformer of adequate capacity to cover for the entire electrical load of the machine shall be offered as a concomitant accessory conforming to Specification for voltage stabilizer as mentioned in clause 2.13.2 above and isolation transformer to the parameters mentioned below:	
	Transformer ratio	1:1
	Winding	Copper wire wound with "B" class insulation or better.
	Protection	To arrest spikes and surges to the order of 3 KV for 200-400 micro seconds duration.

	Common mode rejection	120 dB
	Isolation	Capacitance 0.05 Pf: resistance greater than 1000 Mega Ohms.
2.14	**Atmospheric Conditions**	
2.14.1	The ambient temperature at the site at which the machine will be installed may vary from -4ºC to +50ºC over the year. The relative humidity may be as high as 98%. The atmosphere is expected to be dusty. The machines offered shall be suitably tropicalized to work under these atmospheric conditions without any adverse effect on their performance.	
2.15	The temperature rise shall not reach such a value that there is a risk of injury to any insulating material or adjacent parts.	
2.16	The drive shall be capable of operating at any one of the speed required independent of the load in accordance with the requirements of the machine.	
2.17	Information/data shall be furnished as per the format of submission of technical bid Annexure–A of Section-III.	
3.0	**GENERAL CHARACTERISTIC**	
3.1	**RIGIDITY AND STABILITY**	
3.1.1	The machine shall be robust, rigid and of sturdy construction. It shall be designed to meet heavy duty demands of various operations on the machine under normal Workshop environment for such machines. It shall be free for vibrations even when working at full capacity.	
3.1.2	All machine castings shall be made of close grained high grade cast iron like Mechanite or equivalent materials meeting IS-210 Standards to ensure durability and rigidity. The casting shall be thermal stress relieved to ensure stability and continued accuracy.	
3.1.3	All machine fabrications of critical load bearing assemblies like beds, columns etc. shall be adequately strengthened and stress relieved.	
3.1.4	Change in ambient temperature shall not affect the performance of the machine.	
3.1.5	There shall be no change in the performance of the machine either on switching on the machine or after continuous running.	
3.1.6	There shall be no resonant vibrations throughout the working range of the machine at all load levels.	
3.2	**Safety Controls**	
3.2.1	The machine shall incorporate safety devices to provide protection to the operator and machine against all possible operational and machinery failures.	
3.2.2	Suitable interlock shall be provided to prevent machine operations in the event of:	
3.2.2.1	Faulty sequence of operation.	
3.2.2.2	Fluctuation in supply voltage.	
3.2.2.3	Resumption of power supply after power failure.	
3.2.2.4	Non-positioning of safety guards.	
3.2.2.5	Failure of hydraulic system (where applicable)	
3.2.2.6	Failure of lubricating system (In case of automatic including drop in pressure lubrication)	
3.2.3	A fault or damage in the control circuit or interruption re-establishment after an interruption of fluctuation in whatever manner in the power supply to the machinery must not lead to dangerous situations in particular.	
3.2.3.1	The machinery must not start unexpectedly.	
3.2.3.2	The machinery must not be prevented from stopping if command has already been given.	
3.2.3.3	No moving part of the machinery or piece held by the machinery shall fall or be ejected.	
3.2.3.4	The protection devices must remain effective.	
3.2.4	The machine shall be fitted with an emergency stop device to enable actual or impending danger to be averted. This device must be:-	
3.2.4.1	Conveniently located.	

3.2.4.2	Clearly identifiable.
3.2.4.3	Stop the machine as quickly as possible without causing additional hazards.
3.2.4.4	The emergency stop must remain engaged. It should be possible to disengage it only by appropriate operation. Disengaging the control must not restart the machinery but only permit restarting.
3.2.5	Safety features shall also include.
3.2.5.1	Safety device against overload for all mechanical and electric items to the extent possible.
3.2.5.2	Safety stops against over-running of slides.
3.2.6	Guard and protection devices shall protect exposed persons against risks related to moving transmission parts (such as pulleys, belts, gears, rack and pinion, shafts etc.) and moving parts directly involved in the process to the extent possible. This shall meet the following requirements:-
3.2.6.1	Be of robust construction
3.2.6.2	Not give rise to any additional risk
3.2.6.3	Not be easy to by-pass or render non-operational.
3.2.6.4	Be located at an adequate distance from danger zone
3.2.6.5	Cause minimum obstruction to the view of the production process.
3.2.6.6	Rigidly connected and not prone to rattling
3.2.6.7	Enable essential work to be carried out without the guard or protection device having to be dismantled
3.2.7	A load meter shall be provided to indicate the load on the machine. The meter shall have a suitable mark to indicate the maximum load the machine can take. Full details of the above and other safety features indicating how each one functions must be explained in the offer.
3.2.8	Movement of main cylinder of jig & fixture only possible when robotic head is fully out.
3.2.9	Remote connectivity points should be provided on both sides of the machine.
3.2.10	PLC listing manual should be in the form of ladder or STL if PLC is available in the machine.
3.2.11	Service accessories kits for trouble shooting to component level for different boards should be supplied.
3.3	**Operational Controls**
3.3.1	The operation of the machine shall be by push buttons or levers. The basic rules for the direction of operation of controls and the corresponding direction of movements of the machine tools shall be as per IS:2987-1985.
3.3.2	The control devices shall be
3.3.2.1	Clearly visible and identifiable.
3.3.2.2	Ergonomically positioned for safe operation without hesitating or loss of time, and without ambiguity.
3.4	**Lighting**
3.4.1	Integral lighting suitable for the operations concerned where its lack is likely to cause a risk despite ambient lighting of normal intensity shall be provided.
3.4.2	The manufacturer must ensure that there is no area of shadow likely to cause nuisance, that there is no irritating dazzle and that there are no dangerous stroboscopic effects due to lighting provided by the manufacturer.
3.4.3	Integral parts requiring frequent inspection and adjustment and maintenance areas must be provided with appropriate lighting.
3.4.4	The machine lighting should be of low voltage so as to prevent any hazard to the operator.
3.5	**Machine Maintainability**
3.5.1	The machine shall be so designed as to require minimum possible maintenance and to give trouble free service.
3.5.2	All assemblies/parts of the machine shall be easily accessible for maintenance.

3.5.3	The machine shall not require major dis-assembly for checking and replacement of a particular part, especially for parts requiring periodical check up and replacement.
3.5.4	The manufacturer must provide means of access e.g. stairs, ladders, cat walks etc. to allow access safety to all areas used for production, adjustments and maintenance operations.
3.6	**Wear Compensation Adjustment**
3.6.1	The original built in accuracy of the machine shall be capable of being maintained conveniently and economically by suitable adjustments for taking up wear on slides, bearings and load screws. The system of adjustments incorporated shall be explained in the offer.
3.7	**Coolant System (Where Applicable)**
3.7.1	Suitable coolant system with pump, motor, tank, filter etc. shall be provided. The coolant pump shall be as per IS:2161-1962. The filter shall be of reusable type and indigenously available. If reusable filter cannot be offered the filter cartridge shall be readily available in India. Source of supply shall be indicated. Adequate no. of filters for 2 years working on double shift basis shall be offered as spare. Details of the coolant system shall be indicated in the offer.
3.7.2	The supply of coolant shall be in ample volume. Provision to re-circulate the coolant shall be available. A chip and coolant tray shall be provided. The volume of coolant flow shall be indicated. It shall be adjustable.
3.7.3	An enclosure shall be provided to prevent the coolant from splashing outside the machining zone. Details of enclosure shall be provided. Specific requirements of coolant system for grinding machines etc. shall be clearly indicated.
3.8	**Lubrication System (Where Applicable)**
3.8.1	The machine shall be provided with an automatic lubricating system for ensuring delivery of adequate quantity of lubricant to areas requiring continuous lubrication. Suitable arrangements must be provided for indication of failure of the lubricating system.
3.8.2	The system shall be provided with interlock to prevent machine operating/starting in the event of the failure lubrication system.
3.8.3	Reusable filters capable of filtering chips, dust particles etc. shall be provided. Indicators for showing clogged condition of filters shall be available. The filters shall be indigenously available. If reusable filter cannot be offered the filter cartridge shall be readily available in India. Source of supply shall be indicated. Adequate no. of filters for 2 years working on double shift basis shall be offered as spare.
3.8.4	Lubrication and filter cleaning chart shall be displayed on a metal plate at a conspicuous location on the machine indicating :-
(a)	Specific location of points on the machine to be oiled lubricated/greased.
(b)	Periodicity of lubrication of these points.
(c)	Filter to be cleaned.
(d)	Periodicity of cleaning filters.
(e)	Periodicity of replenishing lubricating oil for the centralized system.
(f)	Any other similar relevant information.
3.8.5	Points where manual lubrication is needed shall be separately indicated. Frequency of lubrication shall be also clearly mentioned.
3.8.6	Lubricating oils used in the machine shall be available in India. Successful tenderer will be required to indicate brand names of approved oils manufactured by various Indian Oil Companies.
3.8.7	First fill of lubricating oils used in the machine shall be provided with the machine. Details of lubricating system provided shall be indicated.
3.9	**Pneumatic System (Where Applicable)**
3.9.1	The compressed air supply will be provided by consignee at the machine within pressure range of 4.5-7.5 kg/cm^2 and a moisture content or 1000 ppm. The pneumatic system of the machine should be designed accordingly. An alarm shall be provided for low air pressure.
3.9.2	Suitable filter/moisture trap shall be provided by the contractor in the system of pneumatic air intake. The filter shall be reusable type and indigenously available. If reusable filter cannot be offered, the filter cartridge shall be easily available in India. Source of supply shall be indicated. Adequate no. of filters for 2 years working on double shift basis shall be offered as spare.

3.9.3	Air pressure regulator, if necessary, shall be provided by the tenderer.
3.9.4	The make of pneumatic control equipment shall be of reputed make. The makes shallbe indicated.
3.10.	**Hydraulic System (Where Applicable)**
3.10.1	Hydraulic circuit must be equipped with the following safety and inspectionequipment :
(a)	Pressure gauges at all place, where pressure has to be set up or inspected.
(b)	Safety valves for hydraulic circuit if relief valve does not fulfill this function.
(c)	Equipment for checking of temperature in the circuit or in the pump wherevernecessary.
(d)	Arrangement to show if the filters (including those in the pump set) are choked and need cleaning. The filters shall be of reusable type and indigenously available. If reusable filter cannot be offered, the filter cartridge shall be readily available in India. Source of supply shall be indicated. Adequate no. of filters for 2 years working on double shift basis shall be offered as spare.
(e)	Alarm for low oil level.
3.10.2	The sump aggregate shall have the following:
(a)	Oil level sight gauges or any other equipment showing the minimum and maximumoil levels in sump.
(b)	A drain plug at the lowest portion of the tank.
(c)	It shall be possible to drain the oil from the tank without disconnecting any pipes orother fittings.
3.10.3	The temperature of oil in hydraulic circuits shall not exceed 60 degrees C in any case. Suitable arrangement shall be incorporated to ensure that the oil is not overheated under local weather conditions at continuous normal working of themachine.
3.10.4	Facilities for bleeding of air in case of air lock shall be provided.
3.10.5	The hydraulic reservoir, pump and allied equipment shall be suitably segregated fromthe machine in order to remove major source of heat.
3.10.6	Hydraulic oils used on the machine shall be available in India. Successful tendererwill be required to indicate brand names of approved oils supplied by various Indian Oil Companies.
3.10.7	First fill of hydraulic oils used on the machine shall be provided with the machine.

4.0 TECHNICAL LITERATURE:

4.1 One copy of the printed illustrative catalogue showing features of the machine and its elements must be enclosed with the bid.

4.2 The technical literature shall be provided for the complete machine, including imported and indigenously purchased components / sub- assemblies. The successful tenderer will have to furnish 4 (four) copies each of the following manuals directly to the consignee along with the machine. Out of these 04 sets, the bidder shall be required to submit one set of all documents in best available condition one month prior to the training for the machine. One set of technical literature should cover the following details:

(i). Operational & Maintenance manual of the machine.
(ii). Operational & Maintenance manual of the servo controlled voltage stabilizer.
(iii). Operational & Maintenance manual of the ultra-isolation transformer.
(iv). Instruction & Maintenance manual for Hydraulic Oil Cooling Unit.
(v). User manual for Tool changer system (if provided).
(vi). Technical & Maintenance manual for Hydraulic System
(vii). Technical & Maintenance manual for Lubrication System.
(viii). Operator Guide for Control System (if provided).
(ix). Programming Guide for Control System (if provided).

(x). Diagnostic & Trouble shooting Guide for Control System (if provided).

(xi). Start-up Guide for Control System (if provided).

(xii). Machine Software Listing (if provided).

(xiii). Soft and hard copies of PLC Program in ladder form with cross reference listing and PLC project file.

(xiv). Drawings of tooling & fixtures, hard copies in A-2 size as well as soft copy in PDF format.

(xv). Wiring diagram, in which length of wires must be mentioned, hard copies in A-3 size as well as soft copy in PDF format.

(xvi). Mechanical drawings (spindle assembly, table assembly, column assembly), hard copies in A-1 size as well as soft copy in PDF format.

(xvii). Spare part manual including part lists no., hard copies in A-4 size as well as in PDF format.

(xviii). Lay out drawings in A-1 size, which clearly shows the position of all type of electrical components in machine.

Note: All manual and literature should be in English/Hindi.

5.0 Spares

5.1 Two lists of recommended perishable and non-perishable spares (inclusive of spares, if specifically asked for in this tender) for each schedule of machine required for normal maintenance to cover complete range of mechanical, hydraulic and electrical equipments including controls on double shift working basis for two years should be furnished and quoted separately. The quantities should relate to, in case of non-perishable spares, to two years normal maintenance. And in case of perishable spares to the duration of its shelf life or two years whichever is less. Shelf life should be indicated with the quotation for spares. It may be noted that it is the responsibility of the bidder to ensure that exhaustive list of spares is quoted to maintain the machine for period of two years.

5.2 Spares shall be supplied along with the machine, if ordered

6.0 Consumables

6.1 The list of consumable spares shall be furnished and quoted along with their unit rate.

6.2 Consumables shall be supplied along with the machine or as per agreed time table, if ordered.

7.0 Special Features:

7.1 Special features incorporated in the machine, if any, shall be indicated separately in the bid clearly indicating the advantages.\

8.0 Deviations:

8.1 The tenderer shall certify that the offered machine fully meets the specification. Various design features incorporated in the machine to fulfill different technical performance requirements shall be fully explained in the offer. However, minor deviations from these specifications which do not affect or in any way interfere with the stipulated performance standards or would result in improved safety/ reliability or would reduce recurring maintenance/operating cost of the machine, can be considered for acceptance. The tenderer in such eventuality shall clearly indicate the details of these deviations and their implications as per the following format:

8.2 All Deviations shall be clearly indicated in the deviation statement as per the format of submission of technical bid Annexure–A of Section-III.

9.0 INSPECTION AND TESTING AT MANUFACTURER'S WORKS:

9.1 The machine shall be inspected and tested during different stages of its manufacture starting from raw material till the completion of machine, by the purchaser or his authorized representative at the supplier's or his sub-supplier's works. The Quality Assurance Programme as per Annexure-F shall be submitted along with the bid. The bidder must submit the exhaustive QAP incorporating the tests as given in Annexure-F along with other tests /stage inspection as followed by them.

9.2 A load and functional test like no load test and maximum Horse Power test must be carried out at the manufacturer's works. Rigidity of the machine shall be demonstrated to the satisfaction of appointed inspector or inspecting agency.

9.3 Manufacturers must have suitable facilities at their works for carrying out various performance tests on the sub-assembly/assembly/machine. The tenderer shall clearly confirm that all facilities exist and shall be made available to the inspecting authority.

9.4 A Sample Inspection Chart for inspecting the equipment shall be supplied along with the bid. The inspection chart should indicate all the tests that are carried out during the machine manufacture and also the tests to be offered to inspecting agency. The standard to which this inspection chart conforms should be clearly indicated. Against each test, acceptable limit/ range of values shall be indicated.

9.5 The complete machine shall be inspected at manufacturer's premises as per approved GA drawing. Inspecting authority shall not carry out the final inspection in case GA Drawing is not approved by the consignee**.**

9.6 The Manufacturer shall produce invoices of bought out items/sub-assemblies to ensure genuineness of such products / verification by the Inspecting agency.

10. TRAINING:

10.1 Free training by the firm shall be imparted in operation and maintenance of the machine. The training to be imparted shall cover operation, troubleshooting and repair of all mechanical, hydraulic, electrical & electronics equipments (Control & AC Drives) and PLC part programming. This training shall be provided to 6 personnel as nominated by RCF, Kapurthala, for a period of 2 weeks free of cost at the manufacturer's premises. All charges pertaining to travel, boarding and lodging shall be borne by Indian Railways.

10.2 Subsequently, technical experts from the manufacturer will fully and adequately provide training to operators and maintenance staff nominated by the consignee at the time of commissioning of the machine.

10.3 The supplier will be responsible for co-coordinating with the consignee the travel plans of trainees to ensure that the training is imparted on the machine at its assembly and testing stage. The bidder shall also submit training schedule along with the offer.

Note: All training should be imparted in English/Hindi only.

11. FOUNDATION & RELATED DRAWINGS

11.1 SUBMISSION OF GA, FOUNDATION & RELATED DRAWINGS FOR APPROVAL:

11.1.1 The supplier shall first submit 01 copy of foundation drawings with details of construction of foundations, complete layout of machine elements like bed, hydraulic tank, coolant tank, electrical panel, Servo Controlled Voltage Stabilizer etc. and other related diagrams (Mechanical, Hydraulic, Electrical & Electronics) along with machine weight, overall dimensions, electrical load with length of 3 phase, 415 V AC electric power cable for approval as per time schedule specified in Section-I to each consignee for approval and to enable the consignee for making necessary arrangements for Installation & Commissioning of Machine on receipt. After getting approval from consignee, the supplier shall supply directly to each consignee 6 copies of approved GA foundation drawings and related diagrams for each machine as per time schedule specified in Section-I from the date of approval of GA drawing for information only. This information should be furnished on the pattern indicated in detail in the following IS Specifications (Latest) or relevant international standards

i) IS: 2974 (Pt.I Para 4.1) for reciprocating type machine.

ii) IS: 2974 (Pt.III Para 3.1) for rotary type machine (medium & high frequency.

iii) IS: 2974 (Pt.IV para 4.1) for rotary type machines of low frequency.

iv) IS: 2974 (Pt.V para 3.1) for impact type machines other than hammers

11.2 APPROVAL OF GA DRAWING

To be governed by Time Schedule in clause 7 of Section-I and following stipulations.

11.2.1 General Arrangement Drawings will be sent by the Supplier to the Consignee as per Time Schedule annexed in Specification.. The supplier should ensure that drawings sent to consignee are complete in all respects as specified in technical specification. The GA drawings shall be approved by the consignee and given back to the contractor, as per the Time Schedule in the Specification.

11.2.2 **Delays in submission of drawings by Contractor would be added to the delay in supply of machine** in case submission of GA drawing is delayed beyond stipulated time as per time schedule and LD would be levied. Thus, the number of days delay in submission of GA drawing plus the number of days delay in supply of machine together will be taken as the delay in supply of machine, for the purpose of calculations of LD. However, if the contractor supplies the machine before original delivery period as per delivery schedule, the number of days by which machine has been supplied earlier than original delivery period that many days will be subtracted from the delay in submission of GA drawings and LD will be levied accordingly**.** Delays in approval of the drawings by consignee will not be on account of Contractor, except as detailed below.

11.2.3 In case, Consignee finds some deficiencies in the Drawings and returns the same for rectification to the 'Contractor', the contractor must return the rectified drawings within 30 days from the date of issue of letter by Consignee. This period will not be counted towards LD calculation. The consignee shall ensure that all deficiencies in the Drawings shall be pointed for clarifications to the firm together at one time only instead of piecemeal multiple reference.

11.2.4 A repeat back reference(s) by Consignee to Contractor pointing out further defects/deficiencies in the Drawings, will be considered a delay on account of the contractor, except for special circumstances like change in location, review of arrangement etc. Thus, Contractors must take utmost care in ensuring completeness as per requirements of the Consignee.

11.2.5 In their own interest, contractor must maintain a log of events in this respect with clear dates and regularly inform consignee to avoid wrong levy of LD. Consignee must cooperate with Contractors by providing all assistance, including clear information about any expected delays in site availability, promptly and in writing.

11.2.6 If an order has been placed on the firm, the firm will have to advise the consignee well in advance regarding requirement of road permit and assistance required from the consignee, if any, so that delay on this account is avoided. Firm should also visit the site before dispatch of machine to assess the condition of path to be used for movement of trailer.

11.3 DISPATCH OF THE MACHINE FROM MANUFACTURER WORKS:

11.3.1 The supplier should normally dispatch the machine only after the foundation is ready for installation and commissioning of the machine on arrival.

11.3.2 In case of delay on part of consignee in providing the clear site for construction of foundation or any other facility as specified in the contract to the supplier, the supplier will report the matter with M&P Department of RCF.

11.3.3 In case proving of component at manufacturer works, the supplier should request for the same as soon as possible after receiving contract, keeping allowance of transit time etc. and approximately 60 days for consignee to handover the parts after receipt of the request accompanied by appropriate and valid bid guarantee. In the event of consignee, certifying the non-availability of prove out components, such components will be deemed to be proved out at manufacturer works. However, the firm will prove out these components at consignee works subject to the availability.

12.0 INSTALLATION, COMMISSIONING AND PROVING TESTS: (ON TURNKEY BASIS)

12.1 Joint Check – The contractor or his agent would be required to carry out a joint check at consignee's end, along with the consignee, before unpacking is done, to avoid subsequent

complaints regarding short shipment/transit damages. It is necessary that this joint receipt inspection be done immediately on receipt of the machine by consignee & bidder's representative to avoid commissioning delays due to shortages/transit damages. After receipt of the machine as above a Joint Receipt Inspection note (JRI) as per Annexure-B of Section-III shall be prepared by the consignee and the firms representative indicating the tentative time schedule for various activities of installation and commissioning.

12.2 RESPONSIBILITIES OF CONSIGNEE AND BIDDER

12.2.1 The **consignee** shall be responsible for-

i. Provision of a clear covered (except where shed is in the scope of contract) site for construction of foundation as per the schedule to ensure its readiness before arrival of machine at site.

ii. In case where construction of shed is also in the scope of contractor, the consignee shall ensure site is encroachment and encumbrance free.

iii Electricity, water and compressed air for installation and commissioning of machine shall be provided free of cost within one week of arrival of machine at site.

iv. Wherever a road mobile crane has to be arranged by the supplier for material handling, a clear approach for it up to the site has to be provided.

v. Clear covered space for storage of material/equipment required for working/ construction of foundation and installation of the machine etc.

vi. The consignee shall arrange the raw material for prove out at their end within 15 days of the dry run of the machine (installation, power connection, auxiliary connection like air, water connection) failing which such components will be deemed to have been proved out. The components supplied by the consignee in time will be required to be proved out as per time schedule chart.

vii. The inspection of foundation, structures etc. and installation of the machine shall be done by authorized representative of consignee.

12.2.2 The bidder shall be responsible for-

i. Design & Construction of foundation, flooring of sufficient thickness, civil works (in line with scope of supply) suiting local soil conditions at the site .

ii. Advise consignee in time regarding schedule for requirement of clear site for construction of foundation and other infrastructure, resources & facilities required.

iii. Construction of foundation as well as flooring (if required) of sufficient thickness suiting local soil conditions, for machine shall be completed by the bidder at the site provided by the consignee before receipt of the machine at their premises.

iv. Provision of all tools and equipment, technical and unskilled manpower, material handling accessories/ equipment and material for installation and commissioning.

v. Unloading of the machine on receipt and its movement to the site of installation including provision of road mobile crane.

vi. The bidder should ensure the proper earthing for the machine and its peripherals/accessories.

vii. The bidder shall be responsible for meeting all the criteria set by State Pollution Control Board and Central Pollution Control Board, wherever applicable, with respect to air, water, noise, land etc. The bidder shall be responsible for obtaining clearance/certificate for installation/commissioning /operation of the machine/system supplied. The consignee will provide the administrative help for establishment of communication with the Pollution Control Board.

12.3 Consignee will provide only 415 V+10%/-20%, 3 phase 50 Hz$\pm$3% AC supply at a single point (mains). All types of cables, connections, circuit breakers etc. required for connecting power supply point to different parts of the machine/control cabinets, shall be the responsibility of the

bidder. Requirement of grounding/earthing with required material shall also be incorporated by the bidder during construction of foundation.

Electrical work like laying of power/electrical cables & earthing wires from mains to machine control panel (upto 20 meters) as well as within the machine, with supply of all materials shall also be carried out by the supplier.

12.4 The supplier shall demonstrate machine performance and prove out the claimed capability for successful commissioning at the consignee's works as per clause 2.4 of Section-I. The M&P shall be deemed to be "commissioned" at consignee premises on the date when it is tested and meets with the specified capabilities/functions according to the technical specifications. In addition to above, in case of tooled-up M&P, the M&P shall be deemed to be "Commissioned" at consignee premises on the date when "prove out" components specified as per the relevant clause of technical specification have been successfully proved out meeting the productivity requirements of Technical specification. The consignee shall arrange the raw material for prove out at their end within 15 days of dry run of the machine (installation, power connection, auxiliary connections like air, water etc.) failing which such components will be deemed proved out. The components supplied by consignee in time will be required to be proved out as per time schedule chart. Any delay in providing the "raw material or any other input" for proving out shall not be logged on supplier's account.

A Joint Commissioning Note (JCN) to this effect shall be made as per the format at Annexure-C of Section-III. After issue of JCN the performance shall be watched for a period of one month, after which the PTC shall be issued. The issue of PTC cannot be delayed by more than 60 days from the issue of JCN. If some minor breakdowns are noticed after the issue of JCN, these shall be attended as per warranty obligations and suitable extension of the warranty period, under intimation to M&P section of RCF.

12.5 If an assembly/sub-assembly requires to be taken back to the manufacturer's premises for repair/replacement either before commissioning or during warranty, the manufacturer or his agent would be required to submit BG of suitable amount. In case the entire machine has to be taken back, a Bank Guarantee for the cost of the machine would have to be submitted. The bank guarantee should be of adequate value so as to cover the cost of the assembly/sub-assembly/paid up cost of the machine.

13.0 SERVICE FACILITY IN INDIA AND TECHNICAL SUPPORT

13.1 The tenderer will clearly spell out in the offer the facilities available with him or his agent for providing adequate after-sales service in India during warranty period in the appropriate section of Annexure-A of Section-III. The complete details such as organization for after sales service, availability of technically competent engineers and warehousing facilities for spares should be clearly indicated. Bidders not offering complete servicing/repair facilities in India to ensure quick response to maintenance/ servicing calls are not likely to be considered.

13.2 After the warranty period and CAMC period, if any, the manufacturer or his agent shall agree to provide service supports for trouble shooting and obtaining spare parts. The manufacturer shall be obliged to provide spare parts required by the Purchasers for a period of 20 years from the date of Commissioning of the machine at the ultimate destination to safeguard against obsolescence.

13.3 Tenderer who are OEM, shall undertake to supply spare parts for a period of expected life of machine. Other tenderers shall submit undertaking from OEM for supply of spare parts for a period of expected life of the machine.

13.4 During warranty period, the supplier or his authorized agent shall attend for break down as soon as possible, but in no case later than 72 hours of receipt of intimation of the breakdown.

14.0 BOUGHT OUT ITEMS

14.1 The bidder shall furnish along with the offer a list of all critical items/ sub-assemblies which are bought out by the bidder and proposed to be used, along with the manufacturer's name, brand model etc.

14.2 The bidder should clearly indicate that in case of components/sub-assemblies taken from reputed companies such as Vickers, Rexroth, RITTAL, THK, and Shenburger etc., the parent company has already entered into contract with their Indian units/affiliates for undertakings repairs/after sales service during warranty and post warranty.

15.0 COLOUR: The machine and its accessories shall be painted in Apple Green Colour No.281 to IS:5-1978, (if any specific colour code standardized by BIS is available, the same be given). The machine can also be painted in equivalent RAL/DIN/other International Standards. If there is a standard color scheme of the manufacturer, the same can also be considered and may be specified.

16.0 Comprehensive Warranty

16.1 The machine shall be designed for a life of 20 years with regular maintenance and all the structural members of the machine and the foundation shall be guaranteed for 20 years against cracks breakages and etc. during the course of normal operations. Tenderer would submit suitable undertaking.

16.2 The warranty period would also cover comprehensive preventive maintenance, which will be inclusive of all spares, material and labour cost. All maintenance consumables like lubricants and grease except hydraulic oil / plant coolants shall form part of the scope of the preventive maintenance during the warranty.

16.3 The firm shall ensure that in case a failure is reported by a consignee, qualified service engineer of the contractor shall visit the site within the prescribed response time from the date and time of complaint for the machine. This response time shall be **48 hours, for upto 06 cases in entire 02 years (or extended warranty period) & Nil thereafter. 48 hours' response time shall be permitted only if 2 successive failures are staggered 3 months apart.** Complaints shall be lodged by consignee by fax, phone, e-mail, whatsapp or per bearer at address given by the tenderer.

16.4 The details of preventive maintenance to be provided during warranty period shall be indicated by the tenderer giving details of type of preventive schedule, periodicity on items to be checked, items to be replaced and expected plant down time. Preventive maintenance schedules shall be conducted on weekends as far as possible or any other day through mutual agreement with consignees. Total breakdown hours shall be calculated after discounting response time and preventive maintenance period.

16.5 Penalty will be levied on the contractor for breakdown period on hours' basis (including holidays) after discounting for the response time. Penalty will be calculated with full/partial deduction of amount of WBG, which shall be deducted from the WBG deposited:

Breakdown period	Applicable penalty
Up to 500 hours in entire duration of warranty of 02 years (plus extended warranty period, if any)	Nil
Exceeding 500 hours to 1200 hours in entire duration of warranty of 02 years (plus extended warranty period, if any)	25% of WBG amount
Exceeding 1200 hours to 2100 hours in entire duration of warranty of 02 years (plus extended warranty period, if any)	50% of WBG amount
Exceeding 2100 hours in entire duration of warranty of 02 years (plus extended warranty period, if any)	Full encashment of Warranty Bank Guarantee besides other action like noting adverse performance of the bidder and/or agent for future tenders and their offer in the subsequent tenders will not be considered for placement of any order for next 02 years.

17.0 <u>Comprehensive Annual Maintenance Contract for the period of 10 years</u>:
The contractor shall be required to take CAMC of the entire machine supplied under the scope of contract.

17.1 Tenderers are required to quote for a comprehensive Annual Maintenance Contract for the various scope of work supplied post warranty on yearly basis giving the rates for each year i.e. first year, second year….so on., which will be inclusive of all spares, material and labour costs. The duties and taxes as applicable should be indicated separately. All consumables spares and materials shall form a part of the scope of CAMC excluding Diesel/Fuel, lubricating oils or coolant

17.2 CAMC shall be operated, managed and paid by the respective consignee. The consignee shall indicate the bill payment authority & custodian of the CAMC BG.

17.3 CAMC is a part of scope of supply. However, CAMC quoted by the bidder will not form part of Contract Value.

17.4 The duration of CAMC shall be 10 years from the date of expiry of warranty. Rates for CAMC as quoted by the tenderer on yearly basis will remain applicable during the duration of CAMC and not subject to any variation except any statutory changes in taxes and duties as compared to quoted rates.

17.5 The contractor must provide CAMC services at the consignee location without any precondition. The CAMC should include complete responsibility for the bought out sub-assemblies and components like Control system, diesel engine, AC unit etc.

17.6 The details of preventive maintenance services to be provided under CAMC shall be provided by the tenderer in the following format.

S.No	Type of Preventive Schedule	Periodicity	Items to be checked	Items of Replacement	Expected Plant Down Time

17.7 Preventive maintenance shall preferably be conducted on weekends through mutual agreement with the consignee. Each preventive maintenance schedule normally shall not exceed one day (24 hours). The preventive maintenance regime offered must be aimed at achieving minimum 95% uptime of the plant excluding the plant down time for preventive maintenance schedules.

17.8 The tenderer shall ensure that in case a failure is reported by a consignee, qualified service engineer(s) of the contractor shall visit the site within the prescribed response time from the date and time of complaint for the machine. This response time shall be **48 hours for upto only one case per quarter during the period of CAMC** & Nil thereafter. **48 hours response time shall be permitted only if 2 successive failures are staggered 3 months apart.** Complaints shall be lodged by consignee by fax, e-mail, WhatsApp or per bearer at communication given by the tenderer. The responsibility to keep the failure reporting address details current will rest with the tenderer

17.9 Incase preventive maintenance is carried out along with breakdown maintenance schedule; preventive maintenance time will be deducted from breakdown time of the plant.

17.10 **Penalty Clause:** Penalty shall be levied on the contractor for maintaining up time below the limit of 95% calculated on working days basis, after discounting for response time and preventive maintenance period. Penalty shall be calculated as %age of quarterly payment and will be deducted from the respective quarterly payments. Penalty calculation will be done over quarterly payment period.

S.No	Availability Slab	Applicable Penalty
1	95% and above	Nil
2	Below 95%	2.5% for every 1% (or part thereof) reduction in availability of plant below 95%.

17.11 For CAMC, a Bank Guarantee (BG) equivalent to 5% of the combined quoted cost of equipment including accessories, shall be deposited by the contractor to the consignee, 90 days before the expiry of warranty. BG shall have the validity of 5 years and 6 months. The confirmation for the submission of this BG shall be submitted to RCF for the release of WBG. The CAMC BG will be returned on completion of CAMC period. In case, the contractor fails to provide CAMC services successfully, the CAMC BG will be forfeited. This will be in addition to penalty as per Clause 17.10 above.

17.12 Up time of less than 75% for two consecutive quarters will constitute complete failure of contractor to provide the CAMC services successfully and will result in forfeiture of CAMC BG, besides other action like noting adverse performance of the bidder and/or agent for future tenders and their offer in the subsequent tenders will not be considered for placement of any order for next 02 years. This will be in addition to penalty Clause 17.10 above for the period of actual performance.

17.13 Since CAMC is part of evaluation of offer, it is the sole responsibility of contractor to stock all spares and materials as required for smoother execution of CAMC in order to achieve up time in compliance to plant availability as per stipulated requirements.

17.14 In case of damage on account of any external factor, viz., floods, earthquake, fire, arson or sabotage, it shall be the responsibility of the Railways for restoration of the plant to the earlier working order prior to the external factor and the entire cost for repair of the plant shall be borne by the railways.

17.15 In case of damage to the plant as mentioned in para 17.14, any spare parts and material necessary to restore the plant to proper working order shall be arranged by the contractor and charged on actual basis duly certified by authorized railway official in the next quarterly bills. The rates charged for such spare parts shall be based upon the spare part rate list provided by tenderer and supported by necessary documents.

17.16 In all cases of failure except as mentioned in Clause 17.14 any other spare part or material necessary to restore the plant to proper working order will be arranged by the contractor as a part of CAMC.

17.17 Normally quarterly payment (@ $1/4^{th}$ of the annual quoted rates) under CAMC will be made to the contractor within 30 days from the end of that quarter subject to submission of the following documents by the contractor to the paying authority assigned by the consignee.

a. Consignee's certificate for work done as per Annexure-E of Section-III with calculation of down time and penalty applicable.
b. A certificate by consignee that no spare part is due with the contractor as per clause 17.13 above.
c. Bills submitted by the contractor & accepted by consignee.
d. Attested photocopy of the CAMC BG.

17.18 In case of failure of the contractor to provide CAMC services as defined in Clause 17.12, the CAMC BG shall be forfeited with levy of other penalties as applicable under advice to the contractor regarding termination of CAMC.

SECTION-III

ANNEXURE-A
FORMAT FOR SUBMISSION OF TECHNICAL BID

1. a) We, M/s.---------- offer our --------- machine, model no. ------- as per the description given in Schedule of Requirements.

   b) **We state that, except for the following, for which clause wise brief description and justification for deviation has been indicated, our machine fully complies with all the clauses as given in technical specification Section- I & II.**

S. No.	Clause/Item	Brief description of Deviation	Justification for deviation

   c) We also confirm all the schedules given in the Delivery Schedule at para 7 of **Section-I.**

   Note 1: The deviation mentioned elsewhere in the bid shall not be considered and the bid shall be evaluated based on the information provided against Annexure-A of Section-III.

   Note 2: In case tenderer offers internationally accepted alternative specifications as per clause 1.7 of Instructions to Tenderers for filling technical bid, complete details of alternative specification, apart from filling above deviation statement, may be enclosed.

2. We further certify that we are meeting the reference clause as;

(A) We are the regular manufacturer of this type of machine.

(B) We have made the following past supplies of similar machines during last 5 years: -

S. No.	Name of the Purchaser with Address	Purchaser's Phone, Email Address, Name of the contact person	Purchase/ Supply Order number and date (along with a copy of the PO)	Quantity Supplied (with pro of of supply) @	Date of Supply (@)	Date of Installation and/ or Commissioning @	Maximum Weight of Components handled by the machine

@ (along with copies of relevant documents to establish linkages of documents/ entities as detailed in clause 5 of Qualifying Requirements)

(C) We are submitting following performance certificate from past users: -

S. No.	Name of the Purchaser with Address	Purchase/ Supply Order number and date (along with a copy of the PO) (It should be the one(s) which are enlisted at clause 2 B above)	Quantity Supplied	Date of Supply	Date of Installation and/ or Commissioning	Date of issue of Performance Certificate	Performance as per Annexure-A1

3. We are having following facilities available with us or our agent for providing adequate after-sales service in India during warranty period. Complete details of after sales service, availability of technically competent engineers and warehousing facilities for spares is indicated below:
   - After sales service centers:
   - Availability of technically competent engineers;
   - Warehousing facilities for spares:

4. We have quoted for the following optional accessories as indicated under clause 4.3 of Section-I

S No.	Description of the optional accessory	Quantity (in Nos.)	Rate (in Rest.)	Indigenous	Shelf Life (in Months)

5. We have quoted for following recommended perishable and non-perishable spares required for normal maintenance to cover complete range of mechanical, hydraulic and electrical equipments including controls on double shift working basis:

Perishable Spares

S No.	Description of the spares	Part number	Quantity (In Nos.)	Rate (In Rs.)	Shelf Life (in Months)

Non-perishable spares

S.No.	Description of the spares	Part number	Quantity (In Nos.)	Rate (In Rs.)

6. *We hereby confirm that we are the OEM and undertake to supply spare parts for a period of expected life of machine.

OR

*We hereby confirm that we are not the OEM, but are submitting undertaking from OEM for supply of spare parts for a period of expected life of the machine to provide maintenance spares (as and when ordered) after the expiry of the Warranty/CAMC for 10 years (life of machine - 20yrs) including the maintenance spares required for the bought out sub-assemblies and parts.

(*Strike out whichever is not applicable)

7. We have quoted consumables required as per clause 6.1 of Section-II, in the format give below

S No.	**Description of the consumable spares**	**Qty.**	**Unit**	**Rate**

8 It is certified that we are having suitable facilities at our works for carrying out various performance tests on the sub-assembly/assembly/machine and these shall be made available to the inspecting authority.

9. **BOUGHT OUT ITEMS:** We hereby furnish a list of all critical items/ sub-assemblies which are bought out by us and proposed to be used, along with the manufacturer's name, brand model etc.

Sr No.	**Description**	**Item no.1**	**Item no. 2**	**Item no. 3**
1.	Brief description of item			
2.	Model no.			
3.	Make			
4.	Quantity/machine			
5.	Manufacturer's name and complete address			
6.	Whether imported or indigenous			
7.	Country of origin			

10. The details of Preventive Maintenance during warranty and comprehensive Annual Maintenance Contract as per clause 16.7 & clause 17 of Section-II respectively. The Preventive Maintenance during warranty and comprehensive Annual Maintenance Contract is in the scope of this tender. Details of preventive maintenance services including cleaning of machine to be provided under PMC during warranty and CAMC is given in the following format.

S.No	**Type of preventive schedule**	**Periodicity**	**Items to be checked**	**Items of Replacement**	**Expected plant own time**

11. We further submit the following information about the offered machine as per the technical specification **Section-II** and Important Features of the tender Section-I. We understand that any omission of any of the below mentioned information will render our offer incomplete to that extent.

Note :- Bidder shall photocopy the specification (Section-I & II) and furnish comments/ details against each clause or link to deviation statement. Any fraudulent change(s) made in specifications (while making photocopy) will lead to summarily rejection of offer. Appropriate punitive action may be initiated.

1.

Schedule-1A

2.2	**Leading parameters**				
2.2.1	**Major parameters:** **(Note: No deviation in major parameter shall be accepted.)**				
Clause no. of Section-I	**Item Description**	**As specified**		**Value/ Write up/ Brochure (As offered)**	
2.2.1.1	Size of Job (Max dimensions)	Suitable to accommodate components of max. dimensions as below: L-4258 mm, B- 2947mm, H-733mm			
2.2.1.2	Weight of job (max)	1500 kg			
2.2.1.3	Load capacity of spinner hanger hook (min)	3000 kg			
2.2.1.4	Surface finish after Shot blasting	SA-2½ of ISO: 8501 spec. No. MDTS-166 Rev-02			
2.2.1.5	Blast Wheel	4 nos			
2.2.1.6	Rotational speed range of hanger spinner	2 – 5 rpm			
2.2.2	**Other parameters**				
Clause no. of Section-I	**Item Description**	**As specified**		**Value/ Write up/ Brochure (As offered)**	**Justification for deviation offered (if any)**
2.2.2.1	**Motor Power for**	**Quantity (In nos)**	**Minimum Capacity (In HP)**		
i)	Blast Wheel	4	25 each		
ii)	Spinner hanger	1	2		
iii)	Exhaust fan	1	25		
iv)	Elevator	1	7.5		
v)	Screw conveyor	1	7.5		
vi)	Rotary valve	1	1		
2.2.2.2	Shot flow rate	180 – 200 kg/minute/ blast Wheel			
2.2.2.3	Ventilation requirement	8000 CFM			
2.2.2.4	Power supply	415V+10% -20%, 50Hz.+/-3%			

S. No.	**Information required**	**As per Clause No.**	**Value**
2.	Technical Details/Particulars of Motors, Control Gears, Voltage Stabilizer & Isolation Transformer		

2.1	A.C. Motors and Control Gears **AC MOTOR** • Manufacturer's Name • Type of enclosure • Type of duty (Ref. IS: 325) (Latest) • Rating-Continuous/intermittent • Output (KW/BHP) • AC voltage across phases, number of phases & frequency. • Speed in RPM • Class of insulation • Normal full load current • Starting current • Maximum current at the time of change over from lower speed to higher speed • Type of motor-Squirrel cage/ slip ring (wound rotor) • Temperature rise of windings and other parts allowed above an ambient temperature of 50 degree C. • Frame size of motor • End use of motor **CONTROL GEARS** • Manufacturer's Name Type of control gear (Direct on line/Star Delta/Auto-transformer etc.) • Rating of starting gear in KW & amps. • Short circuit protection (y/n) • No volt trip (y/n) • Overload trip (y/n) • Delayed action current sensitive single phasing preventer (y/n) • Standard specifications to which the motor control gear and its ancillary offered conform to		
2.2	D.C. Motors and Control Gears **DC MOTOR** • Manufacturer's Name • Type of enclosure • Type of duty (Ref. IS: 4722) (Latest) • Rating-Continuous/intermittent • Output (KW/BHP) • DC voltage across phases, number of phases & frequency • Method of excitation whether shunt, series, compound or separately excited, if separately excited state excitation voltage. • Speed in RPM • Class of insulation • Normal full load current in amps. • Starting current • Temperature rise of windings and other parts allowed above an ambient temperature of 50 degree C. • Frame size of motor • End use of motor **CONTROL GEARS** • Manufacturer's Name • Type of control gear (Direct on line/Resistance type/Thyristor type)		

	• Rating of starting gear in KW & amps. • Short circuit protection (Y/N) • No volt trip (y/n) • Overload trip (y/n) • Standard specifications to which the motor control gear and its ancillary offered conform to • Standard specification to which control gear conforms to		
2.3	Voltage Stabiliser & Ultra Isolation Transformer **VOLTAGE STABILISER** • Manufacturer's Name • Type of voltage stabilizer : a) DC servo motor type b) AC servo motor type c) Solid state • Rated capacity in KVA • Nos. of phases & frequency • Type of input supply unbalanced • Input voltage • Output voltage • Rate of correction • Class of insulation & winding (only copper wound is acceptable) • Type of control circuitry • Class of duty • Type of cooling • Indicating instruments and their ranges • Safety features **ULTRA ISOLATION TRANSFORMER** • Manufacturer's Name • Rated capacity • Ratio of input/output voltage • Class of insulation • Arrangement for suppression of power line surges, spikes, transients and noises • Type for cooling.		
3.	The Bidder shall offer their comments against each clause specification	Section-I & II of Technical specification	
4.	**Misc.** 1. Total connected electrical load and its break up. 2. Details of quoted machine like brand name, model etc. 3. Total working area. 4. Total floor area required for installation and commissioning of the machine. 5. Maximum floor area required for installation and commissioning. 6. Total Weight of the machine. 7. Maximum size of packing and no. of packages. 8. Dimensions (lxbxh) & weight of the major sub-assemblies: 1. Blast cabinet 2. Dust collector 3. Conveyor 4. Bucket elevator		

Signature of the authorized representative
of the bidder with company stamp

Annexure-B

JOINT RECEIPT INSPECTION NOTE

***Note**: With the issue of JRI, payment is released to the contractor, as per the terms of contract. Consignee shall satisfy themselves that the conditions of contract are met before issue of the JRI.*

Date……..

Sub: Receipt of consignment for machine…….
Ref: RCF/KXH PO No…….

1.	Name of consignee/Railway	
2.	Machine name	
3.	Quantity	
4.	Name of supplier	
5.	Consignment of the machine received on	
6.	The foundation & associated works essential for "Safe Installation of Machine" are ready (for turnkey contracts only) *****	

****** If there are Delays on account of Consignee such as clear site is not given, then the condition 6 will not be a valid ground for holding JRI.*

It is certified that the consignment of the machine has been received complete and in good condition as per specification shown in the contract.

Tentative plan for installation and commissioning of the machine is as under

1.	Date of clear site provided	
2.	Contract	Turnkey/Non-turnkey
3.	**Status of readiness of foundation:**	
3(a)	Already constructed on	
3(b)	Under construction & likely date of its completion	
3(c)	Construction yet to be started from ……. and likely date of its completion	
4.	Status of availability of electrical power, water and compressed air etc.	Available/ Not-available
5.	Number of components to be proved out on the machine	
6.	Likely date for start of erection/installation	
7.	Likely date for switch-on the machine	
8.	Likely date of completion of commissioning of the machine	

Representative of firm **Representative of consignee**

Designation **Designation**
(Minimum Gazetted level)

Annexure–C

JOINT COMMISSIONING NOTE

Date:……

Sub: Commissioning of (name of machine) …….

Ref: RCF/KXH PO No…….

1.	Name of consignee/Railway	
2.	Machine name	
3.	Quantity	
4.	Name of supplier	
5.	Machine received on	

6. All the parameters of the machine are found okay. The proving test on the machine was conducted from …… to …….. and machine is working satisfactorily.

7. Machine has finally been commissioned on…….. . The machine has been handed over for regular use and kept under one-month observation to watch its performance.

8. Following minor deficiencies (if any) found during joint observation trials are to be attended/rectified by the firm during one-month observation and before issuing the PTC for the machine:

   a.

   b.

   c.

Representative of firm
Designation

Designation

Representative of consignee

(Minimum Gazetted level)

Annexure-D

Revised List of components to be proved out on Shot Blasting Plant for Bogie Frame

S.No.	Item Description	Drawing No.	Size in mm	Qty to be proved out in 01 shift (8 hrs) m/c availability 85%.
1.	Bogie Frame LHB	LW03002 alt-i	Length =3035mm Width= 2946.5 mm Height =699mm	08
2	Bogie Bolster(LHB)	LW04001 alt-i	Length = 3030mm Width = 1120 mm Height =733mm	16
3	Bogie Frame Vande Bharat TC/NDTC	D-A675UV2-141533	Length =4258mm Width =2651mm Height =596mm	08

SSE/P&P/MFG.
21/02/2024

Note:

1. Prove out components /Assembly are based on the RCF Current production Programme. If any components are not available at the time of commissioning, then any other suitable components/ Assembly from the revised production programme may be taken.
2. Firm will prove out Qty for Bogie Frame and Bogie Bolsters including Blasting time, setting time, Loading & unloading time and inspection time of assembly as per Annexure-D.

Annexure-E

Consignee's Certificate for Quarterly Work Done Under CAMC

1. Name of Plant:
2. Consignee
3. RCF/KXH PO No.
4. Name of Contractor
5. Quarterly charges for CAMC(Standard): Rs._____

   As per RCF/KXH PO no._____dt._____
6. Quarter for which bills are preferred:_____

   From:_____To._____
7. No. of Breakdowns during the quarter:
8. **Calculation of Penalty and Net CAMC charges payable to Contractor for the quarter**:

i. Total Plant Down Time (in days):

ii. Standard down days for preventive maintenance (in days/quarter):

iii. Total grace period for break down:

iv. Net down time for the plant [= (i)-{(ii)+(iii)}] :

v. 100% Availability for the quarter (in days) :

vi. Actual availability [= (v)-(iv)] :

Actual availability in %age [= {(vi) / (v)}x 100]:

vii. Calculation of penalty:

a. %age availability below 90% to 80%:

b. %age availability below 80%:

c. Penalty [={(vii a)x(5)x0.005 +(vii b)x(5)x0.01}]:

viii. Net amount payable as CAMC charges to [=(5)-(vii c)]

It is certified that all spares borrowed by the contractor for the previous quarter have been returned in good condition.

Signature of authorized representative of consignee

Annexure-F

QUALITY ASSURANCE PLAN

MACHINE DESCRIPTION:

Category	**S. No**	**Component / Process**	**Sample Size**	**Type Of Check**	**Quality record**	**TYPE OF CHECK**	**REMARKS**
Bought Out Raw Material		Steels	1 Sample / Size	Chemical & Mech.	TC & INV.	CHP	
Bought Out Components		Bearings	100%	Visual	Inv	CHP	
		Electric Motors	100%	Review of TC	TC & INV	V	
		Hydraulic Pumps & Elements	100%	Review of TC	TC & INV	V	
		Rubber Seals, O Rings & Seals	100%	Visual	TC & INV	V	
		Controllers	100%	Review of TC	TC & INV	V	
		Ball Screw	100%	Visual	IIR	V	
Bought out sub assemblies		Weld joints Load Bearings Others	100 % 5 %	RT DPT	IR IIR	CHP V	
		Hardness and	100%	Hardness	IIR	V	
In process Inspection stage							
		Heat Treatment	100%	Review of Inv.	IIR	V	
		Castings	100%	Visual	IIR	V	
		Spindles	100%		IIR	V	
		surface finish of components	Random	Surface	IIR	V	
		Noise level	100 %	Sound	IIR	CHP	
		Temperature rise	100 %	Measurement	IIR	V	
		Structures Geometry alignment, Guideways	100%	Relevant ISO/DIN/IS/JIS standard	IR	CHP	

INV – Invoice TC – Test Certificate V – Verification CHP – Customer Hold Point
IIR – Internal Inspection Report IR – Inspection Report

Annexure-G

PROFORMA FOR ASSESSING MANUFACTURING CAPABILITY OF THE OEM TO MANUFACTURE SHOT BLASTING MACHINE

Tender No. ..... Date of Opening.....

1. NAME OF THE OEM/ BIDDER

2. LOCATION & ADDRESS

Postal Address

i) Head Office

ii) Works/Factory

Telephone No. (with STD code)/ Mobile Number

i) Regd. Office

ii) Works/Factory

3. DESCRIPTION OF FACTORY/WORKS

i) Total Land area (in Sq. meters)

ii) Total covered area(in Sq. meters)

iii) Different Sub-units (with details of covered/uncovered area, etc.)

iv) Special features, if any:

4. NO. OF PERSONNEL EMPLOYED (CATEGORY-WISE)

i) Managerial*

ii) Supervisory*

iii) Skilled artisans

iv) Unskilled

* The qualification may also be indicated.

5. GENERAL INFORMATION- TECHNICAL

Description of different departments in the Factory/Works along with an organization chart

Detailed description of machinery and plant in each department (make and year of procurement). For special type of equipment /machinery, copy of pamphlet/ write-up to be furnished to support the description.

Details of raw-materials held in stock (state whether imported/indigenous).

Production capacity of the quoted items

i) Per month

ii) Per year

List of other items, which the firm regularly manufactures and corresponding production capacity.

6. DESIGN CAPABILITY

Details of Qualified Personnel (indicating qualification and experience)Other facilities available.

7. MANUFACTURING PROCESS

Level of in-house facilities

Important items for which work done by outside vendors.

Brief details of manufacturing process relevant to the items quoted.

8. QUALITY ASSURANCE

Does the factory have an established Quality Assurance Programme? If yes, please enclose a copy of the

write up? If not, what plans are there if any for setting it up?

Details of Quality Assurance Organization. Quality Control Testing Facilities and Laboratory equipment available. In-house facilities available for inspection and QC. Availability of gauges (details to be furnished)

9. AFTER-SALES-SERVICE

Facilities available at works and branch offices/ authorized service centres/ service delivery partners.

Signature.....