

GOVERNMENT COLLEGE OF ENGINEERING
JAMUNALIA, OLD TOWN, KEONJHAR-758 002

No. 1931 ; Dated 01-12 -2018

TENDER CALL NOTICE

Sealed tenders are invited from reputed original manufacturers or authorized distributor up to the date mentioned in the tenders for supply of equipment through speed post/ registered post only for Department of Metallurgical and Materials Engineering. The date of opening the tender is mentioned in the respective tender document, which will be opened in the office of the Principal, Government College of Engineering, Keonjhar in the presence of bidders and/or their nominees. The tender bid documents with details of terms and conditions are to be downloaded from the College Website: www.gcekr.ac.in.

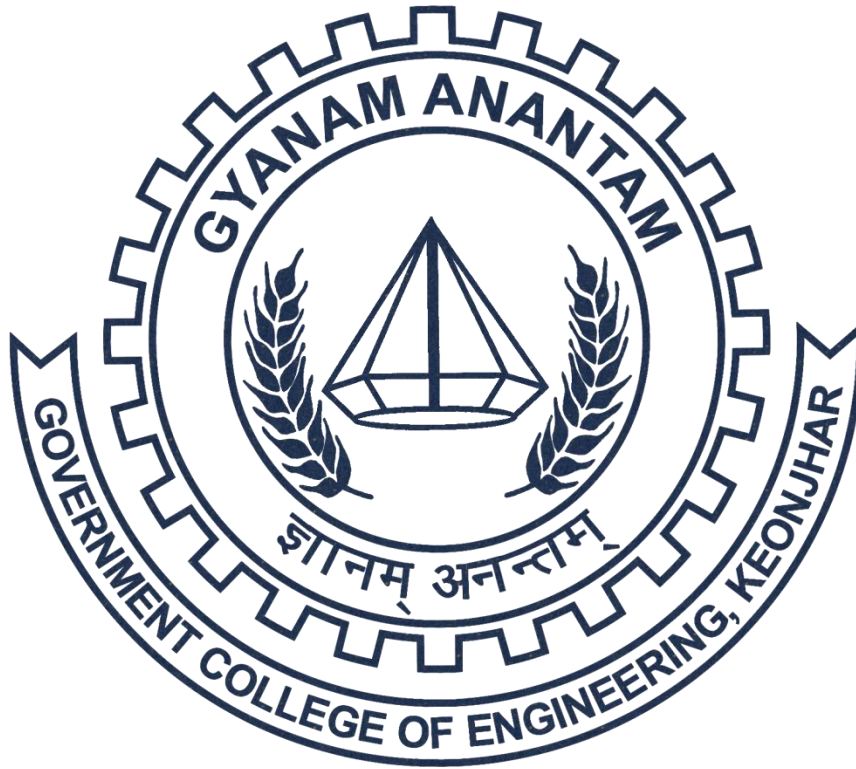
The authority reserves the right to reject/cancel the tenders in whole or in part without assigning any reason thereof. The authority will not be responsible for any postal delay.

Sd/-
Principal

Bid Ref no. 1931

Date:01-12-2018

**BIDDING DOCUMENTS AND INSTRUCTION TO SUPPLY EQUIPMENTS
FOR
DEPARTMENT OF METALLURGICAL & MATERIALS ENGINEERING**



GOVERNMENT COLLEGE OF ENGINEERING, KEONJHAR

[A Constituent College of Biju Patnaik University of Technology]

Jamunalia, Old Town, Keonjhar – 758 002

INVITATION FOR BIDS

Principal, Government College of Engineering, Keonjhar invites sealed bids from eligible bidders for supply of machineries/equipments to Department of Metallurgical and Materials Engineering.

Interested eligible Bidders may obtain detail information and list of items with technical specifications from **the website of the College www.gcekjr.ac.in**

Particulars about submission of bidding document are as follows:

- (a) Price of bidding document : **Rs. 1000/-**(non-refundable)
- (b) First date of availability of Bidding Document in the website: 01.12.2018
- (c) Last date and time for submission of bids: 28.12.2018
- (d) Time and date of opening of Technical bids : 03.01.2019, 11.00 AM
- (e) Time and date of opening of financial bid: will be notified in the college website after the scrutiny of the technical committee

(f) Place of opening of Technical & Financial bids:

**Principal Office
Government College of Engineering,
Jamunalia, Old Town, Keonjhar-758002**

(g) Address for communication:

**Principal/Head of Department (Metallurgical and Materials Engineering)
Government College of Engineering
Jamunalia, Old Town,
Keonjhar-758002**

Sd/
Principal

1. Eligibility of Tenderer and General Instructions:

1.1 Eligibility:

Those who fulfill the following criteria are eligible to participate in the tender.

- a) The tenderer must be a reputed Original Equipment Manufacturer and/or the Authorised agent/ dealer of a reputed manufacturer. Manufacturers must provide all documents relating to their Manufacturing Capabilities.
- b) If the tenderer is an Authorized Dealer/Agent of a reputed manufacturer, necessary certificate to this effect from his manufacturer must be enclosed
- c) The tenderer must be registered with GST.
- d) Annual turn-over of the tenderer must be more than Rs. Fifty Lakh each in last three years. As a letter of support the bidder should submit audited balance sheet of last three financial years.
- e) The tenderer must have cleared GST and Income Tax payment up to date. Attested copies of GST Clearance Certificate or non-assessment certificate from the concerned Sales Tax Authority valid up to date and attested copy of Income Tax Clearance Certificate or non-assessment certificate, as the case may be, from the competent authority, up to date and PAN Number must be enclosed along with the Tender documents.
- f) The tenderer must have the willingness for providing comprehensive maintenance support of the Machine supplied by him for at least two years after expiry of the warranty period.
- g) The tenderer must provide evidence of purchase order and successful execution of supply of orders with installation and successful after sales support in reputed organizations like NITs/IITs/IIESTs/IISERs/NISER/IISc/Central Research Laboratories/ Government Engineering Colleges of Odisha.
- h) The manufacturer should be preferably ISO: 9001-2008.
- i) The manufacturer should have preferably its own NABL (National Accreditation Board for Testing and Calibration Laboratories) accredited laboratory or equipments supplied should have certification from any NABL accredited laboratory in respect of quality and performance.
- j) The manufacturer should be preferably registered with ESI.
- k) The manufacturer should have preferably its own R&D section registered with Government of India.

1.2 General Instructions:

The selection for procurement of equipment will be based on quality and performance along with cost. In this context decision of technical committee is final based on documentary evidence or actual physical verification.

- a) Submission of more than one bid by a particular tenderer under different names is strictly prohibited. In case it is discovered later on that, this condition is violated, all the tenders submitted by such tenderer/s would be rejected or contract cancelled.
- b) The tenderer should mention in the tender paper, the location of its service centre nearest to Keonjhar.

- c) All offers should be in English and the price quoted for each item should be firm.
- d) Warranty period, Delivery period and After-Sale-Service conditions, etc. are also to be clearly indicated.
- e) The rates and the conditions of the offer will remain valid for three months from the date of opening of the tender and no change or alteration of the rate will be acceptable on any account.
- f) Submitted tender forms with overwriting or erased or illegible specifications and rates will be rejected.
- g) Request from tenderer in respect of additions, alterations, modifications, corrections, etc. of either terms & conditions or rate after opening of the bid may not be considered. However, negotiation may be made before finalization.
- h) Tenderers shall carefully examine the bid documents and fully inform themselves of all the conditions, which may in any way affect the work of the cost thereof.
- i) Should a tenderer find discrepancies or omissions from the specification or other documents and any doubt as to their meaning, he should at once notify the purchaser and obtain clarification in writing.
- j) This, however, does not entitle the tenderer to ask for time beyond the due date fixed for receipt of tenders.
- k) The tenderer must also specify minimum time and maximum time to repair/replace in the event of a failure and penalty there of.
- l) Verbal clarification and/or information given by the purchaser or its employees or representatives shall not be binding on the purchaser.
- m) Submission of sealed bid will carry with the implication that the tenderer agrees to abide by the conditions laid down in the detailed particulars of the bid notice.
- n) Conditional offers and offers qualified by vague and indefinite expression, as 'subject to immediate acceptance' 'subject to prior sale', etc. will not be considered.
- o) While tenders are under consideration, tenderers and their representatives or other interested parties are advised to refrain from contacting by any means, to the purchaser's personnel or representatives on matter relating to the tenders under study.
- p) The purchaser, if necessary, will obtain clarification on tenders by requesting such information from any or all the tenderers either in writing or through personal contact as may be necessary.
- q) The tenderer will not be permitted to change the substance of his offer after the tenders have been opened.
- r) In the event of non-compliance with this provision, the tenderer is liable to be disqualified.

1.3 Procedure for Submission of Tenders:

- a) The Tenderers must submit their bids as required in two parts in separate sealed covers prominently super scribed as Part-I "Technical Bid" and Part-II "Financial Bid" and also indicating on each of the covers the "Tender call Notice Number & Date" and due date and time of submission as mentioned in Tender Call Notice.

Part-I (Technical Bid)

Excepting the price schedule, all other documents as mentioned in para 1.1 i.e details of technical specifications, printed information Catalogue for each instrument, Copy of Firm Registration Certificate from the competent authorities, GST clearance, Income Tax Clearance, PAN Card copy, list of clients, evidence of successful execution with photograph, etc. along with tender document duly signed by the authorized person in each page shall be covered in Part-I (Technical Bid).

Part-II (Financial Bid)

All indications of price shall be given in Part-II (Financial Bid)

b) Both sealed covers Part-I “ **Technical Bid**” and Part-II “Financial Bid” should be placed in a third cover along with requisite **EMD & cost of Tender documents** (separately in the form of DD drawn in favour of **Principal, Government College of Engineering, Keonjhar** at any Nationalized Bank payable at Keonjhar) , others requisite supporting documents etc. and sealed. The sealed cover containing tender documents as per procedure indicated above should be sent to the Office of the Principal, GCE,Keonjhar by Registered Post/Speed Post only addressing to the Principal, Government College of Engineering, Jamunalia, Old Town, Keonjhar-758002**within the due date and time as stipulated in Tender. The sealed envelope must show the name of the tenderer and his address and should be super scribed as “Tender for supply of Equipment for foundry Lab, heat treatment and material testing laboratory of Metallurgical and Materials Engineering Department” on the top of the envelope.**

c) All the documents submitted must be in the papers showing signature of the tenderer and printed office name of the tenderer on official seal.

d) All the documents must be submitted in a sequential manner with separator/flags to help in quick scanning of the topics. Wherever possible, data in tabular form should be given.

2. Requirements by Tenderer before Supply:

2.1 Rating Plate, Name Plate and Labels:

Each of the equipment is to have permanently attached to it, a rating plate of non-corrosive material in a conspicuous position, upon which the total specifications along with the manufacturer’s name, address, etc. are to be engraved.

2.2 Packaging:

All the equipment are to be suitably protected, covered in water -proof packing and crated to prevent damage or deterioration during transit and storage till the time of installation. The supplier shall be responsible for any loss or damage caused during transportation, handling or storage till their successful installation.

2.3 Inspection:

a) All materials / equipment shall be inspected and tested for completeness, proper assembly, operation, cleanliness and state of physical condition and performance as per quoted specification.

- b) The test shall be conducted, reported and certifications to be provided by the tenderer.
- c) The tenderer shall provide all test and measuring equipment/tools required for inspection / testing.
- d) The cost of all such tests shall be borne by the Tenderer.
- e) GCE, Keonjhar reserves the right to reject any equipment if it does not comply with the specifications during site testing, installation and commissioning stage.
- f) Inspection & testing would be conducted, jointly, at various stages as applicable during unpacking, installation and commissioning of respective equipment / components at the manufacturing site.

2.4. Environmental Condition:

All the equipment supplied shall be rugged and should operate without any deviation in quality, or degradation of equipment performance. All the specification/parameters shall be guaranteed over the following environmental conditions:

- * Storage Temperature : 0 to 50⁰ C
- * Operating Temperature : 0 to 50⁰ C
- * Humidity : 95% RH (non-condensing)

All the equipments are intended to operate under 220 V/ 440V, 50 Hz power supply.

3. Requirements by Tender after Supply:

3.1 Supply:

- a) The material would be delivered by the supplier at GCE, Keonjhar, Jamunalia, Old Town, Keonjhar – 758002, Odisha.
- b) The items should be supplied directly from the manufacturing terminal having passed all tests successfully with Certifications as required.
- c) The equipment should conform to the latest relevant National/International standards and shall be completed in all respect.
- d) Any component, fitting etc. which may not have been specifically mentioned in the specifications but which are usual and necessary for the equipment, shall be supplied by the tenderer at no extra cost.
- e) In case, articles are found damaged in transit or found short at the time of delivery the full cost of the same will be deducted from the bill of the supplier in case the supplier does not replace the stock within a week from the date of the complain.
- f) The articles ordered must be supplied in one lot within 4 to 6 weeks of placing of the order.

- g) GCE, Keonjhar reserves the right to procure the materials from alternative sources at the risk and cost of the successful tenderer giving 15 days notice.
- h) Any increase in tax and duties after expiry of delivery period will be borne by the supplier.
- i) In case the items supplied by the supplier are found not up to the specification shall be rejected.
- j) The supplier will be intimated to take back the stocks at his own cost within three days from the date of rejection and to replace the same within 7 days, failing which the EMD will be invoked in addition to taking legal actions.
- k) Imported consignment, if any, should be destined to GCE,Keonjhar Jamunalia, Old Town, Keonjhar – 758002, Odisha, India through Bhubaneswar Air Port.
- l) The suppliers shall be responsible for releasing the consignments from the carriers/transporters.
- m) The equipment shall be delivered and installed at site at the cost of the tenderer.
- n) All taxes, levies, surcharges including the customs clearance and handling freight and insurance should be paid and handled by the tenderer.

3.2 Installation and Commissioning:

Installation and Commissioning shall include the following:

- a) Installation and Testing of the Equipment, Machineries etc. must be conducted by the tenderer at GCE, Keonjhar.
- b) It will be the responsibility of the tenderer to provide all necessary spares and consumables, which may be required during installation and commissioning, at no extra cost to purchaser.
- c) The tenderer is to bring their own testing and measuring instruments required for installation, testing, commissioning, which can be taken back after completion.
- d) Installation must complete within 15 days after delivery on site.
- e) During installation and commissioning the complete intended experiments is to be conducted with results must be within accepted level of accuracy.
- f) The raw materials and samples required for conducting experiments during installation is to be supplied by the tenderer free of cost.

3.3 Documentation:

- a) Detailed technical manuals, handbooks, drawings, Warranty card and Factory Quality Assurance checklist, test results and any other certifications mentioned in the Technical specifications shall be supplied along with the consignment.
- b) Supplied manuals/handbooks must cover detailed technical specifications and installation, operation, maintenance and System Safety procedures.
- c) For Experimental setups details of theory, procedure and methods of taking measurements etc. should be provided in the form of hand books for each experiment.

d) The receipts for taxes paid, if any, for the supplied materials should also be submitted.

3.4 Trial Operation and Performance Guarantee Test:

a) After successful completion of Installation and Commissioning of the equipment, a 7-day continuous trial operation putting those on optimum use shall be conducted by the tenderer at site, during which the performance of the equipment shall be demonstrated for trouble-free continuous operation, meeting the specified standards and proper training shall be imparted to two persons of the purchaser.

b) During trial operation, tenderer shall do all necessary adjustments required to ensure the performance as per the acceptable level.

c) In case, guaranteed performance is not established, the tenderer shall be given opportunity to rectify/replace the equipment/components, and restart the 7 days continuous trial operation, at the risk and cost of the tenderer.

3.5 On-Site Warranty:

a) The entire materials may be used continuously. The reliability and safety of the total installed system and trouble-free operation are, therefore, of prime importance. The supplied devices/equipment and components shall be covered under **Two-years or more** comprehensive on-site warranty from the date of issue of successful completion of Performance Guarantee Report.

b) During the period of warranty, it shall be the responsibility of the tenderer to provide all essential spares and consumables, which may be required for maintenance and trouble-free operation of the devices / components at the tenderer's cost.

c) Software, if any, has to be tested with at least one-year warranty for trouble free operation.

3.6 Comprehensive Maintenance Contract:

a) The tenderer shall be under the obligation of entering into a Comprehensive Maintenance Contract (CMC) with GCE for a minimum period of two years, renewable if felt necessary, on mutually acceptable rates, terms and conditions. CMC shall start after the completion of Warranty.

b) The scope of CMC shall cover maintenance and supply/replacement of materials and components, for smooth and reliable operation of the systems without trouble.

c) Accordingly, the tenderer has to offer rates for the CMC structure per equipment along with the price for the Systems and other associated Equipment supplied.

3.7 After Sales Service

a) During the warranty period and subsequently, after signing of Agreement for CMC the tenderer shall attend to the problems reported by the users of GCE on a priority basis.

- b) For any problem reported the tenderer shall attend and rectify the problem within 7 (seven) days or provide a standby system of the similar configuration.
- c) The report on any problem will be informed through phone or fax number of which shall be given by the tenderer.
- d) The branch office of the concerned manufacturing firm will be fully responsible to provide maintenance service, in case of any negligence, in providing the service by the tenderer.
- e) On failure to comply with those instructions, the Bank Guarantee provided for the warranty period shall be invoked.

4. Financial Terms:

4.1 EMD

- a) The tenderer has to submit a Demand Draft / Banker's Cheque / Pay order of Rs.20000/- **in favour of Principal, Government College of Engineering, Keonjhar** payable at Keonjhar in any Nationalized Bank towards EMD.
- b) There will be no interest paid to the tenderer towards EMD money.
- c) In no case, the EMD Money in cash or other forms will be accepted at the time of opening of the bid.
- d) No request for adjustment of claims, if any, will be accepted.
- e) The EMD of unsuccessful tenderers will be refunded as soon as possible after the tenders are finalized.

4.2 Performance Security Deposit

In case of successful Bidder EMD will be kept as Performance Security Deposit and will be refunded after expiry of stipulated warranty periods (Two years) from the completion date of installation and commissioning on satisfactory performance of the equipment.

4.3 PRICES:

Price quoted should be **for Government College of Engineering, Keonjhar only. Tax components as applicable should be mentioned clearly in the financial bid.**

- a) Price should be quoted for unit item.
- b) Purchase order will be placed as a single lot for each type of item or for all the items together, as the case may be.
- c) In case of items of import, the tenderer should take full responsibility for customs clearance, handling, tax payment, etc. and specify the charge for the same in the price bid.

4.4 Sales Tax Concession:

Central Sales Tax Concession is to be availed on production of the required certificates applicable to Educational Institution.

4.5 Discount:

- a) Our Institute is a pioneer Institution in the field of Teaching and Research in Engineering and allied disciplines and do not run with profit motive.
- b) As such we are availing price discount for purchase of equipment/instruments.
- c) The rate of discount or any other Institutional benefit arising out of Govt. Policy etc., on each item may also be indicated in the bid specifically.

4.6 Payments:

- a) In case of imported items, payment will be made by opening LC in the name of the manufacturer subject to the condition that a Bank Guaranty for an equal amount will be submitted by the selected tenderer to GCE for the period of completion of installation and commissioning.

4.7 In case of purchase in Indian Rupees, payment of 90 percent of the ordered value will be made after successful installation and commissioning of the equipment subject to submission of satisfactory performance report by the concerned Head of Department. The rest 10 percent of the payment will be made after one year of successful installation of the equipment.

4.8 Penalty:

If the delivery, installation and commissioning is not carried out in time as specified in other part of the tender document, the tenderer/manufacturer will be charged @ 1 % (one per cent) per week of the total value of the concerned machine / equipment.

5. Instruction to the Tenderer:

- a) Some of the minimum specifications specified may be redundant, obsolete or incompatible and in these cases, quote the particulars of correct specification of latest trend and technology.
- b) Higher specifications instead of minimum specifications are allowed if a minimum specification is not available, obsolete or incompatible.
- c) Otherwise, model with higher specification should be in addition to the model with minimum specifications.
- d) Specify brand name and full model name and number for each offer.
- e) Include the printed catalogue and pricelist if any for each of the equipment quoted.

- f) Specify the list of Accessories required along with each of the equipment.
- g) Quote the additional price of the accessories; only those, which are fully compatible with the quoted model, should be furnished.
- h) Specify the list of Accessories to be given free of cost, along with the equipment as “**Free Accessories**”; these should be fully compatible with the quoted models.

5.1 Solving Disputes:

- a) GCE,Keonjhar the tenderer and the manufacturer shall make all efforts to resolve amicably by direct informal negotiation on any disagreement or dispute arising between them under or in connection with this contract.
- b) All disputes arising out of the contract shall be referred to courts under the jurisdiction of the Keonjhar court only.
- c) **The above terms and conditions except those otherwise agreed upon, shall form a part of the Purchase Order.**
- d) **Sign on each page of this tender document and Return it along with the offer enclosing this part together with the Technical Offer.**
- e) **The GCE authority has all rights to accept / reject any tender without assigning any reasons thereof.**

6. Technical Specifications:

Following are the minimum specifications of the equipment.

- a) The minimum specifications are indicative and not exhaustive.
- b) The models with higher specifications may be quoted.
- c) The quoted materials should be of latest trend and technology.
- d) Each equipment should be complete in itself without needing any extra requirements except the requirement of general test and measuring instruments.

List of equipment with technical specification required for Metallurgical and Materials Engineering Department:

Technical Specification of “Pit Type Furnace”

DESCRIPTION	TECHNICAL SPECIFICATIONS
Furnace type	Pit Type Furnace
Quantity Required	One(1 No.)
Working chamber dimension	300 mm Diameter x 250 mm Height, Tolerance 5%
Maximum temperature	1250 deg C
Continuous temperature	1200 deg C
Heating element	Metallic heating elements (Non Ni-Cr based compositions) with ROB design must be used in the furnace.
Furnace KW rating	8 KW or less
Voltage	230V, +/- 10%, 50Hz, +/-5%, Single phase supply for the zone.
No. of control zone	One
Type of temperature control	Microprocessor based Programmable PID controller.
Number and location of the thermocouples	Two “K” type Thermocouples must be provided; One thermocouple will be used for measurement of the temperature and the other for over temperature protection.
Heating rate	The heating element must be able to support rapid heating rates of at least 7°C/minute in the temperature range of 10°C - 800°C and heating rate of at least 5°C/minute above 800°C.
Temperature Accuracy	High temperature accuracy (+/- 2 °C up to 800°C and +/- 1°C above 800°C) at maximum temperature after two hours of soaking time.
Insulation	The insulation inside the furnace should be made out of vacuum formed ceramic fibre block with a density of at least 200 kg/m ³ . The insulation should have low shrinkage as compared to conventional ceramic fiber blankets.
Temperature control system	The furnace should be provided with automatic temperature control system consisting of following: <ul style="list-style-type: none"> • One automatic PID type programmable temperature indicating controller capable of running a heating/cooling program with at least 12 segments (Make: Eurotherm model 2416 or equivalent). • One indicating type excess temperature controller. (Eurotherm/West/Honeywell/Equivalent) • Two ‘K’ type thermocouples (Make: Heatcon or Toshniwal or equivalent) • One thyristor (Make: Sudershan or equivalent) the thyristor should be phase angle fired and suitable for either 4 to 20 mA or 0 to 10V DC.
Furnace casing	The furnace casing should be fabricated from mild steel plates of thickness of at least 1.6 mm. It should be a double wall construction. The furnace should have a suitable vent at the top/back for exhaust. The outside of the furnace should be suitably powder coated to prevent corrosion and rusting.
Furnace Door	The furnace door should be at top side in plug form. The door should be fabricated with mild steel sheet and also be insulated like side walls to reduce heat loss. Clamps should be provided for proper sealing of door in closed condition.
Electrical Connections	The furnace should be provided with an instrument cum

	control panel. The panel should house all the temperature control instruments as stated above. It should also house the switch gear components to supply power to heating elements. All electrical components must have CE/Suitable safety certifications. The vendors are required to provide certification of each electrical components used.
Safety features	<ul style="list-style-type: none"> • Excess temperature protection. • Limit switch to cut off heaters while opening door. • Earthing terminal to avoid electrical current leakage • Fuse Unit / Circuit breaker to cut off the supply in case of circuit faults.
Accessories	One Minimum Repair Kit of Consumables (Electrical, Fittings, and Seals) should be provided as Spare Kit.

Technical Specification of “Universal Strength Machine”

DESCRIPTION	TECHNICAL SPECIFICATIONS
Machine type	Universal Strength Machine [mechanical and digital with computer interface]
Quantity Required	One(1 No.)
Load range	Up to 50kg/cm²
Voltage	230V, +/- 10%, 50Hz, +/-5%, single phase supply for the zone.
No. of control zone	One
Accessories	Shear strength attachment High dry strength
Application	Determine Compression, Shear, Tensile strength of Green sand and No bake sand, CO ₂ sand.

Technical Specification PLANETARY BALL MILL

Description	Technical Specification
Input power	Single phase, 230v, 50/60 Hz
Number of Grinding Stations	2
Speed ratio	1 : -2
Sun wheel speed range	(100- 650) rpm
Effective sun wheel dia	(155-185) mm
Grinding down the feed material to Nano range quickly and efficiently	Yes
Grinding modes	2 (both wet & dry)
Measurement of Energy Input	Yes
Feed Materials	Soft, Hard, Brittle, Fibrous
Medium of grinding	Dry or Wet
Size reduction principle	Impact, friction
Safety Slider	Yes
Grinding Jar Sizes that can accommodate in the grinding station	(12-500) ml
Memory of remaining grinding time in case of power failure	Yes
Input Material size	<4 mm
Final fineness	<1 μm (for colloidal grinding <0.1 μm)

Safety closure devices for grinding jars	50, 80, 125 ml
Possibility of programmable interval, break time, and rotational direction	Yes
Possibility of addition of additional lock system and special kind of lid for grinding in inert atmosphere	Yes
Facility to monitor and measure the gas pressure and temperature during the grinding process	Yes
Digital display facility for measurement of speed, RPM, Time	Yes
Storage of SOPs	10
Drive Power	>750 W
Grinding jars Material with volume (O-rings for each grinding jars)	Tungsten carbide 80 ml (2 No.) Hardened Steel 125 ml (2 No.)
Ball Materials with their sizes (Dia.)	Tungsten Carbide: 3 mm (200 Nos.), 5 mm (200 Nos.) Hardened steel: 5 mm (500 Nos.), 10 mm (50 Nos.)
Motors and components should be from reputed and reliable suppliers. Accuracy of the specified inputs need to be verified and presented during installation	
<ul style="list-style-type: none"> Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated For the ball materials and grinding jar, the test certificate for chemical composition should be supplied 	

Technical Specifications Impact Testing Machine

Parameters	Technical Specification	
	Charpy	Izod
Pendulum drop angle (in deg.)	140	90
Pendulum effective weight (in Kg)	21.30	21.30
Pendulum Speed (m/sec)	5.3465	3.85
Pendulum Impact energy (J)	300	170
Min Graduation (J)	2	2
Distance bet. axis of pendulum to center of strike (length of pendulum in mm)	825	825
Max. Total friction & Wind age losses	0.5% of max. Impact energy	0.5% of max. Impact energy
Striking edge		
a. Angle (Degree)	30	70
b. Radius of Curvature (mm)	2	0.7
c. Width at tip (mm)	18	--

d. Horizontal relief (Degree)	--	10
e. Vertical relief (Degree)	--	5
Specimen Anvils and supports		
a. Suitable for max. specimen cross section(mm)	10X10	10X10
b. Distance between specimen anvils (mm)	40	--
c. Included angle of Anvil tip (degree)	Slopping angle= 0 Relief angle= 10	--
d. Radius of curvature at Anvil tip (mm)	1	--
Overall size (mm) (approx)	--	--
Standard	IS: 3766-2003, IS: 1598-1977, IS: 1957- 1999, BS :131 (Part I, II, III, IV) & also confirms to BS EN: 10045-1993 (for charpy)	
Remarks (accessories)		
<ol style="list-style-type: none"> 1. Release of Pendulum by Hand operation, 2. Safety guards for Protection, 3. Braking Arrangement provided to arrest the swing of pendulum after specimen rupture. 4. Specimen clamps for Izod specimen 5. Standard Impact specimen for verification of machine 6. Gauge for checking std. 'U' notch on specimen 7. Gauge for checking std. 'V' notch on specimen 		

Technical Specifications wear and friction tester(rotating pin-on-disc machine with Digital Display)

DESCRIPTION	TECHNICAL SPECIFICATIONS
Quantity Required	One(1 No.)
Normal load range	up to 200N
Frictional force range	up to 200N with a resolution of 1N with tare facility
Wear measurement range	0-4mm with tare facility
Sliding speed	0.26 to 10m/s (disc speed 100 to 3000rpm)
Preset timer range	up to 99:59:59
Wear disc diameter	160mm (En31 disc 55-60 HRC) and 8mm
Wear disc track diameter	10-140 mm
Specimen pin diameter /diagonal	dia. 3mm to 12mm
Pin length	25-30mm

Accessories	<p>1.Wear and Friction Tester Software With graphical user interface menu driven screens and display for display of</p> <ul style="list-style-type: none"> ○ Normal Load, ○ Frictional Force ○ Displacement ○ Speed <p>Software has data acquisition, real time display of value as well</p> <p>2.Computer Interface Facility for Wear and Friction Tester for Model: IWFT-DD and IWFT-DD-R With interface for</p> <ul style="list-style-type: none"> ○ Normal Load, ○ Frictional Force ○ Displacement ○ Speed <p>3.Lubricant Re-circulating System</p> <p>4.Digital Temperature Indicator – 2 Channel with temperature sensors (for use with lubricant system)</p>
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Technical Specification of “Cutting Machine for Metallographic Sample Preparation”

Description	Technical Specification
Cutting capacity	Up to 8mm diameter
Powered by	5HP, 3 phase motor, 415 V/50 Hz
Movement	Z, Y and X movement
Inbuilt moveable recirculation coolant tank	
Cut-off wheel	300 mm diameter
Spindle speed	2800 rpm
Emergency stop button with key and safety switch	
Serial cutting option	
T slot bed	310X 260 mm with 8mm T slot
Corrosion Resistance cutting chamber for long product life time	

