

Technical Specification For Tender No. 2022-23/05 Released Government e- Marketing (GeM Portal)

1. Arc Resistance

Sl. No.	Specification	Range / Value
1	Voltage range	5 – 12.5 kV (50Hz)(Max.15 KV)
2	Auto Transformer	Adjustable to provide operating voltage of 12.5 kV
3	Current	5mA – 40mA
4	Timer Sec.	In-built digital timer with an accurate interval of 1
5	Automatic Interrupter	4 Steps 1/8,1/4,1/2 & 1
6	Interrupter Accuracy	± 1/120 Sec
7	Safety	Micro-controller based control system.Enclosure with interlock switch for operator safety
8	Electrode	Tungsten rod electrode Dia.: 2.4 mm, Length: 4.5 mm
9	Trip Current	0.40mA, Adjustable
10	Test Confirms to standard	ASTM D 495
11	Other	Voltage Indication: KV Voltmeter, 0 to 15KV Current Indication: 1/8 DIN, 31/2 Digit Ammeter, 0 to 2.000A Load on each electrode: 1.0 Newton Supply: 220 – 240V AC, 50-60 Hz, (user national standard if specified) Single Phase Max. Fuse Rating: 3A Rapid
NIST traceable/NABL accredited calibration certificates to be supplied		
Scope of Supply :		Equipment with mentioned specification and Calibration certificates. Other items if any for smooth conduct of test as per requisite standard

2. HDT / VSP Tester

Sl. No.	Specification	Range / Value
1	No. of Stations	3 Stations
2	Temperature Range	Ambient to 300 ^o C, Temperature Measurement – at each station separately
3	Display and control	Digital, LCD and PLC control system, Equipment with the facilities to store the data for interpretation (PC with installed Software - Window based control & data acquisition software
4	Accuracy	± 0.1 ^o C
5	Chamber material	Stainless steel
6		Jacketed bath to have cooling water circulation
7	Rate of Heating	2 ± 0.2 °C/min (HDT); 50 ± 5 °C/hr & 120 ± 10°C/hr (VICAT)
8	Load	Suitable load increments for fibre stress of 66 & 264PSI (HDT test) and 10 N & 50 N (VSP test)

9	Deflection and penetration measuring range	0.01~ 5.00 mm (digital sensing)
10	Deflection measurement technique	LVDT
11	Support span	Adjustable and detachable both for HDT & VSP test
12	Other Features	(i). Water cooling system should be provided to cool the oil after every measurement. Required volume of silicone oil (heating medium) should be provided (ii). Machine should be supplied with required weights to perform both the tests. (iii). Weight lift – Manual or Automatic
13	Warranty	Minimum 2 years warranty must be provided
14	Calibration Certificate	Calibration certificate from NABL accredited lab with traceability to NIST/ International standards for load, indenter tip and temperature shall be made available
15	Standard	ASTM D 648 & ASTM D 1525, other equivalent International standards.

3. Impact Tester (Pendulum)		
Sl. No.	Specification	Range / Value
	The machine should offer following key features	
1	Machine Design	Microprocessor based instrument to automatically calculate and display impact energy absorbed by a specimen. It should resolve energies less than 0.03% of the capacity of the pendulum.
		With the proper selection of accessories, machine should perform Izod & Charpy tests in accordance with ASTM D256 & ISO 180 (Izod Impact) ASTM D6110 & ISO 179 (Charpy Impact) Easy switching between tests by choosing appropriate striking bit
2	Pendulum	Aerodynamic compound pendulum with facility to increase/decrease pendulum capacity with addition/removal of weights enabling user to change to desired capacity quickly & easily
	Display	Should offer simple machine configuration and setting test parameters through display
		Selectable energy units of J, in.lbf, ft.lbf, kgf.m, kgf.cm
		Selectable strength calculations in ft.lbf/in, J/m, kgf.m/m, KJ/m ² , in.lbf/in, kgf.m/m ²
		Should offer break type input options
		Should provide real time display of energy
		Simple calibration routine which should automatically calculate the Windage and Friction losses
		Facility to set Upper and Lower Limits for Energy and Strength

		Toss Correction for low energy specimens should be implemented automatically or by keypad entry
4	Technical Specifications	Basic pendulum capacity: 2.82J, with addition of weights, user should be able to change it to 25J (Standard). Pendulum shall be supplied with load set for conducting test at 15J also.
		Drop Height: 0.61m
		Impact velocity: 3.46m/s
		Power: 220V/50Hz, single phase
		Communication: should be provided for the output of test data to a serial printer or computer
5	Charpy setup	Should include charpy striker, anvils, setting gauges & supports as per ASTM D6110 & ISO 179
6	Izod setup	Should include Izod striker, setting gauges & supports as per ASTM D256 & ISO 180
		Notch Aligning tool for specimen Positioning
7	Add-on Weights	Various weight sets upto 25J capacity (ISO & ASTM methods)
8	Certification	Calibration/verification certificate issued by NABL accredited Laboratory / traceable to NIST
9	Accessories	should be able to provide automatic specimen notcher to produce a notch in accordance with ISO 179, ISO 180, ASTM D256 & ASTM D6110. It should use single tooth diamond cutter to notch 28 specimens (3.2mm thick) simultaneously. It should feature air cooling system to reduce risk of thermal degradation
10	Scope of Supply :	Equipment with mentioned specification and calibration certificates
		Basic Equipment, Aerodynamic compound pendulum, Weights for pendulum, Izod and Charpy setup, Specimen notch cutter and other additional items required to carry out Izod and Charpy impact test as per the standard requirements.
		NIST traceable/NABL accredited calibration certificates to be supplied

4. Melt Flow Rate Tester

Sl. No.	Specification	Range / Value
1	Scope	Determination of flow properties of polymer powders & granules
2	Standard	ISO 1133 (1991) and ASTM D1238, Method A, B & C and other equivalent International standards.
3. TECHNICAL SPECIFICATION:		

a	Temperature range	50 to 400 Degree C
b	Temperature display resolution:	+/- 0.1 C
c	Thermal stability:	+/- 0.2 C from 50 to 400 Degree C with thermal fuse protection
d	Data acquisition	MVR with up to 10 data points acquisition for a single test (with encoder)
e	Barrel Cylinder:	Hardened Nitride Steel
f	Display	• On-board LCD Display with alphanumeric keypad for methods setting and visualization of results.
g	Motorised Lifting	• Should be equipped with high accuracy encoder and motorized lifting device to allow precise and exact positioning of the lifting device for the masses.
h	Cutting device	Automatic cutting device
i	Calibration certificates	Calibration certificate from NABL accredited lab with traceability to NIST/ International standards for load, timer & temperature shall be provided.
4. Accessories to be Quoted and Supplier along With Machine / Equipment:		
a	Masses	1.2, 2.16, 5, 10, 21.6 kg
b	Nozzle	Standard Nozzle as per ISO 1133/ASTM D1238 Diameter 2.095 mm, Length 8 mm, tungsten carbide; should be supplied with dimensional conformity certificate
5	Other accessories	Cleaning Tools & Cleaning cream
		Go-No-Go Gauges for dies and piston with calibration certificate from NABL Lab
		CRM with NIST traceable certificate
		Die Plug
		Windows based software
		Suitable PC (i3 or above) & Printer shall be provided.
		Die According to ASTM D1238 Method C (Half Die), for high flow rate polyolefins, Dia 1.048 mm, Length 4.00 mm, - Made of tungsten carbide; should be supplied with dimensional conformity certificate with traceable certificate
		Spare Standard Die/Nozzle and Piston
		Fuses and Thermal Probe

		The equipment should be supplied with all the essential accessories to meet the standard methods mentioned above. The Basic start up kit including material for calibration shall be provided by the supplier.
6	Warranty	Minimum 2 years warranty must be provided

5. Environmental Chamber		
Sl. No.	Specification	Range / Value
	Interior dimensions	
1	Dimensions - Width x Height x Depth (Approx)	400 x 400 x 330
2	Interior volume (l)	Min 100
3	Load per shelf (kg)	15
4	Permitted total load (kg)	60
	Temperature data	
5	Temperature range (°C)	- 40 to 180
6	Temperature fluctuation (± K)	0,1 - 0,5
7	Recovery time after door was open	30 sec
a	at -10 °C (min.)	5
b	at 70 °C (min.)	1
c	at 150 °C (min.)	5
8	Mean warm-up rate acc. to factory standard (°C/min.) -40 °C to 180 °C	4°C/min.
9	Mean cooling rate acc. factory standard (°C/min.) 180 °C to -40 °C	1.5 to 2.0°C/min.
10	Heat compensation, max. (W)	500
	Humidity data	
11	Humidity range (%)	10-99
	Electrical data	
12	IP protection class acc. to EN 50529	IP 20
	Temperature and Humidity should be microprocessor based Programmable	
	Calibration certificate should be provided from NABL accredited lab	

6. Xenon Arc Weather-O-Meter

Sl. No.	Specification	Range / Value
1	Light source - Air cooled Xenon Arc Lamps	
2	Sample compartment – Approx. 3000 Sq. cm or more	
3	Microprocessor control required	
4	Touch screen/key pad	
5	Irradiance control required	
6	Irradiance Sensors at 340nm, 420 nm & TUV range	
7	Irradiance Calibration device for quick, easy, error free and automatic calibration	
8	Optical Filter system to simulate outdoor / indoor testing	
9	Filters should be of non-ageing type to avoid frequent change	
10	Black Panel Temperature (BPT) Control	
11	Black Standard Temperature (BST) Control	
12	Chamber Air Temperature Control	
13	Simultaneous control of BST & CAT required	
14	Relative Humidity Control required	
15	Provision of water spray front & back required	
16	Data logging interface along with software	
17	Capability of mounting and testing fabric specimens/Plastic Test specimens	
18	Compliance to various international standards (ISO, ASTM and other standards) such as SAE - 2412, ASTM G155, ASTM G 151, ISO 4892-2, ASTM D 4459, ASTM D 5071, IS 15827	
(B) Accessories to be quoted and supplied along with machine / equipments:		
1	Specimen holder set for Xenon test chamber.	
2	One Set of Xenon Arc Lamps for Xenon test chamber	
3	Other types of Filters (Window glass, UV/Extended UV) for Xenon test chamber	
4	Suitable Radiometer with NIST Traceable calibration certificate for optional filters for Xenon test chamber	
5	Black Panel Calibration Thermometer for Xenon test chamber	
6	Provision for back spray and dual spray in xenon test chamber	

7	The Equipment should be supplied with calibration certificate & necessary accessories.
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7. Atomic Absorption Spectrophotometer With Flame and Graphite Furnace		
Sl. No.	Specification	Range / Value
	Purpose	For detection of various heavy metals as per IS 12235 and other ASTM & IS Standards.
1	Atomizer System	A compact integrated dual atomizer system with inbuilt flame and furnace atomizers. Changeover from Flame to Furnace mode and vice-versa should be automatic and controlled through the software. Furnace autosampler should be permanently aligned with the system with no manual changeover. The vertical and horizontal alignment (if needed) of the flame burner head in the light beam should be Motorized automatic through the software. Separate 10 cm titanium/Suitable alloy burner head for Air – Acetylene flame and 5 cm titanium/Suitable alloy burner head for Nitrous oxide – Acetylene flame should be supplied with the system. Suitable Zeeman Background/Deuterium (D2) correction for GF to have higher light throughput. The Furnace Autosampler must be integrated to main Spectrometer with a minimum of 60 sample positions. The system should be equipped with an integrated graphite furnace camera as a standard for easy autosampler tip alignment and real time viewing of the process happening in graphite furnace. The GF system should be supplied with pyrolytically coated graphite tube, integrated platform, rapid furnace heating (preferably 2500 °C/s or higher temperature). A good quality air compressor and a recirculating water chiller unit of appropriate capacity for cooling of Graphite Furnace must be quoted by the manufacturer. Auto Sampler for flame should be quoted .
2	Lamps	The system should have a minimum 6 lamp holder with a provision of automatic lamp selection. Built-in power supplies for Lamps that are used for the analysis of volatile elements like Pb, Hg, etc. (HCL's or other types of specific lamps should be quoted for specific elements if required). Lamps & Standards for elements Cadmium, Mercury, Tin
3	Sample Introduction System	A high sensitivity nebulizer system including impact bead with corrosion resistant against the acids like 5% hydrofluoric acid, hydrochloric acid and Nitric Acid. Corrosion resistant spray chamber.
4	Optical System	A double beam spectrometer system with high light throughput optical system with a diffraction grating ruling density of atleast blazed in both UV and Visible regions. Reciprocal linear dispersion 0.5 nm/mm at 200 nm. Optical resolution should be available as 0.1nm for better sensitivity at UV region.
5	Detector	Photomultiplier Tubes (PMT) or Solid State Detector, Wavelength range: 185 – 900 nm
6	Background Correction Methodology	Zeeman Background Correction / deuterium D2 Lamp for the Graphite Furnace with the magnetic field applied along optical path should be available
7	Gas Flows system	Software controlled gas flow and automatic changeover of oxidant flow from air to nitrous oxide when switching to or from air-acetylene to nitrous oxide – acetylene flame.
8	Additional Features	All safety interlocks built-in and additional feature like Burner Head Interlock, Nebulizer/End Cap Interlock, and Drain Interlock to be built-in.

9	Sensitivity	Greater than 0.9 or better sensitivity absorbance with the precision of <0.5% RSD from 5 second integrations for 5 ppm Cu standard
10	Hydride Generation Accessory	The atomic absorption spectrometer system should be incorporated with automatic Hydride generation system for the analysis of volatile elements like As, Se, Hg, etc. with best sensitivity and achievable detection limits upto 0.0005 mg/l or PPb level.
11	Software	Programmed facility with multitasking software should provide complete control of instrument with instrument status display and its various accessories. Provide Accurate and reproducible time averaged, integration, non- averaged integration, multilevel calibration. Software should handle instrument linear absorbance reading, concentration or emission intensity, integration time, built in statistics, calibration equation control, slope of analytical curve using operator selective calibration standard. Built in interface for computer connection and use of optional accessories.
12	Gas Purifications Panel.	Std. Gas Purification panel should be quoted.
13	Computer System	Latest Windows based, Reputed Branded Computer with B/w Laser Jet Printer
14	UPS	Suitable UPS system with 30 Minutes Battery Backup facilities should be offered in Option.
15	Training	10 days free training for complete operation of instrument during the warranty period should be offered for Onsite & Manufacturer's Application Lab in India including Lodging, Boarding, Training for minimum 2 persons.
16	Other Items	Any other Accessories required for installation and successful operation of offered machine should be offered in the offer. Offered quoted Instrument should be latest instrument from the manufacturer from his current Product Line. Manufacturer should be having a facility to provide after Sales and Service at least in Karnataka/ Tamilnadu or near by for faster response and reducing Downtime of Machine. AAS Lamps & Following Standards 1000 PPM 100 ml with NIST Traceability to be included in the offer: Lead - Pb, Cadmium - Cd, Tin - Sn, Mercury - Hg,
17	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above: • Hard copies of Operational & Service Manual- 01 Set . • with NIST Traceability Calibration certificates for Standard solutions as mentioned below • Machine should come with all other essential accessories & spares required for installation, commissioning & Operation.

8. Gas Chromatography

Sl. No.	Specification	Range / Value
<p>Preamble: To determine Vinyl Chloride monomer (VCM) content in PVC resin as per IS:10151:2019/ IS 12235 Pt15</p>		
		The Column oven has an operating range of ambient to 450° C.

1	Oven	<p>Heat up time from 50^oC to 450^o C within 5 minutes (230VAC Version)</p> <p>Cool down time from 450 deg. C to 50 deg. C in less than 5 minutes.</p> <p>Heating Ramp settable from 0.10 deg. C /min to 110^o C /minute with at least 9 Rams/10 plateaus.</p>
2	Split / split less Injector – 01 no.	<p>The injector is able to operate with capillary wide bore and packed columns.</p> <p>The injector features an optimized, modular thermal profile for Split and splitless injection with a cold head.</p> <p>The injector allows timed closure/opening of the purge line.</p> <p>Maximum Temperature : 400^o C</p> <p>Split Ratio : 6,000:1 or better.</p> <p>Pressure Range : 0-100 PSI or higher split range</p> <p>Total Flow Setting Display</p> <p>Control of Split flow in 1 ml/min from 0 to 125 ml/min</p> <p>Control of Purge Flow 0 to 50ml/min</p>
3	Detector	<p>The GC must have complete integrated control of all parameters for the following detectors FID & TCD - Detector must be fitted with the instruments (Mandatory) NPD, ECD (Optional)</p>
4	Flame Ionization Detector	<p>Flameout detection and automatic re-ignition</p> <p>MDL : 1.5pg C/S or better.</p> <p>Sensitivity : >0.03 Coulombs/gC</p> <p>Linear Dynamic Range : >10⁶</p> <p>Maximum Temperature : Upto 450^o C in steps of 10^o C.</p> <p>Data Acquisition Rate : 200 Hz or Better.</p> <p>Signal filtration: 50, 200, 800 m.sec.</p> <p>Input range: -1 to 20</p>
		<p>Capillary column compatible</p> <p>Proven Constant current design, Software protection to prevent filament burnout</p> <p>Ideal for series operation</p>

5	Thermal Conductivity Detector	1/8-in fittings
		PPC pneumatics - software flow control of reference gas
		Operating temperature: 100° C to 350° C or higher temperature is preferable in steps of 10° C.
		Sensitivity : 9µV/ppm nonane at 160 mA at the bridge with a detector temperature of 100° C OR < 400 pg tridecane/mL with helium carrier or <20 pg tridecane/s with a total flow of helium through the cell of 3 mL/min
		Minimum Detectable quantity: Typically < 1 ppm nonane
		Power Supply: Constant current with 4 selectable settings: ±40 mA, ±80 mA, ±120 mA, ±160 mA,
		Linearity: > 105
		Signal filtration: 50, 200, 800 m.sec.
		Filament production: Self limiting & resetting after transient overloads in either channel
		Make up gas: Required for 0.25 mm or smaller. i.e. Columns autosampler independent.
6	Software	Latest 32/64 Bit Software for complete control and data acquisition from GC .
		It should be able to collect data from 2 detectors simultaneously.
		It should be upgradable to control 2 or more GC in future.
		It should have all routine chromatography functionalities like full GC parameter, setting, viewing Chromatograms, calculation based on % area, Area normalization, External standard, internal standard etc. Viewing of calibration curves, addition and subtraction of chromatograms etc., internal standard etc. viewing of calibration etc.
7	Head Space Sampler	Head Space Sampler either by Transfer line technique or heated Syringe base technique.
		Sample Tray have Capacity of more than 40 Samples.
		Incubation temperature 200° C or better with at least 6 Vials or more Simultaneous heating capacity with overlapping mode.
		Syringe Temperature should be up to 150° C or transfer line temperature must be 200° C or better.
		Head Space sampler with Auto dilution, Standard preparation facility is preferable .

		It should be compatible with 10 to 25 ml vials.
		It should have built-in constant temperature mode, multiple Headspace extraction mode and mode for optimization method parameters (Progressive mode)
		Injection Volume Range settable from 0.1 to 5 ml
8	Bidder should quote and supply the accessories for effective and better utilization of the machine	Require accessories like screw vials, Vial caps, Sampling Vials total of 500 Nos. and suitable capillary Suitable column as per standard to measure VCM content as per IS 10151 , CRMs and test reagents, PC, Printer, Cylinders with Regulators, Gas purification system and UPS must be provided along with the system.
		Should have Vial capacity of 50 or higher.
		Should possible to use ALS and HS on the same inlet, if not possible then please quote one extra set of FID and SSL.

9. Universal Testing Machine - 10 Tonnes Fully Computerised

Sl. No.	Specification	Range / Value
1	Control System	Microprocessor controlled
2	Maximum Load Capacity	10 kN
3	Cross head Travel distance	Min 1000 mm
4	Horizontal daylight	Min. 400mm
5	Cross Head Speed	
5.1	Minimum	0.5 mm / min
5.2	Maximum	500 mm/min
5.3	Accuracy for Cross head speed	0.5 % of Set Speed or better
6	Load cells	1 kN, 5 kN 10 kN
7	Load cell Accuracy	≤ 0.5 %
8	Grips & Fixtures	Pneumatic and Manual Tensile (suitable for plastics, rubber, film and fibre) compression, flexural, and shear fixtures. Rigid plastics (self lock wrench grip, opening up to 12mm), plastic/composite rod (upto 12 mm dia) woven sacks (50mm width), rubber, fibre/filament.
9	External Extensometer	Ready to connect longtravel with support of software connected with PC: travel range upto 700mm or better with resolution 0.1mm
		Tensile: ASTM D 638, ASTM D 882, ASTM D 3039 and ISO 527

10	Test Conform to	Flexural: ASTM D 790 and ISO - 178
		Compression: ASTM D 695
		Shear: ASTM D 732
11	Data Acquisition Rate:	16-bit or better resolution card with data acquisition rate of minimum 100 Hz or better simultaneously on load, extension, and strain channels.
12	Data Sampling Rate:	400kHz or better
13	Safety lock provisions	Limiting switch for cross head travel should be provided
14	Software	(a) Software attached & data storage for sample test methods
		(b) Software should automates data acquisition, machine control, analysis, and reporting for a wide range of test requirements.
		(c) In addition, data compilation and provision for stress relaxation and creep shall be provided as per relevant ASTM Standards
		(d) Window's based graphical user interface.
15	Essential Accessories	
16	Computer System	Computer with suitable latest configuration to support the software and colour bottled inkjet printers should be provided
17	Any other accessories required	Bidder should quote and supply any other accessories for effective and better utilization of machine.
16	Calibration certificate	NABL Calibration certificate for load cells, Strain rate, Displacement and extensometer traceable to National / International Standards should be provided
17	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package including material necessary to prove the machine and provide training.
		The bidder must have supplied machines at other Institutes in the past (a satisfactory performance certificate from those users may be solicited if needed). Bidder should submit complete contact details.

18	Terms & Conditions	Manufacturer of the supplied equipment must be ISO Certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
		Manufacture/Supplier should have sizable installations of same model worldwide and at least Five in India.
INSTALLATION, COMMISSIONING AND		
19	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
20	Training and documentation	Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
		· Software key (if any)
· Software CDs		
21	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.

10. Automatic Hydraulic Injection Moulding Machine (60-75 T)

Sl. No.	Specification	Range / Value	
	Injection Unit		
1	Shot Capacity (In GPPS)	g	Min.110 and above
2	Screw Diameter	mm	30-40
3	Screw L/D Ratio	-	Min. 20:1
4	Injection Pressure	bar	Min. 1600 and above
5	Injection Speed	mm/sec	Min. 60 and above
6	Injection Rate	cc/sec	90 and above
7	Plasticizing Rate (GPPS)	gm/sec	Min. 10 and above
8	Max. Screw Speed	rpm	200 or Higher
9	Total Heating Capacity	KW	8 or Higher
10	Bi-Metallic Screw Barrel for processing of abresive material	-	Specify & Quote
	Clamping Unit		
11	Clamp Force	ton	60-75
12	Mould Opening Stroke	mm	Min. 350 and above
13	Maximum Daylight	mm	Min. 700 and above
14	Mould Height Min./Max.	mm	100/ 350
15	Platen Size	mm	Min. 550 x 550 and above
16	Distance Between Tie Rod	mm	Min. 350 x 350 above
17	Ejector Stroke	mm	Minimum 100 and above
18	Ejector Force	ton	Min. 3
18	Mould Weight Capacity	kg	Specify
19	Hydraulic Multiple Core Pulling Unit		specify and quote (Minimum 2 core pulling)
20	Multi Stage Air Ejection		Specify and Quote (Minimum 3 point)
21	Clamping Mechanism		Toggle
General			
22	T Slot Platen		Specify and Quote (T Slot is Preferred)

23	Latest Square Platen		Specify and Quote
24	Water inlet & outlet manifold for Mould cooling		Min. 10/10 Channel
25	Essential/Standard spares		Specify and Quote (Standard Tool Kit, NRV, Thermocouple, Band Heater, Short/Extended Nozzle, SSR, Proximity Switch, Limit Switch, Mould Clamps, T-Nut and Studs, Etc.,)
26	Hopper Loader cum Drier	Kg	Min.25 Kg Capacity
27	Safety		The machine or set of machines supplied to meet objective shall be able to operate without any risk or hazard without any additional protection, provision, training or guarding devices and meet current international standard.
28	Motor / Pump Type		SERVO
29	Motor load		Specify
30	Machine Dimensions (LxWxH)		Specify
31	Total connected load	KW	Specify (lower Connected Load will be preferred)
32	Max. Power consumption @ full machine capacity		Specify (lower power consumption will be preferred)
33	Warranty		Two Years from the date of installation.

11. Radial Drilling Machine			
Sl. No.	Specification	Range / Value	
	Make:	Bidder to specify	
	Model:	Bidder to specify	
1	Max. Drilling Capacity in Steel & CI	mm	50 & 60
2	Drilling Radius Max./ Min.	mm	(1200-1500) / (450– 600)
3	Vertical Traverse of Arm	mm	700-800
4	Horizontal Traverse of Arm	mm	700-800
5	Column Diameter	mm	350-400
6	Cross travel	mm	1000-1200
7	Morse Taper in Spindle -	Type	MT-5
8	Number of Speeds	Nos.	12 or better

9	Range of Speed	RPM	40-1800 or better
10	Angle of Arm Rotation	Degree	360
11	Angle of Drill Head Rotation	Degree	360
12	Spindle Travel	mm	300-400
13	Motor	HP	2.25 HP or better
14	Feed	Mode	Manual & Auto feed Both type
15	Accessories to be quoted and supplied along with machine / equipments:		
15.1	Box Shape Worktable	Set of accessories suitable to the machine.	
15.2	Machine Vise 8"		
15.3	Taper / Reduction sleeves		
15.4	Quick Change Drill Chuck		
15.5	Coolant Equipment		
15.6	Machine Lamp		
15.7	Drifts		
15.8	One set of manuals		
15.9	One set of Service Tools, Keys		
16	Others	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.	
17	General features :		
17.1	The specification of feed drive motors with make, model no., max. & nominal torque		
17.2	Preferably the guide ways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside. Guide ways should be of hardened steel with hardness HRC60 or more		

17.3	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors.	Bidder to specify the features of the machine
17.4	Each axis should have electrical limit switches interlocked with feed/ rapid drive as well as mechanical stopper	
18	Any Others Accessories	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.
19	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details.
		The quoted machine should be recently manufactured with the latest technologies and should not be a absolute model in the market and has atleast minimum 7 years residual market life.
		The machine should be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
20	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
20.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
20.2	Training and documentation	Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories

20.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
20.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/partner in India along with the certificate of authorization should be attached.
20.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown.

12. Shaper Machine

Sl. No.	Specification	Range / Value	
1	Table size	mm	(500-600) x (300-350)
2	Length of Stroke	mm	600-650
3	Length of Ram	mm	1000-1200
4	Horizontal Travel of the Table	mm	600-650
5	Vertical Travel of the Table	mm	300 – 325
6	Distance between Table to Ram	mm	10– 50 (min.)
			350 – 400 (max.)
7	Vertical Travel of the Tool Slide	mm	100
8	Cross Feed per stroke Range	mm	0.250-1.5
9	Tool Shank Size	mm	25 x 25
10	Angular Movement of the Table	degree	45
11	Swivel of the Tool Head	degree	60
12	Nos.of Ram speed	Nos.	4
13	Ram Speed	Stroke (mm) / min	10 -70
14	Power of the motor	HP	3-4.5

Accessories to be quoted and supplied along with machine / equipments:

15	Set of Tools - HSS Tool Blank SQ 0.5" x 8" L - 05 Nos.	Set of accessories suitable to the machine
16	Machine Vice 4"	
17	Angle Plate 8" & 12" (01 each)	
18	Machine Lamp	
19	C – Clamp 4", 6" (01 each)	
20	V-Block with U-Clamp	
21	One set of manuals	
22	One set of Service Tools, Keys	
23	Others	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.
24	General features :	Bidder to specify the features of the machine
24.1	The specification of feed drive motors with make, model no., max. & nominal torque	
24.2	Preferably the guide ways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside. Guide ways should be of hardened steel with hardness HRC60 or more	
24.3	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors. Anti-vibration pad is to be provided for reach leg of the machine.	
24.4	Each axis should have electrical limit switches interlocked with feed/ rapid drive as well as mechanical stopper	
25	Others	Bidder to specify and quote if any other accessories available /required for smooth running of the equipment.
26	Terms & Conditions	<p>The bidder must have supplied machines at other Institutes in the past (a satisfactory performance certificate from those users may be solicited if needed). Bidder should submit complete contact details.</p> <p>The quoted machine should be recently manufactured with the latest technologies and should not be a absolute model in the market and has atleast minimum 7 years residual market life.</p> <p>The machine must be CE certified</p> <p>Authorization Letter from OEM</p>

		List of clients in last five years to be provided.
27	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
28	INSTALLATION, COMMISSIONING AND TRAINING	
28.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
28.2	Training and documentation	Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
28.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
28.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
28.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown.

13. CNC Lathe/ Milling Programming Simulator

Sl. No.	Specification	Range / Value
	Make	Bidder to specify

	Model	Bidder to specify
1	CNC Programming Simulator-1 No, having similar hardware unit of CNC Machine for 2 axis Turning and 3 axis milling operations for FANUC / SIEMENS (or) Equilvalent controllers with the following features	
1.1	Basic education	
1.2	Integrative training in programming, toolpath generation, interactive NC Prgram Compilation and valiadtion with post processor.	
1.3	Machining verification through graphics simulation & operation selection like MDI,Emergency stop button,Manual Pulse generator and over ride switch	
1.4	Display device-10 inch LCD (Min.)	
1.5	Simulator Weight-10 to 12 kg	
1.6	Communication I/F -Ethernet	
1.7	Built -In USB port , CF Card	
1.8	Part program storage -512 KB or better	
2	CNC Simulation software with PC-15 Nos .	
2.1	<p>The above Simulator should be supplied with latest versions of CNC Education package software along with PC Compatiable for the software supplied.</p> <p>PC Configuration :Processor (CPU): Intel Core i5 or equivalent</p> <p>Operating System: Microsoft Windows 10 Professional x64</p> <p>Memory :16 GB RAM</p> <p>Storage:512 GB internal Solid State Drive (SSD) or 1 TB internal HDD</p> <p>Monitor/Display: 24" LCD monitor</p> <p>UPS:1 KVA</p>	Bidder to specify
3	GENERAL TERMS & CONDITIONS	
3.1	The quote shall be supplied with reference to the module_	
3.2	The license must be perpetual_	
3.3	Warranty : Five years from the date of acceptance of installation_	

3.4	The Installation and training will be the responsibility of the supplier.	
3.5	During the above period of maintenance, any upgrades released will be supplied free of cost	
4	Any Others Accessories to be quoted and supplied along with machine / equipments:	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.
5	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
		Equipment should be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
6	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete startup package necessary to prove the machine and provide training.
INSTALLATION, COMMISSIONING AND TRAINING		
7	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
8	Training and documentation	Training should be provided during installation. Total training duration shall be of 07 days. Training shall be planned in two phases basic for 4 days and advanced for 3 days. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
		· Software key (if any)
· Software CDs		

9	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
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14. Cylindrical Grinding Machine

Sl. No.	Specification	Range / Value	
	Make:	Bidder to specify	
	Model:	Bidder to specify	
1	Type	mm	Hydraulic
2	Centre Height	mm	150-200
3	External Grinding		
3.1	Max. Grinding Diameter (OD)	mm	150-200
3.2	Max. Grinding Length	mm	600-800
3.3	Max. Distance between Centres	mm	600-800
3.4	Max. Grinding Diameter (Internal Grinding)	mm	15-100
3.5	Max. Grinding Depth (Internal Grinding)	mm	75-100
4	Table Swivel	degree	± (10)
5	Work Head and Tail Stock		
5.1	Speed of work head spindle	rpm	50-750
5.2	Morse taper in work head		Bidder to specify
5.3	Swivel of work head	degree	± (50)
5.4	Morse taper in tail stock		Bidder to specify
6	Wheel Head and Wheel speed		
6.1	Grinding Wheel diameter	mm	300-400
6.2	Grinding Wheel width	mm	40 - 50
6.3	Grinding Wheel Bore	mm	76-100 / Bidder to specify
6.4	Swivel of Wheel head	degree	± (45)
6.5	Automatic in-feed	mm	0.00125 - 0.0125 or better
6.6	Plunge Feed & Travel	mm	0-0.050 & 0.3 -0.5

6.7	Speed of the Grinding Wheel	rpm	2000 or better
7	Internal Grinding Attachment		
7.1	Grinding Spindle Diameter	mm	60-80
7.2	Quill Travel	mm	25-30
7.3	Min. & Max. dia. of hole grinding	mm	10-100
7.5	Spindle Speed	rpm	Bidder to specify
8	Electrical Motors		
8.1	Wheel head motor	HP	Bidder to specify and quote the required motors for smooth running of the machine
8.2	Work Head Motor	HP	
8.3	Hydraulic pump motor	HP	
8.4	Coolant pump motor	HP	
8.5	Internal grinding Attachment motor	HP	
9	Accessories to be quoted and supplied along with machine / equipments:		
9.1	Poly V-belt, coolant tank with piping, Grinding wheel with one flange, 2 dead centres, True Chuck Flange, Two Point Steady Rest & Three Point Steady Rest for Dia. 10 mm to 80 mm, set of Oil seals.		Set of accessories suitable to the machine
9.2	Three Jaw chuck (ø 150mm)		
9.3	Four Jaw Chuck (ø 150mm)		
9.4	Dogs & Carriers (5 – 30 mm)		
9.5	Internal grinding Attachment with quill of different diameters.		
9.6	Machine Lamp		
9.7	Diamond Tool with holder		
9.8	Coolant splash guard		
9.9	Wheel balancing stand		
9.10	Wheel Puller with extracting nut		
9.11	Wheel guard		
9.12	One set of manuals		

9.13	One set of Service Tools, Keys, allen keys, Spanner	
9.14	Grinding wheel (Al ₂ O ₃) / SiC – 02 Nos. suitable for External Grinding & Internal Grinding mentioned in Sl.NO 03 & 07	
9.15	Anti vibration Pads	
10	Others	Bidder to specify and quote if any other accessories available /required for smooth running of the machine
11	General features :	
11.1	The specification of feed drive motors with make, model no., max. & nominal torque	
11.2	Preferably the guide ways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside. Guide ways should be of hardened steel with hardness HRC60 or more	
11.3	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors. Anti-vibration pad is to be provided for reach leg of the machine.	Bidder to specify the features of the machine
11.4	Each axis should have electrical limit switches interlocked with feed/ rapid drive as well as mechanical stopper	
12	Others	Bidder to specify and quote if any other accessories available /required for smooth running of the equipment.
		The bidder must have supplied machines at other Institutes in the past (a satisfactory performance certificate from those users may be solicited if needed). Bidder should submit complete contact details.

13	Terms & Conditions	<p>The quoted machine should be recently manufactured with the latest technologies and should not be a absolute model in the market and has atleast minimum 7 years residual market life.</p> <p>The machine must be CE certified</p> <p>Authorization Letter from OEM</p> <p>List of clients in last five years to be provided.</p>
14	Scope of supply	<p>Bidder should submit complete scope of supply (Machine, standard accessories, Optional Acessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.</p>
15	INSTALLATION, COMMISSIONING AND TRAINING	
15.1	Installation and commissioning requirements	<p>Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.</p>
15.2	Training and documentation	<p>Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.</p> <p>The vendor should supply the necessary manuals such as</p> <ul style="list-style-type: none"> · Maintenance and trouble manual · Training · Installation and Commissioning · Handling of accessories
15.3	Warranty	<p>The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.</p>

15.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
15.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown.

15. Surface Grinding Machine

Sl. No.	Specification	Range / Value	
	Make:	Bidder to specify	
	Model:	Bidder to specify	
1	Working Area	mm	(500-600) x (250– 300)
2	Longitudinal Travel	mm	600-700
3	Cross travel	mm	250-300
4	Height of the Table to Grinding Wheel	mm	250-300
5	Spindle Speed	rpm	1200 or better
6	Cross feed & Vertical feed graduation	mm	0.002 or better
7	Table traverse/ longitudinal speed Range	m/min	Bidder to Specify
8	Max. Vertical traverse of Wheel Head spindle from the table	mm	350-400
9	Cross feed of the table / Auto feed with micrometer graduation	mm / Stroke	Bidder to Specify
10	Size of grinding wheel (dia x width x bore)	mm	250 x 25 x 76 or equivalent
11	Spindle motor & Hydraulic Pump Motor	KW	Bidder to Specify
12	Essential Accessories to be quoted and supplied along with machine / equipments:		
12.1	Complete electrical with motor & Starter		
12.2	Permanent Magnetic Chuck		
12.3	Diamond Tool with holder (Wheel Dresser)		
12.4	Coolant equipment with splash guard		
12.5	Wheel Balancing stand with mandrel		
12.6	Wheel guard		

12.7	Wheel adaptor puller	Bidder should quote and supply well known branded with make, model and major specification - suitable for the machine.
12.8	Angle Plate - 125 mm x 75 mm x 100 mm - 01 No.	
12.9	Grinding wheel (Al ₂ O ₃) – 04 Nos.as mentioned in Sl. No. 10	
12.10	One set of Service Tools, Keys, Oil can, Spanners	
12.11	Anti Vibration Pads	
12.12	Machine Lamp	
12.13	One set of manuals	
13	Others	Bidder to specify and quote if any other accessories available /required for smooth running of the equipment.
14	Terms & Conditions	The bidder must have supplied machines at other Institutes in the past (a satisfactory performance certificate from those users may be solicited if needed). Bidder should submit complete contact details.
		The quoted machine should be recently manufactured with the latest technologies and should not be a absolute model in the market and has atleast minimum 7 years residual market life.
		The machine must be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
15	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
16	INSTALLATION, COMMISSIONING AND TRAINING	
16.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
16.2	Training and documentation	Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning

		Handling of accessories
16.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
16.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/partner in India along with the certificate of authorization should be attached.
16.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown.

16. Vertical Milling Machine			
Sl. No.	Specification	Range / Value	
1	Work Table Area	mm	(1200 – 1500) x (200 – 300)
2	Table Clamping Area	mm	(1200 – 1400) x (200 – 300)
3	Longitudinal movement	mm	700-800
4	Cross (Transverse) movement	mm	250 – 300
5	Vertical movement	mm	350 – 400
6	Spindle		
6.1	Quill Travel	mm	70-100
6.2	Spindle Speed range	rpm	45 – 2000 or better
6.3	Vertical milling head swivelling on both sides	deg	45
6.4	Spindle Taper		ISO-40
6.5	Nos./ progression		12 or better / 1.4
7	Feed		
7.1	Nos. of feed		18
8	Feed Range(Progression 1.25)		
8.1	Longitudinal	mm / min	16 - 800 or better
8.2	Traverse	mm / min	16 - 800 or better
8.3	Vertical	mm / min	4-200 or better
9	Rapid Transverse		
9.1	Longitudinal	mm / min	2500 or better
9.2	Traverse	mm / min	2500 or better
9.3	Vertical	mm / min	650 or better
10	Milling spindle motor	kW	5.5 or better
11	Feed motor	kW	1.5 or better
12	Safe load on table	kg	400 or better

13	Accessories to be quoted and supplied along with machine / equipments:		
13.1	Collet Holders ISO -40 with set of collet sizes Dia. 5 mm , 6 mm , 8 mm ,10 mm , 12 mm & 20 mm	Set of accessories suitable to the machine	
13.2	Morse Taper Adapter MT 1 , MT2 , MT3 , MT4 & MT5		
13.3	Face Mill Arbor Dia. 50 mm		
13.4	DRO (3 Axis)		
13.5	Precision Machine Vice 6"		
13.6	Clamping Kit		
13.7	Coolant System with splash guard		
13.8	Machine Lamp		
13.9	Oil gun		
13.10	One set of manuals		
13.11	Set of T-Bolt and Clamp		
13.12	One set of Service Tools, Keys		
13.13	Vertical Indexing head		
13.14	Rotary Table -dia. 300 mm - 01 No.		
13.15	Set of T-Bolt and Clamp		
13.16	One set of Service Tools, Keys		
14	Others	Bidder to specify and quote if any like a kit of spares, Consumbles available /required for smooth running of the machine	
15	General features :		
15.1	The specification of feed drive motors with make, model no., max. & nominal torque		
15.2	Preferably the guideways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside. Guide ways should be of hardened steel with hardness HRC60 or more		

15.3	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors. Anti-vibration pad is to be provided for reach leg of the machine.	Bidder to specify the features of the machine
15.4	Each axis should have electrical limit switches interlocked with feed/ rapid drive as well as mechanical stopper	
16	Any Others Acessories	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.
17	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
		The quoted machine should be recently manufactured with the latest tecnologies and should not be a absolute model in the market and has atleast minimum 7 years residual market life.
		The machine should be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
18	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Acessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
19	INSTALLATION, COMMISSIONING AND TRAINING	
19.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.

19.2	Training and documentation	Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
· Handling of accessories		
19.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
19.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/partner in India along with the certificate of authorization should be attached.
19.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown.

17.3 CNC Milling Machine			
Sl. No.	Specification	Range / Value	
Make		Bidder to specify	
Model		Bidder to specify	
1	Axis Travel		
1.1	X-Axis	mm	500-600
1.2	Y-Axis	mm	400-500
1.3	Z-Axis	mm	400-500
2	Table		
2.1	Length	mm	700 -800
2.2	Width	mm	400-500
2.3	T-Slot Width	mm	14-16
2.4	Number of Std T-Slots	(Nos)	5 or more
3	Feed		
3.1	Rapid Feed (X, Y,Z Axes)	m/min	20 or better
3.2	Max. Cutting Feed (X, Y,Z Axes)	m/min	10 or better

4	Spindle		
4.1	Rating	KW	Bidder to specify
4.2	Max. Speed	rpm	6000 or better
4.3	Taper		BT40
5	Accuracy		
5.1	Positioning	µm	10 or better
5.2	Repeatability	µm	5 or better
6	Automatic Tool Changer		
6.1	Magazine capacity	(Nos)	20 or better
6.2	Tool select by shortest & Random select		Bi-Directional
6.3	Max. tool diameter	(mm)	80 or better
7	Control System		
7.1	Controllor	Fanuc or equivalent (Latest with complete module)	
7.2	Part Program Storage	(GB)	Capable to store large CAM programs for continous running (Minimum 4 GB)
7.3	Programming Functions with editor	Complete Module with technical calculator for power and torque requirements , with dxf file import facility, 3D simulation	
8	Essential Accessories		
8.1	Servo stabilizer	Bidder to specify and quote suitable for the machine	
8.2	Ultra Isolation transformer		
8.3	Air Compressor with drier and multi dry filter		
8.4	Automatic centralized lubrication system		
8.5	Touch Probe	Bidder to specify and quote Branded quality(Renishaw / Blum) Touch Probe	
8.6	Machine protection	Monitoring vibration during machining to protect machine and spindle failure. User autorisation to the control system and the machine. Safety during power failure and Panel cooler for electrical cabinet. Door interlock for safety	
8.8	Operation hardware	Electronic handwheel, Flushing gun for internal cleaning & Coolant tank	

8.9	Tool holding devices	<p>Bidder to specify and quote Set of suitable Cutting Tool holders ER 10 Extended collet chuck -1 No. ER 10 collets Dia 1.0 to Dia 10.0 in steps of 1mm - 1 each ER 25 collet chuck -1 No. ER 25 collets Dia 3 to Dia 14 in steps of 1mm - 1 each ER 32 collet chuck - 1 No. ER 32 collets Dia 10 to Dia 20 in steps of 1mm - 1 each ER 40 collet chuck -1 No. ER 40 collets Dia 20 to Dia 25 in steps of 1mm - 1 each ER 25 Tap collets with square drive for M6 to M10 taps- 1 each ER 32 Tap collet with square drive for M12 tap-1 each Side lock adaptors Dia 16, 20, 25 & 32 -1 each Keyless drill chuck 0-13mm (with adapter) ER 40 Taper Shank adapter (Three Ranges) Holder (adapter) for 40 mm Face mill - 1 No Holder (adapter) for 80 mm Face mill - 1 No Holder (adapter) for 50 mm Bull - 1 No Tool locking device-1 No. Pull stud- 30 no's</p>
8.10	Cutting Tools	<p>Bidder to specify and quote Set of Cutting tools (standard make) Face mill cutter (with replaceable inserts 20 nos.) - Dia 80 mm Bull nose cutter (with replaceable inserts 20 nos)- Dia 50 mm End Mill cutter (with replaceable inserts 20 nos)- Dia 32 mm Bull nose cutter (with replaceable inserts 20 nos)- Dia 25 mm Endmill cutter (with replaceable inserts 20 nos)- Dia 20 mm Endmill cutter (with replaceable inserts 20 nos)- Dia 16 mm Carbide End Mill cutter (each two)- Dia. 3, 4, 5, 6, 8, 10, 12, 16 mm carbide Ball End Mill cutter (each two)- Dia. 3, 4, 5, 6, 8, 10, 12, 16 mm M6, M8, M10, M12 HSS Tap with suitable Carbide Drills - 2 Sets Dia. 5, 6, 8, 10 and 12 mm HSS Reamers with suitable Drills - 2 Sets HSS Drills (one set) - Dia. 1 to 20 mm Centre Drill (Carbide & HSS) - each 3 Diff. Sizes Finish boring kit dia 10 to 40- 1 set</p>
8.11	Precision Machine vice	4 Inch
8.12	Edge finder	Mechanical type
8.13	Clamping Kit	Clamp set
8.14	Others	RS 232 Ports with fabricated data cable (20 meters), USB ports
8.15	Software	CAM software with post processor suitable for the machine to be quoted separately and transfer media software for RS 232 connections

9	Any other accessories if available for better utilization	Bidder to specify and quote if any other accessories available /required for smooth running and better utilization of the machine.
10	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
		The quoted machine should be recently manufactured with the latest technologies and should not be a absolute model in the market and has atleast minimum 7 years residual market life.
		Equipment should be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
11	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Acessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
12	INSTALLATION, COMMISSIONING AND TRAINING	
12.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
12.2	Training and documentation	Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
		· Software key (if any)
· Software CDs		

12.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
12.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
12.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

13. 18. CNC Lathe			
Sl. No.	Specification	Range / Value	
	Make	Bidder to specify	
	Model	Bidder to specify	
1	Capacity		
1.1	Swing over bed	mm	450-550
1.3	Max. turning diameter	mm	250-300
1.4	Max. turning length	mm	400-450
1.5	Distance between centres	mm	400-500
2	Travel		
2.1	X-Axis Travel (Cross)	mm	150-200
2.2	Z-Axis Travel (Longitudinal)	mm	400-450
3	Main Spindle		
3.1	Spindle motor Power	KW	7.5 or better
3.2	Max. Speed	rpm	4000 or better
3.3	Spindle Bore	mm	50-60
3.4	Spindle Nose		A2-5 or better
4	Feed Rate		
4.1	Rapid Traverse X axis	mts./min	20 or better
4.2	Rapid Traverse Z axis	mts./min	20 or better

4.3	Feed Rate	mm/min	5000 or better
5	Turret		
5.1	No. of station	Nos.	8 or better
5.2	Tool shank size	mm	20x20 or better
5.3	Boring bar dia.	mm	32 or better
5.4	Turret indexing		Bi Directional
6	Tailstock		
6.1	Quill dia	mm	60-80
6.2	Quill stroke	mm	100-120
6.3	Quill taper	-	MT4 or better
7	CNC System		
7.1	Controller		Siemens/Fanuc (Latest with complete module)
7.2	Part Program Storage	GB	Capable to store large CAM programs for continuous running
7.3	Programming Functions with editor		Complete module
8	Accuracy		
8.1	Positioning uncertainty	µm	5
8.2	Overall Axis Repeatability (X, Z)	µm	5
8.3	Part Surface Finish	µm	5
8.4	Roundness	µm	5
8.5	Turret Indexing Repeatability	µm	5
9	Accessories suitable for the machine to be Supplied and prices included along with machine cost		
9.1	Programmable Tailstock with sleeves	one No.	
9.2	Automatic Tool setter	one No.	
9.3	Hydraulic 3 Jaw Chuck	one No. suitable to turn maximum job size of 200 mm diameter	
9.4	Mechanical 4 Jaw Chuck	one No. suitable to turn maximum job size	
9.5	Soft Jaws	two sets	
9.6	Drill Chuck	one No.	

9.8	Set of standard Cutting Tools with holder for replaceable inserts(10 nos) (for Facing,Turning, boring, threading, grooving & parting,) Centre Drill and 1to 20 mm drills	Standard brand cutting tools
9.9	Coolant System	Bidder to specify and quote suitable for the machine
9.10	Start up Tool kit	
9.11	Foot switch	
9.12	Work light	
9.13	Centralized lub. System	
9.14	Set of Rubber mounts	
9.15	Voltage Stabilizer	
9.16	Ultra Isolation transformer	
9.17	Others	USB ports, RS-232C Communication Ports, Set of manual (or) CD
10	Any Others Accessories to be quoted and supplied along with machine / equipments:	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.
13	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
		The quoted machine should be recently manufactured with the latest technologies and should not be a absolute model in the market and has atleast minimum 7 years residual market life.
		Equipment should be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
14	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price.Bidder should supply complete start up package necessary to prove the machine and provide training.
15	INSTALLATION, COMMISSIONING AND TRAINING	
15.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
		Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.

15.2	Training and documentation	<p>The vendor should supply the necessary manuals such as</p> <ul style="list-style-type: none"> · Software instruction · Maintenance and trouble manual · Training · Installation and Commissioning · Handling of accessories · Software key (if any) · Software CDs
15.3	Warranty	<p>The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.</p>
15.4	Technical support and service	<p>Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/partner in India along with the certificate of authorization should be attached.</p>

19. Microprocessor Controlled Injection Moulding Machine (80T)

Sl. No.	Specification	Range / Value	
Injection Unit			
1	Shot Capacity (In GPPS)	g	75 and above
2	Screw Diameter	mm	25-36
3	Screw L/D Ratio	-	Specify
4	Injection Pressure	bar	Min. 1600 and above
5	Injection Speed	mm/sec	Specify
6	Injection Rate	cc/sec	80 and above
7	Plasticizing Rate (GPPS)	gm/sec	Min. 9 and above
8	Screw Speed	rpm	Min. 250 and above
9	Total Heating Capacity	KW	Max. 10 KW
10	Bi metallic screw barrel suitable for processing abrasive materials to be quoted and supplied. (Material test certificate should be enclosed for the screw)	-	Should Comply
Clamping Unit			
10	Clamp Force	ton	80-90
11	Mould Opening Stroke	mm	Min. 300 and above
12	Maximum Daylight	mm	Min. 700 and above
13	Mould Height Min./Max.	mm	150/ 350
14	Platen Size	mm	Min. 500 x 500 and above
15	Distance Between Tie Rod	mm	Min. 350 x 350 above
16	Ejector Stroke	mm	Minimum 100 (Multi point and Multi Stage) Specify
17	Ejector Force	ton	Min. 3
18	Mould Weight Capacity	kg	Specify
19	Hydraulic Multiple Core Pulling Unit	-	specify and quote (Minimum 2 core pulling)
20	Multi Stage Air Ejection	-	Specify and Quote (Minimum 2 point)
21	Clamping Mechanism	-	Specify
General			
22	T Slot Platen	-	Specify and Quote (T Slot is Preferred)
23	Latest Square Platen	-	Specify and Quote
24	Robot Interface	-	Specify and Quote
25	Hot Runner Interface	-	Specify and Quote (Minimum 4 Zones))
26	Interface for Gas Assisted Injection	-	Specify and Quote
27	Water inlet & outlet manifold for Mould cooling	-	Min. 8/8 Channel
28	Computer connectivity	-	Specify
29	Essential/Standard spares	Specify and Quote (Standard Tool Kit, NRV, Thermocouple, Band Heater, Short/Extended Nozzle, SSR, Proximity Switch, Limit Switch, Mould Clamps, T-Nut and Studs, Etc.,)	
30	MTC (Oil Type)	-	Specify and Quote
31	Safety	The machine or set of machines supplied to meet objective shall be able to operate without any risk or hazard without any additional protection, provision, training or guarding devices and meet current international standard.	
32	Motor / Pump Type	-	SERVO
33	Motor load	-	Specify
34	Machine Dimensions (LxWxH)	-	Specify
35	Total connected load	KW	Max. 35
36	Max. Power consumption @ full machine capacity	Specify (lower power consumption will be preferred)	
37	Max. Power consumption @ full machine capacity	Specify (lower power consumption will be preferred)	