

Compliance Checklist for Technical Specifications and Terms & Conditions of Wire Arc Additive Manufacturing (WAAM) Machine			
Note:-			
1. Bidder has to completely fill the Compliance Checklist legibly with details including the reference no/ page no and submit along with the Technical Bid.			
2. Bidder shall sign with seal in each page of the Compliance Checklist.			
3. Bidder has to provide quantitative values where it is asked for quantitative values.			
4. The details provided by the Bidder in the technical bid and Compliance checklist will be evaluated by VSSC.			
5. VSSC reserves right to verify the details provided in the technical bid and Compliance Checklist during the PDI or at Installation & Commissioning stage.			
Compliance Checklist			
Sl.No	Description	Value/Parameter/Detail	Details to be filled & submitted by Vendor with reference to their bid
I	GENERAL		
1	Scope	Supply, Installation, Commissioning, Training and Performance Demonstration of Wire Arc Additive Manufacturing (WAAM) machine including <u>AMC for 5 years</u> as per following technical specifications and terms and conditions	Yes / No (Provide bid Ref.No)
2	Machine Description	<p>Wire Arc Additive Manufacturing (WAAM) machine specified here shall build parts layer by layer by fusing the wire fed through an arc discharge system (MIG with CMT or equivalent) . The WAAM machine shall print in two modes of operation (3 axis mode and 5 axis mode) with a Robotic arm onto a 3 axis table at front side with capacity of</p> <p>(a) 3 axis axisymmetric jobs of size Diameter 5.0 x 5.0 Ht (cylindrical)</p> <p>(b) 3 axis prismatic jobs of size inscribed in diameter 5.0m (i.e 3.7m) x 5.0 m Ht</p> <p>(c) 3 axis prismatic jobs of size 5.0m x 2.5m x 5.0m(Ht) and onto a 5 axis table fixed rear side with capacity of</p> <p>(d) 5 axis axisymmetric jobs of size Diameter 2.0m</p> <p>(e) 5 axis prismatic jobs of size inscribed in diameter 2.0m (i.e 1.48m) x 2.0m Ht.</p> <p>The machine shall be equipped with necessary software support for preprocessing, printing in all the axes possible in the machine on the configuration specified above. The machine shall have support for its subsystems (planning activities, parameters selection, tool path and process simulation, close loop process monitoring, real time recording and data acquisition). The machine shall be fitted with state-of-the-art control system and shall be driven with user friendly Human Machine Interface (HMI). The machine shall have power source that supports for printing in different modes listed above.</p>	Yes / No (Provide bid Ref.No)

3	Machine Construction	<p>[Likely Configuration and Capacities are detailed in the sketches given in Annexure - 1] The machine shall have</p> <p>a) Main Rotary table (Dia.5.0m) at front side</p> <p>b) Fixed Support tables (for printing 5.0m x 2.5m x 5.0m(Ht)) around the Main Rotary table at front side</p> <p>c) Rotary & Tilt table (Dia 2.0m) at rear side</p> <p>d) Horizontal rail of length (5.0m) between the two tables</p> <p>e) Vertical column with a vertically movable & rotatable platform to carry the robot and other systems travelling in the slots of Horizontal rail and capable of reaching suitable height for printing 5.0 m height jobs</p> <p>f) Robot of 6 axes mounted on the platform for printing on both the tables by rotating and positioning the platform to the respective table rail</p> <p>g) End effectors for deposition systems changeable among different methods like MIG with CMT or equivalent and for parting the build from the substrate. h) Power source suitable for deposition systems and capable for materials listed i) Local gas shielding system j) Fume extraction system k) Feedback system with sensors. Vendor shall also suggest alternate configuration that can accommodate all printing capacities mentioned above and the configuration has to be accommodated within hook height of 6.5m from floor level. Acceptance of alternate configuration if any suggested by the vendor will be subject to thorough review of suggestion and accepted if there is no compromise in the dimensions of the component to be printed.</p>	Yes / No (Provide bid Ref.No)
4	Materials to be printed	<p>Materials to be printed on both the tables are listed below:</p> <p>i. Aluminium Alloys (AA4xxx, AA 2xxx etc.)</p> <p>ii. Stainless Steels</p> <p>iii. High Strength Low alloy Steels</p> <p>iv. Superalloys (Inconel 718 etc.,)</p> <p>v. Titanium alloys (Ti6Al4V etc)</p>	Yes / No (Provide bid Ref.No)
5	Machine details	Pl. Specify make/Model No of the offered machine and its systems. Country of origin of the offered machine shall be exclusively specified. Machines from/through border sharing nations shall not quote. The offer must have original machine manufacturer's signature.	Yes / No (Provide bid Ref.No)
II TECHNICAL SPECIFICATIONS			
A General			
1	Total number of axes	10 [6 (Robot) + 1 (Main rotary table for 3 axis) + 1(Horizontal movement for 3axis for covering length of Support tables & main rotary table) + 2(Tilt & Rotary table for 5axis)]	Offered / Not offered (Provide bid Ref.No)
2	Modes of operation	<p>FOUR</p> <p>a. 3 axis jobs with printing by Robot alone</p> <p>b. 3 axis jobs with printing by Robot with synchronised rotation of Main Rotary table (Dia.5.0m) alone.</p> <p>c. 3 axis jobs with printing by Robot with movement on Horizontal rails (5.0m length) and on Main rotary table and Fixed support tables without movement.</p> <p>d. 5 axis jobs with Tilt & Rotary table for cylindrical, prismatic and spherical jobs</p>	Offered / Not offered (Provide bid Ref.No)

3	Operation details on different modes of operation	<p>a. 3 axis mode for 3 axis general jobs : Printing by Robot alone on Main Rotary Table and Fixed Support table without movement.</p> <p>b. 3 axis mode for 3 axis cylindrical jobs : Printing by rotation of Main rotary table only with robot fixed at any intermediate position on Vertical rail.</p> <p>c. 3 axis mode for 3 axis prismatic jobs: Printing on Main rotary table only with synchronised rotation with robot fixed at intermediate position on Vertical rail</p> <p>d. 3 axis mode for 3 axis prismatic jobs of volume 5.0m x 2.5m x 5.0m(Ht) : Printing on Main rotary table without rotation and on fixed Support tables with robot fixed at any intermediate position on Vertical rail and movable synchronously along the length of 5m in Horizontal rail</p> <p>e. 5 axis mode for 5 axis cylindrical jobs including spherical : Printing on Tilt & Rotary Table with robot turned to 5 axis table side and fixed at any intermediate position on Vertical Rail</p> <p>f. 5 axis mode for spherical jobs : Printing on Tilt & Rotary Table with robot turned to 5 axis table side and fixed at any intermediate position on Vertical Rail</p> <p>g: 5 axis mode for 5 axis prismatic jobs : Printing on Tilt & Rotary Table only with robot turned to 5 axis table and fixed at any intermediate position on Vertical Rail</p>	Offered / Not offered (Provide bid Ref.No)
4	Axes details on different modes of operation	<p>a. Prismatic jobs with Robot alone: 6 (robot)</p> <p>b. Cylindrical jobs with rotation of Main Rotary table alone : 7[6 (robot) + 1 (Main rotary table)]</p> <p>c. Prismatic jobs with synchronised rotation of Main Rotary Table : 7[6 (robot) + 1 (Main rotary table)]</p> <p>d. Prismatic jobs of volume 5.0mx2.5mx5.0m(Ht) : 7 [6(robot) + 1(Horizontal rail)]</p> <p>e. Cylindrical jobs (5 axis) of Dia2.0m x H(Ht) : 8[6 (robot) + 2 (Tilt & Rotary table)]</p> <p>f. Spherical jobs (5 axis) of Dia2.0m : 8 [6 (robot) + 2 (Tilt & Rotary table)]</p> <p>g. Prismatic (5 axis) jobs : 8 [6 (robot) + 2 (Tilt & Rotary table)]</p>	Offered / Not offered (Provide bid Ref.No)
5	Printing Capacity		
5.1	General Printing with Robot alone (mm)	2500 (Minimum) and as per maximum reach of robot	Pl. Specify the value (Provide bid Ref.No)
5.2	Cylindrical Printing volume on Main Rotary Table (mm)	Diameter 5000 x 5000 (Ht) [Minimum]	Pl. Specify the value (Provide bid Ref.No)
5.3	Prismatic Printing volume on Main Rotary Table (mm)	3700 (W) x 3700 (D) x 5000 (H) [Minimum]	Pl. Specify the value (Provide bid Ref.No)
5.4	Prismatic Printing volume on Main Rotary Table & fixed Support Tables (mm)	5000 (W) x 2500 (D) x 5000 (H) [Minimum]	Pl. Specify the value (Provide bid Ref.No)
5.5	Cylindrical Printing (5 axis) volume on Tilt & Rotary Table (mm)	Diameter 2000 [Minimum] x 2000 (Ht) and limited to maximum tilt of the table	Pl. Specify the value (Provide bid Ref.No)
5.6	Spherical Printing (5 axis) volume on Tilt & Rotary Table	Diameter 2000 [Minimum]	Pl. Specify the value (Provide bid Ref.No)
5.7	Prismatic Printing (5 axis) volume on Tilt & Rotary table (mm)	1480 (W) x 1480 (D) x 2000 (H) [Minimum]	Pl. Specify the value (Provide bid Ref.No)
6	Weight of the Machine (Kg)	Pl. Specify	Pl. Specify the value (Provide bid Ref.No)
7	Foot Print (mm)	Pl. Specify. Machine shall be limited within the foot print of 8000 x 8000	Accepted / Not Accepted (Provide bid Ref.No)

B Main Rotary Table			
1	Number of axes	1 (Rotation)	Pl. Specify the value (Provide bid Ref.No)
2	Material of table	Cast iron or Welded steel plats of minimum thickness 30mm	Pl. Specify the details (Provide bid Ref.No)
3	Mode of operation	Synchronised Rotation for 3 axis printing	Pl. Specify the details (Provide bid Ref.No)
4	Rotary Table Size (mm)	5000(Minimum) with robot placed at one of the ends of the rotary table and at centre of horizontal rail.	Pl. Specify the value (Provide bid Ref.No)
5	Drive	Servo motor	Offered / Not offered (Provide bid Ref.No)
6	Motor Power (kW)	To be specified	Pl. Specify the value (Provide bid Ref.No)
7	Speed of Rotation (RPM)	2 deg/s (Minimum)	Pl. Specify the value (Provide bid Ref.No)
8	Main Table positioning accuracy	5 arc/s (nominal)	Pl. Specify the value (Provide bid Ref.No)
9	Clamping	Threaded holes in minium 5 PCDs.	Pl. Specify the value (Provide bid Ref.No)
10	Weight Carrying Capacity (Kg)	5 Ton (Nominal) inclusive of fixtures	Pl. Specify the value (Provide bid Ref.No)
11	Feedback system	Rotary encoders	Offered / Not offered (Provide bid Ref.No)
12	Insulation system	Required. The table shall have insulation system like a plate to prevent it from effect of Temperature. Pl. Specify with details.	Accepted / Not accepted (Provide bid Ref.No)
C Fixed Support Tables			
1	Purpose	As a support table along with Main rotary table for printing prismatic volume of 5.0 m x2.5 m x 5.0 m(Ht)	Offered / Not offered (Provide bid Ref.No)
2	Number of table segments	1 or 2	Pl. Specify the value (Provide bid Ref.No)
3	Material of table	Cast iron or Welded steel plates of minimum thickness 30mm	Pl. Specify the details (Provide bid Ref.No)
4	Number of axes	0 (No movements due to fixed table/s)	Pl. Specify the value (Provide bid Ref.No)
5	Support table size (mm)	5500 (L) x 3000 (W) x Height of main rotary table with relief to main rotary table given for rotation	Pl. Specify the value (Provide bid Ref.No)
6	Clamping	Threaded holes of size M16 with pitch 200mm in both the directions.	Pl. Specify the value (Provide bid Ref.No)
7	Weight Carrying Capacity (Kg)	5 Ton (Nominal)	Pl. Specify the value (Provide bid Ref.No)
8	Feedback system	Not required as it is fixed table	Pl. Specify the details (Provide bid Ref.No)
9	Insulation system	Required. The table shall have insulation system like a plate to prevent it from effect of Temperature. Pl. Specify with details.	Accepted / Not accepted (Provide bid Ref.No)
10	Height of the table top in Horizontal position (mm)	To be maintained at the level of Main rotary table enabled with easy access of jobs by a person in standing position.	Pl. Specify the details (Provide bid Ref.No)
D Tilt & Rotary Table			
1	Number of axes	2 (Rotation & Tilting)	Offered / Not offered (Provide bid Ref.No)
2	Material of table	Cast iron or Welded steel plats of minimum thickness	Pl. Specify the details (Provide bid Ref.No)

3	Mode of operation	Synchronised Rotation & tilting for 5 axis printing	Offered / Not offered (Provide bid Ref.No)
4	Drive	Servo motors	Offered / Not offered (Provide bid Ref.No)
5	Rotary Table (mm)	2200 (Nominal)	Pl. Specify the value (Provide bid Ref.No)
6	Speed of Rotation (RPM)	0-65 deg /s (nominal)	Pl. Specify the value (Provide bid Ref.No)
7	Angle of tilting (deg.)	45 deg(nominal)	Pl. Specify the value (Provide bid Ref.No)
8	Positioning accuracy	5 arc/s (nominal)	Pl. Specify the value (Provide bid Ref.No)
9	Weight Carrying Capacity (Kg)	1000 kg (Minimum)	Pl. Specify the value (Provide bid Ref.No)
10	Feedback system	Rotary encoders	Pl. Specify the details (Provide bid Ref.No)
11	Insulation system	Required. The table shall have insulation system like a plate to prevent it from effect of Temperature. Pl. Specify with details.	Accepted / Not accepted (Provide bid Ref.No)
12	Height of the table top in Horizontal position (mm)	To be maintained at a height for easy access of jobs by a person in standing position. Pl. Specify with details.	Pl. Specify the details (Provide bid Ref.No)
E	Vertical Column		
1	Drive mechanism	Precise Rack & Pinion / Ball screw. Pl. Specify with details.	Offered / Not offered (Provide bid Ref.No)
2	Stroke Length (mm)	Pl. Specify. Printing with Robot in horizontal arm extended straight position upto height of 5.0 m above main table is required.	Offered / Not offered (Provide bid Ref.No)
3	Platform	REQUIRED for placing the robot with other systems and shall have provision for locking at intermediate positioning and rotatable to have full access over the Main rotary table side (front side), fixed support tables and Tilt & Rotary side (rear side) . The platform shall have self referencing & locking features for positioning to front side and rear side.	Offered / Not offered (Provide bid Ref.No)
4	Intermediate Positioning	REQUIRED. Column shall have a automated locking & releasing mechanism commanded by the software & controller for the platform carrying robot at intervals on 500mm. Pl. Specify with details.	Offered / Not offered (Provide bid Ref.No)
5	Drive	Servo motor connected to Controller	Offered / Not offered (Provide bid Ref.No)
6	Feedback system	Linear encoder for linear positions	Offered / Not offered (Provide bid Ref.No)
7	Weight Carrying Capacity (Kg)	Pl. specify with details. Column shall be capable of carrying total weight of Robot, end effectors and other accessories etc.	Pl. Specify the value (Provide bid Ref.No)
F	Robot		
1	Brands	KUKA/ABB/equivalent & reputed brand with guaranteed service support to VSSC.	Offered / Not offered (Provide bid Ref.No)
2	Number of axes	6 (Minimum)	Pl. Specify the value (Provide bid Ref.No)
3	Arm reach (mm) from its centre	3000 (Minimum)	Pl. Specify the value (Provide bid Ref.No)
4	Payload weight (kg)	90 kg. (Minimum). It shall be capable of carrying end effectors for all deposition systems.	Pl. Specify the value (Provide bid Ref.No)
5	Base & mounting position	Flat bottom & Floor mounting	Offered / Not offered (Provide bid Ref.No)
6	Size of base	Pl. specify	Pl. Specify the value (Provide bid Ref.No)

7	Ambient Operating temperature	Upto 50 deg.cel and RH 80%	Pl. Specify the value (Provide bid Ref.No)
8	Total weight (kg)	Pl. specify	Pl. Specify the value (Provide bid Ref.No)
9	Axiswise motion reach ranges		
9.1	Axis 1	± 185° (nominal)	Pl. Specify the value (Provide bid Ref.No)
9.2	Axis 2	-140° / -5° (nominal)	
9.3	Axis 3	-120° / -168° (nominal)	
9.4	Axis 4	± 350° (nominal)	
9.5	Axis 5	± 125° (nominal)	
9.6	Axis 6	± 350° (nominal)	
10	Axiswise speed range		
10.1	Axis 1	120° / s (nominal)	Pl. Specify the value (Provide bid Ref.No)
10.2	Axis 2	115° / s (nominal)	
10.3	Axis 3	112° / s (nominal)	
10.4	Axis 4	179° / s (nominal)	
10.5	Axis 5	172° / s (nominal)	
10.6	Axis 6	220° /s(nominal)	
10.7	Axes Drives	Servo for all axes	Offered / Not offered (Provide bid Ref.No)
11	Positioning accuracy (mm)	± 0.5 or lower(for full traverse)	Pl. Specify the value (Provide bid Ref.No)
12	Pose repeatability (As per ISO 9283) (mm)	± 0.05	Pl. Specify the value (Provide bid Ref.No)
13	Automatic Calibration of supplementary loads on arm	Required. Pl. Specify with details.	Provided / Not Provided (Provide bid Ref.No and details)
14	Mechanism for counter weight balance	Required. Pl. Specify with details.	Provided / Not Provided (Provide bid Ref.No and details)
15	Communication Protocol	Support Profinet, devicenet, ethernet, ethercat etc	Provided / Not Provided (Provide bid Ref.No and details)
16	Controller	Suitable latest Robot controller	Offered / Not offered (Provide bid Ref.No)
17	Placement of servomotors of Robot	To be positioned at back of the robot especially for motors of 4th, 5th and 6 th axes	Provided / Not Provided (Provide bid Ref.No and details)
18	Protection rating (As per IEC 60529)	Should comply to IP 65	Complied / Not complied (Provide bid Ref. No)
19	Protection rating for robot wrist (As per IEC 60529)	Should comply to IP 65 / IP 67	Complied / Not complied (Provide bid Ref. No)
20	ESD Requirement	Should comply to IEC61340-5-1; ANSI/ESD S20.20	Complied / Not complied (Provide bid Ref. No)
G	Printing and Power source		
1	Mode	Multimode [able to change the systems according to the selected printing mode]	Offered / Not offered (Provide bid Ref.No)
2	Power sources	MIG / MAG with CMT/cwMIG/coldarc PLUS/equivalent	Offered / Not offered (Provide bid Ref.No)
3	Power source make	Fronius /EWM or equivalent reputed make	Offered / Not offered (Provide bid Ref.No)

4	Mode of operation	Continuous and Pulsed	Offered / Not offered (Provide bid Ref.No)
5	Current (A) range	5 - 400 A	Pl. Specify the value (Provide bid Ref.No)
6	Current at 100% Duty Cycle	300A or better	Pl. Specify the value (Provide bid Ref.No)
7	Mains Voltage	3 x 400V (with $\pm 15\%$ tolerance)	Pl. Specify the value (Provide bid Ref.No)
8	Parameter settings	Software shall have mandatorily the provision for varying major parameters viz current, voltage, wire feed rate, filler wire diameter, arc length correction, gas flow rate and pulsing.	Offered / Not offered (Provide bid Ref.No)
9	Torch cooling	Required for continuous duty operation. Pl.Specify with details	Offered / Not offered (Provide bid Ref.No)
10	Chiller for Power source	Required with suitable capacity. Reputed make is preferred	Offered / Not offered (Provide bid Ref.No)
H Wire feeder			
1	Mode of operation	Automatic	Offered / Not offered (Provide bid Ref.No)
2	Type	Mechanical type powered by servo motor	Offered / Not offered (Provide bid Ref.No)
3	features required	Programmable & controllable by software	Offered / Not offered (Provide bid Ref.No)
4	Integration	Integrated to Power source	Offered / Not offered (Provide bid Ref.No)
5	Wire sizes (mm)	Diameter 0.8-1.6 mm	Pl. Specify the value (Provide bid Ref.No)
6	Spool size & weight	Pl. specify with details.	Pl. Specify the value (Provide bid Ref.No)
7	Bulk wire storage & automatic loading system for continuous printing without build interruption	Required. Pl. Specify with details.	Pl. Specify the details (Provide bid Ref.No)
I End Effector			
1	Mandatory features	a. Shall consists of different metal printing attachments specified, provision for local shielding, torch cooling, wire positioning and wire feeding, sensor for Temperature measurement, Pyrometers for before and after deposition, melt pool monitoring camera, provision for shape capturing for feeding to corresponding monitoring software. Pl. Specify with details viz different items required for printing with different methods. b. Shall be capable of changing with different deposition (welding) systems according to the user selection. Pl. specify with details viz procedure for changing the elements for different deposition system.	Offered / Not offered (Provide bid Ref.No)
J Shielding			
1	Local shielding	Required (Collapsible type and tent shaped)	Offered / Not offered (Provide bid Ref.No)
2	Shielding gas	Ar, Ar+He (for local shielding)	Offered / Not offered (Provide bid Ref.No)
K Fume extraction system			
1	Make	Pl. Specify. Reputed make is required.	Offered / Not offered (Provide bid Ref.No)
2	Air flow (m ³ /hr)	3500 (nominal)	Pl. Specify the value (Provide bid Ref.No)
3	Filtrations	Three stages filtration required. [Three stages : prefilter, electrostatic filtration, activated carbon filter]	Offered / Not offered (Provide bid Ref.No)
4	Efficiency (%)	95 or better	Pl. Specify the value (Provide bid Ref.No)

5	Suction Hose diameter & length (mm)	150 (min) & 10000	Pl. Specify the value (Provide bid Ref.No)
6	Silencer unit	Required	Offered / Not offered (Provide bid Ref.No)
7	Others	All units are to be powder or suitable coated for surface protection	Offered / Not offered (Provide bid Ref.No)
L	Workflow system		
1	Controller	OEM make	Offered / Not offered (Provide bid Ref.No)
2	Processing speed (fs)	Pl. Specify	Pl. Specify the value (Provide bid Ref.No)
3	Interface	2 x 21.5" touch screens + remote	Offered / Not offered (Provide bid Ref.No)
4	Support for CAD file formats	CATIA (.CAT Part), Solidworks (.sldprt), Creo/ProE (.prt& .asm), NX (.prt), Inventer (.ipt), NEUTRAL (.step, .stp, .stl, .iges, .igs& .dxf), ACIS (.sat & .sab), PARASOLID (.x_t, .x_b), OBJ (.obj), UNV file (Universal file format) and 3MF file format.	Complied / Not complied (Provide bid Ref. No)
5	Support for other file formats	Required. Pl. Specify with details.	Complied / Not complied (Provide bid Ref. No)
6	Features required	The control shall have the capability for slicing the 3D model to be printed, generate optimal tool path (for desired shape & size, reduced stress & distortion, minimal time), select the parameter based on the material definition and processing for printing with real time monitoring.	Offered / Not offered (Provide bid Ref.No)
7	Future Expansion	Vendors shall provide details of the features & other welding technologies possible to add as future upgrade in the presently offered machine especially other power sources/ deposition head	Accepted/ Not Accepted
M	Controller		
1	Controller	Latest Version Robot Controller capable for operation of machine as specified.	Offered / Not offered (Provide bid Ref.No)
2	Process monitoring	Closed loop system with all feedbacks and sensors in the machine.	Offered / Not offered (Provide bid Ref.No)
N	Feedback System		
1	For Main Rotary table	Rotary encoder (Heidenhain or reputed make)	Offered / Not offered (Provide bid Ref.No)
2	For Tilt & Rotary table	Rotary encoder (Heidenhain) / Pl. specify with details	Offered / Not offered (Provide bid Ref.No)
3	For Robot	Encoders / Pl. Specify with details	Offered / Not offered (Provide bid Ref.No)
4	For Horizontal rail	Linear encoders/ scales (Heidenhain or reputed make)	Offered / Not offered (Provide bid Ref.No)
5	For Vertical column	Linear encoders/ scales (Heidenhain or reputed make)	Offered / Not offered (Provide bid Ref.No)
6	For Metal deposition systems	Pl. Specify with details	Offered / Not offered (Provide bid Ref.No)
7	For Wire feeding system	Pl. Specify with details	Offered / Not offered (Provide bid Ref.No)

8	Sensors	<p>Sensors are required for following functions/ areas/ activities for effective operation of WAAM machine.</p> <p>a. Process (travel speed, shielding gas flow rate, arc current from power source and others, arc voltage from power source and others, wire position, wire feed speed, wire end sensor, temperature monitoring camera/sensor, wire proximity, melt pool imaging camera, pyrometers at before and after welding positions, layer height, 3D profile, coolant return, coolant flow rate),</p> <p>b. Local shielding (gas flow rate sensors, shielding gas sensors. shielding gas pressure sensors)</p> <p>c. Safety : pressure sensors, temperature sensors, proximity sensors</p> <p>d. operation(Rotary encoders for tables, position sensors for linear movements, temperature sensors (inside the welding area), interlocks including for safety),</p> <p>e. Robot (collision detection sensor, proximity sensor, axis position sensors, motor torque monitoring sensors, accelerometers)</p> <p>f. Tables: Temperature sensors, encoders, angle position sensors</p> <p>g. Vertical Column : liner scale/encoders for sensing the position of table carrying the robot</p> <p>h. Horizontal rail: linear scale/encoders for sensing exact position of vertical column and feeding into controller</p>	Offered / Not offered (Provide bid Ref.No)
O	Control Panel		
1	Control panel interface	Interface with electrical System for Welding torch, Robot, Wire feeder, power source, GAS flow, positioner, robot movement through column- Communication with PLC System, HMI Display for interface and input for communications. Display of Sensor informations in HMI	Offered / Not offered (Provide bid Ref.No)
P	Software		
1	license	Perpetual license is required on VSSC with updates and <u>new releases</u> for all the systems and subsystems	Offered / Not offered (Provide bid Ref.No)
2	Features expected		
2.1	Controller: The software shall be the operating system of the WAAM machine contains operator dashboard, machine management, data logging and reporting system.		Offered / Not offered (Provide bid Ref.No)
2.2	Realtime monitoring of Printing : The software shall be capable of building the actual printing in 3D on the input 3D model live in software window using the inputs from various sensors working on laser Interferometric Technology.		Offered / Not offered (Provide bid Ref.No)
2.3	Planning : The software shall be capable of preparing the 3D input model into a printable format and outputs the program with advanced slicing and trajectory strategies. It shall have various functions like slicer(fixed tool orientation, revolving surface, simple surface, non planar features), multidimensional sectioner, multi material process capability, tool path planner and post processor.		Offered / Not offered (Provide bid Ref.No)
2.4	Parameters: The software shall have mandatorily the provision for varying the parameters viz current, wire feedrate, filler wire diameter, voltage, arc length correction, and gas flow rate and pulsing. The software shall be capable of selecting the right parameters from its database according to the wire material that is going to get printed. It is preferred to have suitable compensations for thermal inertia. The software shall be capable of defining new set of parameters of new materials by the user. customisation of parameters are also required. The software is expected to have detailed database for Steels, Aluminium alloys, Super alloys, Ti alloys.		Offered / Not offered (Provide bid Ref.No)
2.5	Simulation: The software shall be capable of showing Virtual kinematic simulation of WAAM printing prior to actual printing. The software shall be capable of visualising robot trajectory, toolpath plan visualisation, checking collision, defective tool path and with debugger.		Offered / Not offered (Provide bid Ref.No)

2.6	Alarms: The software shall have a proper alarm library with details of alarm and trouble shooting direction for alarms.		Offered / Not offered (Provide bid Ref.No)
Q	Work Station		
1	Work Station Specification	ONE No. of High end work station with the following configuration shall be part of the supply; <ul style="list-style-type: none"> • Operating system: Microsoft Windows 10 or latest • Processor: Intel I9 12th Generation (i9-12900KS) having 16 cores (8 P + 8 E, 5.5 GHz or higher, 30 M Cache or latest in the market • Installed Memory (RAM): 128 GB (32 GB x 4) • LED Colour monitor: 27 inch or higher with 2K or higher resolution • Professional Graphics card: Nvidia RTX series 3070 (equivalent or better), memory 8 GB (min) • Storage: Primary - SSD M.2 (512 GB), Secondary - Hard disk (2 TB x 2) Seagate/Hitachi • Motherboard: Compatible with processor, adequate slots & power supply 	Offered / Not offered (Provide bid Ref.No)
R	Performance Parameters & tests		
1	Minimum wall thickness that shall be printed (mm)	4 mm or lesser. To be demonstrated	Complied / Not complied (Provide bid Ref. No)
2	Surface finish (mm)	1.0 or better. To be measured after printing	Complied / Not complied (Provide bid Ref. No)
3	Build rate (kg/Hr)	2.5 kg/hr (Minimum) on all the materials listed	Complied / Not complied (Provide bid Ref. No)
4	Positioning accuracy (mm) of robot with end effectors	0.5mm	Complied / Not complied (Provide bid Ref. No)
5	Material capabilities of Printing	On all the material viz. Aluminium, Stainless Steel, Superalloy, Titanium alloy	Complied / Not complied (Provide bid Ref. No)
6	Sample Printing	Test coupons (40 x 150x 300mm – 1 No. each in horizontal (300mm), vertical (300mm) orientations suggested by VSSC	Complied / Not complied (Provide bid Ref. No)
7	Component Printing	Demonstration of Printing on a mutually agreed component and on materials suggested within the capacity of the machine.	Complied / Not complied (Provide bid Ref. No)
8	Endurance test	Continuous printing for 24 hours (Minimum) without any troubles.	Complied / Not complied (Provide bid Ref. No)
S	Installation Requirements		
1	Power Supply(V)	Pl. Specify	(Provide bid Ref.No)
2	Main Fuse Protection (A)	Pl. Specify	(Provide bid Ref.No)
3	Compressed Air (bar)	Pl. Specify	(Provide bid Ref.No)
4	Floor loading (kN/m2)	Pl. Specify	(Provide bid Ref.No)
5	Gas connection requirements	Pl. Specify	(Provide bid Ref.No)
6	Water cooling	Pl. Specify	(Provide bid Ref.No)
7	Site requirements	Pl. Specify	(Provide bid Ref.No)
III	STANDARD ACCESSORIES		
1	Stock of wires (AA2319 - 100 kg, SS304L - 100 kg, Inconel 718 - 100 kg, Ti6Al4V ELI-100kg)		Offered / Not offered (Provide bid Ref.No)

2	Standard clamping : 01 Set	Offered / Not offered (Provide bid Ref.No)
3	Systems for gas shielding - 01 set	Offered / Not offered (Provide bid Ref.No)
4	Suitable Servo controlled Voltage stabiliser with noise cutoff ultra isolation transformer of Reputed make. Pl. Specify with details.	Offered / Not offered (Provide bid Ref.No)
5	Build plates made of Stainless Steel suitable for all tables- 06 Nos (02 for each table)	Offered / Not offered (Provide bid Ref.No)
6	UPS with ten mins backup for shutting down for the SAFESHUT DOWN OF THE machine	Offered / Not offered (Provide bid Ref.No)
7	Water Chiller of adequate capacity, reputed Brand) : 01 No	Offered / Not offered (Provide bid Ref.No)
8	Weld tips - 10 Nos	Offered / Not offered (Provide bid Ref.No)
9	Wire guides and nozzles for the wire diameters bided - 10 sets	Offered / Not offered (Provide bid Ref.No)
10	Maintenance tools for machine System, robot and welding system	Offered / Not offered (Provide bid Ref.No)
11	Collapsible local gas shielding - 10 Nos	Offered / Not offered (Provide bid Ref.No)
12	UV Protection system - movable, foldable and retractable - 01 No.	Offered / Not offered (Provide bid Ref.No)
13	Bulk wire storage & automated loading system - 01 No.	Offered / Not offered (Provide bid Ref.No)
14	High end work station PC - 01 No	Offered / Not offered (Provide bid Ref.No)
15	Essential consumables (ceramic collets etc) - 10 sets	Offered / Not offered (Provide bid Ref.No)
16	Three tier process lamp - 01 No	Offered / Not offered (Provide bid Ref.No)
17	Work lighting - 02 Nos (minimum) for front + 02 Nos (minimum) for rear side	Offered / Not offered (Provide bid Ref.No)
IV	OPTIONAL ACCESSORIES	
1	Provisions for capability to add advanced welding technology end effectors. Pl. specify with details	Offered / Not offered (Provide bid Ref.No)
2	Substrate Cooling system in tables with easily serviceable, leak proof internal cooling channels sufficient to maintain the table surface temperature below 80 Deg.Cel. Pl. Specify with details.	Offered / Not offered (Provide bid Ref.No)
3	Safety fencing - 01 No	Offered / Not offered (Provide bid Ref.No)
4	Any other item useful for the machine. Pl specify with details	Offered / Not offered (Provide bid Ref.No)
V	SAFETY	
1	The entire machine shall be designed and manufactured in accordance with following standards or equivalent international standards (machine safety, environmental regulations, etc.): - Safety for machines design: ISO 12100 - Safety for electrical components of machines: ISO 60204 - Test code for machine tools: ISO 230	Complied / Not complied (Provide bid Ref. No)
2	Noise levels produced by the system shall not exceed 85 dB.	Complied / Not complied (Provide bid Ref. No)
3	Safety interlock systems required during operation of machine	Complied / Not complied (Provide bid Ref. No)
4	Warning lights shall be provided when the machine is in operation	Complied / Not complied (Provide bid Ref. No)

5	All moving parts/guide ways/ball screws/control and measuring systems shall be protected against dust and oil incursion by providing suitable covers/bellows.	Complied / Not complied (Provide bid Ref. No)
6	Emergency off button shall be integrated on the machine at suitable location.	Complied / Not complied (Provide bid Ref. No)
7	The machine shall be equipped with safety devices to protect machine from any malfunction and possible operator errors.	Complied / Not complied (Provide bid Ref. No)
8	All parts integral to the machine shall be CE certified and sourced from OEM only.	Complied / Not complied (Provide bid Ref. No)
9	Safe failure mode which allows the job to start from the same layer after interruption due to power failure shall be available	Complied / Not complied (Provide bid Ref. No)
10	The machine shall have and bided with UV protection feature	Complied / Not complied (Provide bid Ref. No)
11	The torch shall be able to detect collision and abnormal gas & wire flow and stop the machine.	Complied / Not complied (Provide bid Ref. No)
12	Safety alarms shall be set in the machines which pops error codes which can alert the operator	Complied / Not complied (Provide bid Ref. No)
13	The machine shall be connected to I4.0 for creating backup incase of any safety issue and monitoring	Complied / Not complied (Provide bid Ref. No)
14	The machine shall have a UV Protection, whole system Emergency switch, servo motor with brake for vertical axis, Switch interlock to the door.	Complied / Not complied (Provide bid Ref. No)
15	The exhaust of Fume extraction system shall comply with ISO 18001 or equivalent standard	Complied / Not complied (Provide bid Ref. No)
16	The machine shall not continue printing if the wirefeed is not working.	Complied / Not complied (Provide bid Ref. No)
17	The machine shall have display of Temperature of printing, wire feeding, gas exposure at visible location for awareness of operator as a safety precaution	Complied / Not complied (Provide bid Ref. No)
18	The machine shall have sufficient numbers of stickers/labels about safety precautions, temperature exposure, gas exposure, robot movement interference at multiple locations	Complied / Not complied (Provide bid Ref. No)
19	Safe failure mode which allows the job to start from the same layer after interruption due to power failure shall be available. UPS mentioned in SI. No: III.6 should be adequate for the same.	Complied / Not complied (Provide bid Ref. No)
VI	ENVIRONMENT	
1	The equipment and all its accessories shall be tropicalized to Indian weather conditions at Trivandrum, India (40 °C & 70-80%RH). Vendor has to confirm the suitability of machine to operate in the specified environmental conditions.	Complied / Not complied (Provide bid Ref. No)
2	Vendor has to provide airconditioning system from reputed make like RITAAL or equivalent brands as a standard feature for maintaining the temperature within the cabiner for continous and safe working of the machine.	Provided / Not provided (Provide bid Ref. No)

VII	PRE DELIVERY INSPECTION & ACCEPTANCE	
	The machine along with ordered accessories are need to be made ready and the same need to intimated well in advance to VSSC for pre delivery Inspection. Following inspections will be carried out at vendor's site by VSSC team.	Accepted / Not accepted (Provide bid Ref. No)
1	(a) Machine and End effectors as per the order specification (b) Accessories as per the order specification (c) Demonstration of all features of machine, its systems, its accessories and capabilities of all softwares (d) Inspection of documentation, certificates, reports from OEM etc (e) Demonstration of performance features (Minimum wall thickness, positioning accuracy, surface roughness, porosity in sample printing, build consistence at height more that 3m, build rate, chemistry, tensile properties, microstructure, macrostructure and NDT of printed coupons) (f) Endurance test for continous printing for 24 hours. (g) Printing of samples as per instruction of VSSC on materials listed. (h) Printing of mutually agreed component of Aluminium alloy and Titanium alloy material. Filler wire for demonstration has to be procured by the vendor. Simulation of printing movements is also accepted incase of seperate supplies of machine, tables, positioner etc (i) Vendor is responsible for arrangement for conduct of all the demonstrations, tests & inspections mentioned above.	Accepted / Not accepted (Provide bid Ref. No)
2	(a) Chemistry, tensile properties, microstructure, macrostructure and NDT shall be demonstrated on the test coupons extracted from the sample printing as per ASTM standards within one week of PDI. (b) Tensile specimens from the sample printed all directions (3 nos. each) shall be tested and demonstrated as per applicable international standards. Charges for the same shall be included in the quote for the machine.	Accepted / Not accepted (Provide bid Ref. No)
3	DESPATCH CLEARANCE shall be given on successful completion of inspection and on satisfactory acceptance of the machine and all systems as per PO by VSSC team.	Accepted / Not accepted (Provide bid Ref. No)
VIII	INSTALLATION, COMMISSIONING & PERFORMANCE DEMONSTRATION AT VSSC	
1	The entire inspection tests carried out at pre delivery inspection need to be carried out again at VSSC to confirm the test results.	Accepted / Not accepted (Provide bid Ref. No)
2	Installation and commissioning of the system at VSSC, Thiruvananthapuram shall be done by the Vendor.	Accepted / Not accepted (Provide bid Ref. No)
3	Training of the operators and Engineers shall be provided in India desirably at VSSC, Thiruvananthapuram. Utility requirements for the training shall be mentioned in the bid.	Accepted / Not accepted (Provide bid Ref. No)
4	Training shall include data preparation, part selection for AM, build preparation, parameter optimization, quality monitoring and minor troubleshooting / machine maintenance etc.	Accepted / Not accepted (Provide bid Ref. No)
5	Trainers should have relevant documentation from the manufacturer	Accepted / Not accepted (Provide bid Ref. No)
6	Demonstration of performance features (Minimum wall thickness, positioning accuracy, surface roughness, porosity in sample printing, build consistence at height more that 3m, build rate, chemistry, tensile properties, microstructure, macrostructure and NDT of printed coupons)	Accepted / Not accepted (Provide bid Ref. No)
7	Printing test coupons (40 x 150x 300mm – 1 No. each in horizontal (300mm), vertical (300mm) orientations using filler wire sourced by the department.	Accepted / Not accepted (Provide bid Ref. No)
8	Printing of mutually agreed components within the capacities of the machine at VSSC site.	Accepted / Not accepted (Provide bid Ref. No)

9	All capabilities of machine as agreed in the bid shall be demonstrated during performance demonstration. Machine will be accepted only after successful demonstration.	Accepted / Not accepted (Provide bid Ref. No)
10	Installation, testing , commissioning and performance demonstration is under the vendor's scope.	Accepted / Not accepted (Provide bid Ref. No)
11	All handling equipment, tools, tackles etc. required shall be arranged by vendor	Accepted / Not accepted (Provide bid Ref. No)
12	Movement of the packed cases from its storage location in VSSC-ISRO campus, Trivandrum to the installation site, opening the cases, movement of the machine to the site and installation shall be performed by the Vendor.	Accepted / Not accepted (Provide bid Ref. No)
13	Required manpower shall be organized by the vendor.	Accepted / Not accepted (Provide bid Ref. No)
14	Civil/ Foundation/ Electrical requirements for the machine including drawings in English language shall be submitted to VSSC along with the bid.	Accepted / Not accepted (Provide bid Ref. No)
15	The foot print of the machine, its accessories with clear access to all the parts of machine shall be contained within the area of 9m x 8m and shall be within the height of 6m height.	Accepted / Not accepted (Provide bid Ref. No)
16	Details of machine foot print and all the installation requirements to be specified	Accepted / Not accepted (Provide bid Ref. No)
17	The overall dimensions of the machine its system, requirements of civil works and material handling system should be informed in advance.	Accepted / Not accepted (Provide bid Ref. No)
IX	FINAL ACCEPTANCE will be given after successful inspection & satisfactory acceptance of machine at VSSC site after successful installation, commissioning, training and all activities as per PO	Accepted / Not accepted (Provide bid Ref. No)
X	QUALIFICATION CRITERIA	
1	Vendor shall be Original Equipment Manufacturer (OEM) or their authorized representative.	Accepted / Not accepted (Provide bid Ref. No)
2	The Vendor should have supplied WAAM systems of similar capacity to globally reputed Government/private industry/ R&D sector in recent time. The Vendor should quote at least one references to whom the bided or similar machine was supplied. Performance certificate obtained from such references should be submitted in the bid with their contact details.	Accepted / Not accepted (Provide bid Ref. No)
3	The technology of the machine i.e WAAM system should be a proven model in the market and should not be a prototype or developmental system. This is applicable for other subsystems also.	Accepted / Not accepted (Provide bid Ref. No)
4	OEM should have adequate Experience to provide support in terms of R&D on parameters, applications, materials and printing of parts.	Accepted / Not accepted (Provide bid Ref. No)
5	In case of bid from authorized representative of OEM, authorization certificate from OEM shall be submitted along with bid.	Accepted / Not accepted (Provide bid Ref. No)
6	OEM shall provide commitment to provide after sales support up to a period of 10 years even in case of a change of the authorized representative in India.	Accepted / Not accepted (Provide bid Ref. No)

7	The Vendor has to mandatorily submit a clause by clause compliance statement (Annexure-2) . Quote without this compliance statement will be considered as disqualified.		Accepted / Not accepted (Provide bid Ref. No)
XI	TRAINING		
1	Training on demonstration of technology, performance, operation of machine as per PO, trouble shooting, essential maintenance and others that are required prior to installation & Commissioning for THREE persons for 5 days (maximum) at Factory's site/s.		Accepted / Not accepted (Provide bid Ref. No)
2	The Vendor shall demonstrate to us the various functions, operations and trouble shooting for user familiarization at VSSC. and bid complete training to VSSC team for minimum of 7 days at VSSC on following specifics: 3 Days basic training (Local technical team) 4 Days advanced training (along with global technical team)		Accepted / Not accepted (Provide bid Ref. No)
3	The vendor shall provide training on Maintenance (Mechanical, Electrical, Electronics, Robot all software and hardware) to VSSC team for minimum of 5 days at VSSC.		Accepted / Not accepted (Provide bid Ref. No)
4	Upon completion of training, OEM support engineer should give stand by support by call or online.		Accepted / Not accepted (Provide bid Ref. No)
XII	WARRANTY		
1	Comprehensive Warranty period for Machine and its systems	TWO YEARS	Accepted / Not accepted (Provide bid Ref. No)
2	Software warranty	Warranty for a period of TWO YEARS from the date of installation, shall be provided by vendor. During the said warranty period vendor shall provide all upgrades/ updates, patches without any additional charges and provide software support whenever necessary either by deputing service engineer or through phone / email/ video mode as deemed appropriate by VSSC and as intimated to the vendor.	Accepted / Not accepted (Provide bid Ref. No)
XIII	ANNUAL MAINTENANCE CONTRACT (AMC)		
1	Service Details	Service Maintenance AMC for FIVE YEARS after expiry of warranty of the Machine, its accessories and Software . The vendor shall have to mandatorily provide ONE Preventive Maintenance (PM) in a year, Breakdown Maintenance (BM) on call basis and Software upgrade as and when it is released without additional cost. Details viz no of Periodic Maintenance (PM) and Breakdown Maintenance (BM) visits in a year, logistics, cost per year and other terms shall be clearly and exclusively specified. <u>AMC cost will be considered for evaluation of bids.</u>	Accepted / Not accepted (Provide bid Ref. No)
2	Cost of Spares in AMC period	Cost of spares shall be submitted along with AMC bid by Vendor for purchase of the same during AMC period, if called for.	Accepted / Not accepted (Provide bid Ref. No)
3	AMC Undertaking	An undertaking (exclusively for machine & its systems and software) is required for servicing of the supplied machine and software by the AMC Vendor till its completion period.	Accepted / Not accepted (Provide bid Ref. No)
XIV	MAINTENANCE		
1	Assurance for after sales support and supply of spares for a minimum period of 10 years from date of handing over the machine shall be provided along with the bid.		Provided / Not provided (Provide bid Ref. No)
2	Provision shall be made for the manufacturer to remotely access the machine in cases where the manufacturer's intervention would be required for solving certain maintenance issues.		Provided / Not provided (Provide bid Ref. No)
3	The machine shall have latest connected features like IOT for productivity and maintenance management.		Provided / Not provided (Provide bid Ref. No)

4	It is preferred to have after sale service team available in India		Provided / Not provided (Provide bid Ref. No)
XV	DELIVERY PERIOD	10 months	Accepted / Not accepted (Provide bid Ref. No)
XVI	SPARES		
1	The vendor shall recommend and submit list of essential spares on various headings viz., (Mechanical/Electrical/Electronic/Robot/sensors/Others) required for the machine for trouble free operation of the machine for next two years after the warranty period. Spares that shall be considered are Liner inside torch, feed roller , coolant, Contact tip, Gas nozzle, Contact tip holder, Spatter guard, Feeder rolls in main wire feeder and torch servo drive.		Provided / Not provided (Provide bid Ref. No)
2	Complete list of spares for the machine and its accessories along with spares specification/type/model and name & address of the spare Vendor shall be submitted along with documentation while supplying the machine.		Provided / Not provided (Provide bid Ref. No)
3	Vendor should ensure the availability of spares for the next ten years of operation of the machine with document evidence/undertaking.		Provided / Not provided (Provide bid Ref. No)
XVII	DOCUMENTATION		
1	Three sets of the following documents in hardcopy plus one set in soft copy in English should be supplied.		Provided / Not provided (Provide bid Ref. No)
2	Installation requirements (shall be shared after receiving the PO)		Provided / Not provided (Provide bid Ref. No)
3	Operators Manual		Provided / Not provided (Provide bid Ref. No)
4	Maintenance Manual		Provided / Not provided (Provide bid Ref. No)
5	Software modules Manual		Provided / Not provided (Provide bid Ref. No)
6	Spare parts manual for Mechanical, Electric servos, Robot, Welding and control system		Provided / Not provided (Provide bid Ref. No)
7	Transport/Assembly/Commissioning manual		Provided / Not provided (Provide bid Ref. No)
8	Foundation drawings/Assembly drawings/foot print and installation instructions (with a check list)		Provided / Not provided (Provide bid Ref. No)
9	Calibration certificates for all measurable items with calibration procedure / sources/ periodicity for all the gauges and instruments used in the machine		Provided / Not provided (Provide bid Ref. No)
10	Preventive maintenance check list, troubleshooting charts and guidelines		Provided / Not provided (Provide bid Ref. No)
11	Sub assembly drawings		Provided / Not provided (Provide bid Ref. No)
12	Catalogues / OEM Manuals of all bought out items		Provided / Not provided (Provide bid Ref. No)

13	List of sub Vendors and documents	Provided / Not provided (Provide bid Ref. No)
14	Machine diagram indicating all the service items for easy understanding of location	Provided / Not provided (Provide bid Ref. No)
15	Maintenance, interface & commissioning manuals for controller system & drives	Provided / Not provided (Provide bid Ref. No)
16	Detailed specification of all rubber items and hydraulic/lube fittings	Provided / Not provided (Provide bid Ref. No)
17	One re-installation CD//Pen drive for the PC.	Provided / Not provided (Provide bid Ref. No)
18	Licensed version software CD/DVD/Pen drive and replaceable hard disk installed with all the software shall be included.	Provided / Not provided (Provide bid Ref. No)
19	Power, control & circuit elements shall be properly labeled as per circuit diagram. In the same way the machine and its systems shall be legible labelled with serial nos.	Provided / Not provided (Provide bid Ref. No)
XVIII	PACKING	
1	The machine shall be packed in modules to enable it to enter through 5m x 5m wide entry to the installation site.	Accepted / Not accepted (Provide bid Ref. No)
2	The packing of each item should be adequately sturdy to avoid any damage while handling and during transit. The packing should also prevent any prolonged exposure to hostile environment (rain) and it shall be seaworthy.	Accepted / Not accepted (Provide bid Ref. No)
XIX	OTHERS	
1	Prebid Meeting: Vendors shall request for a Pre-Bid Meeting to Purchase wherein a detailing shall be deliberated on the Tender Specifications.	Accepted / Not accepted (Provide bid Ref. No)
2	Vendor shall explicitly quote the technical details wherever it is required/asked. bids having mere 'Yes' or incomplete answers for numerical values to be quoted will not be considered.	Accepted / Not accepted (Provide bid Ref. No)
3	The quotation shall be comprehensive against specifications and the Vendor should state whether the machine bid by them confirm as per specification point by point as listed. If any alternate bids are made, it should be stated as alternative and price to be quoted separately (only in price bid) if any.	Accepted / Not accepted (Provide bid Ref. No)
4	The bid shall be submitted in Two Part basis. The first part shall be item wise unpriced bid with Technical specifications and Commercial terms. The second part shall be item wise priced bid.	Accepted / Not accepted (Provide bid Ref. No)
5	All correspondences and technical details/ documentation shall be submitted in English (UK/US) language only.	Accepted / Not accepted (Provide bid Ref. No)
6	Metric system of measurement shall be followed in all specifications, drawings, manuals, etc.	Accepted / Not accepted (Provide bid Ref. No)
7	The Vendor shall provide technical literature/catalogues/detailed drawings of the machine and the items bid. Quotations received without these details are likely to be ignored/disqualified for consideration.	Accepted / Not accepted (Provide bid Ref. No)
8	Quote Shall be on FOB (freight on board) Basis for imported supplies and it shall be on FOR, VSSC basis for domestic supplies.	Accepted / Not accepted (Provide bid Ref. No)

