

**GOVERNMENT OF INDIA  
DEPARTMENT OF SPACE  
LIQUID PROPULSION SYSTEMS CENTRE, VALIAMALA (LPSC)  
THIRUVANANTHAPURAM**

**Tender for Supply, Installation, Commissioning and Demonstration of  
Multi axis, CNC Tube bending machine**

**Bids to be submitted online**

**Tender No.: LPSC/LVF/LP202100076501 dated 25-08-2022**

## A. Tender Details

Tender No :	LPSC/LVF/LP202100076501
Tender Date :	25-08-2022
Tender Classification:	GOODS
Purchase Entity :	LVF
Centre :	LIQUID PROPULSION SYSTEMS CENTRE, VALIAMALA (LPSC)

### Supply, Installation, Commissioning and Demonstration of Multi axis, CNC Tube bending machine- PT (TWO PART)

1. For and on behalf of the President of India, the Head, Purchase & Stores, Liquid Propulsion Systems Centre (LPSC), Valiamala, Thiruvananthapuram invites tenders through e-procurement mode; <https://eproc.isro.gov.in> Prospective vendors interested in participating in the tendering process need to get registered in the portal by using Digital Signature Certificate. Offers submitted through our online portal only will be considered and no other means will be considered. Detailed instruction, prerequisites and illustrative tutorials for bid enrollment, preparation etc are available in the portal at <https://eproc.isro.gov.in>. A help desk is also functioning to assist the vendors whose contact details are available in the portal.

2. Class I/Class II Local suppliers are only eligible to submit the bid against this tender.
3. Please declare/confirm the exact Local Content Percentage involved in the quoted Items. Also mention the location at which the value addition takes place.
4. This being a two part tender, Technical & Commercial Part and Price Part separately, the tenders should not attach any documents containing Pricing information along with Technical & Commercial Bid. Normally we do not open PART-II (Price Bid), if PART-I (Techno Commercial bid) does not meet with our technical specification requirements. Our Tender Enquiry contains technical requirements and specification. The detailed technical specification of your offer should be covered in the technical part. The Technical documents need to be attached online as a single PDF file without any price information. The tender attachment/technical bid containing Price details will be treated as unsolicited offers and rejected.

#### A.1 Tender Schedule

Tender Publish Date : 25-08-2022 14:00  
Bid Clarification Due Date : 08-09-2022 14:00  
Bid Submission Start Date : 02-09-2022 18:00  
Bid Submission Due Date : 03-10-2022 14:00  
Bid Opening Date : 03-10-2022 14:30  
Price Bid Opening Date : 24-10-2022 14:30

## **A.2 Pre-bid Meeting Details**

**Date :** 02-09-2022 14:00

**Place :** LPSC Valiamala

**Location :** LPSC Valiamala

**Centre :** LIQUID PROPULSION SYSTEMS CENTRE, VALIAMALA (LPSC), THIRUVANANTHAPURAM, KERALA

**Details :** Pre-bid meeting will be conducted online on 02-09-2022 at 1400hrs. Interested Vendors shall intimate their willingness to participate in the Pre-bid meeting by mail to [ps0\\_1@lpsc.gov.in](mailto:ps0_1@lpsc.gov.in)/[sps0\\_purchase@lpsc.gov.in](mailto:sps0_purchase@lpsc.gov.in) on or before 1000 hrs. on 31-08-2022. The offers submitted without attending the Pre-bid meeting will be considered as disqualified. The details regarding the time and web link for pre-bid meeting will be intimated by email on the basis of your request.

## **B. Tender Attachments**

### **Technical Write-up/Drawings**

**Document : Compliance Matrix / Statement**

### **Instructions To Vendors**

#### **2. SPECIAL INSTRUCTIONS TO TENDERERS**

1. As far as implementation of public procurement policy (Preference to Make In India) Order, 2017 is concerned, the Office Orders vide No. P-45021/2/2017-B.E-II dt.15.06.2017, which is partially modified by Order No. P-45021/2/2017-PP(BE-II) dt.28.05.2018, Order No.P-45021/2/2017-PP(BE-II)dt. 29.05.2019, Order No. P-45021/2/2017-PP (BE-II) dt 04.06.2020 and Order No.P-45021/2/2017-PP (BE-II) dt16.09.2020 and subsequent Amendments issued by the Department for Promotion of Industries and Internal Trade, Ministry of Commerce and Industry regarding Class-I/Class-II local suppliers, Purchase preference, verification of local contents etc shall be applicable to this tender. Therefore, bidders may ensure compliance of the same while submitting tenders.

2. Class-I / Class- II local suppliers are only eligible to participate in this tender

3. Price Preference shall be extended to the MSEs under the Public Procurement Policy for MSEs. Such MSEs shall produce documentary proof of registration as per provisions of the Policy ie: registration with District Industries Centre (DIC) or Khadi and Village Industries Commission (KVIC) or Khadi and Industries Board (KVIB) or Coir Board or National Small Industries Commission (NSIC) or Directorate of Handicrafts and Handlooms or UdyogAadhar Memorandum or any other body specified by Ministry of MSME.

4. The tendered requirement is having local content more than 20%. Hence, the provision/evaluation of offers shall be as per the office orders mentioned above, issued by Govt. of India. Bidders have to submit all relevant documents as per the said office orders.

## C. Bid Templates

### C.1 Technical Bid - Supply, Installation, Commissioning and Demonstration of Multi axis, CNC Tube bending machine

#### 1. TUBE BENDER

Supply, Installation, Commissioning and Demonstration(Including Packing, Forwarding & Transportation) of Multi axis, CNC Tube bending machine with Simulation Software and essential accessories for safe operation of the machine.

#### Item specifications for TUBE BENDER

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	1.Machine details proposed	As per the following	Yes / No / Explain		
2	1.1)Minimum no. of axes (movements) in the CNC machine	9 axes	Yes / No / Explain		
3	1.2)Material of construction of tubes proposed to be bent	Stainless Steel AISI304L, Titanium alloys (Ti-6Al-4V) & Aluminium alloy AA6061	Yes / No / Explain		
4	1.3) No. of bending dies to be accommodated simultaneously for different bend radius	3 (maximum)	Yes / No / Explain		
5	1.4) No. of servo motors	9 motors (one for each axis)	Yes / No / Explain		
6	1.5)Machine capacity proposed for bending (min)	6 mm OD x 1.0 mm WT (SS tubes)	Yes / No / Explain		
7	1.6) Machine capacity proposed for bending (max)	38 mm OD x 2.5 mm WT (SS tubes)	Yes / No / Explain		
8	1.7)Bending direction	Bi-directional (Clockwise & Anticlockwise)	Yes / No / Explain		
9	1.8) Carriage travel	2 Meters	Yes / No / Explain		
10	1.9) Bend head movement	Vertical & Lateral	Yes / No / Explain		

11	1.10) Bend angle range	0-190 degree(Considering Spring back up to 10 degree)	Yes / No / Explain		
12	1.11)Max no. of bends that the machine shall be capable to do in one tube.	30 bends	Yes / No / Explain		
13	1.11) Details on bending dies	Machine shall be capable of bending each diameter tube to maximum of 3 different bend radii in single setting using 3 different bending dies based on our requirement.Machine shall be capable of holding 1/2/3 bending dies based on the bending requirement of each tube and bend the tubes as per the inputs provided.	Yes / No / Explain		
14	2.Machine construction	2.1) Tube head with quick setting collet for holding the tube on its outer diameter. 2.2) Tail stock / Tube support for feeding mandrel through ID of tube. 2.3) Bed of suitable length and of rigid construction to withstand shock loads during bending. 2.4)Die holder for holding Bend die, Wiper die, Pressure die, Clamp die and other elements. 2.5) Die(s) and mandrel shall be replaceable as per size of tube being bent.	Yes / No / Explain		
15	3.Basic Details of tubes to be bent	As per the following	Yes / No / Explain		
16	3.1) Minimum bend radius (Centre Line Radius) of tubes	1.5 x OD of tube	Yes / No / Explain		
17	3.2) Maximum bend radius (Centre Line Radius) of tubes	180 mm (nominal)	Yes / No / Explain		

18	3.3) Minimum distance between adjacent bends	2.5 x OD of tube bent	Yes / No / Explain		
19	3.4) Maximum length of tube to be bent	2 meters	Yes / No / Explain		
20	3.5) Bend angle range	0 – 180 degree (without spring back)	Yes / No / Explain		
21	3.6) Minimum number(s) of bend radius to be bent in each tube	3 different bend radius (min)	Yes / No / Explain		
22	3.7) Permissible ovality in bent tube	5% of diameter (max)	Yes / No / Explain		
23	3.8) Permissible thinning of tube in bent portion	10% of wall thickness (max)	Yes / No / Explain		
24	3.9) Maximum no. of bends to be bent in one tube	20 bends max.	Yes / No / Explain		
25	4. Size of tubes to be bent (AISI304L Stainless Steel and Titanium Alloy Ti-6Al-4V)	4.1) 1/4" OD x 0.7 mm WT x 9/16" CLR 4.2) 6mm OD x 1.0 mm WT x 15mm CLR 4.3) 8mm OD x 1.0 mm WT x 15 mm CLR 4.4) 8mm OD x 1.0 mm WT x 24 mm CLR 4.5) 10 mm OD x 1.0 mm WT x 24 mm CLR 4.6) 12 mm OD x 1.0 mm WT x 38 mm CLR 4.7) 19 mm OD x 2.0 mm WT x 56 mm CLR 4.8) 20 mm OD x 1.5 mm WT x 56 mm CLR 4.9) 25 mm OD x 2.5 mm WT x 82 mm CLR 4.10) 30 mm OD x 2.5 mm WT x 112 mm CLR	Yes / No / Explain		
26	5. Material of tube to be bent and its properties	As per the following	Yes / No / Explain		
27	5.1) AISI304L (Stainless Steel)	Yield Strength: 17kg/mm <sup>2</sup> , Ultimate Strength: 51kg/mm <sup>2</sup> and % of elongation: 30%	Yes / No / Explain		

28	5.2)Ti-6Al-4V(Titanium alloy)Annealed	Yield Strength:88kg/mm <sup>2</sup> ,Ultimate Strength:95kg/mm <sup>2</sup> and % of elongation:14%	Yes / No / Explain		
29	5.3)Aluminium AA6061(for future need)	Yield Strength:23kg/mm <sup>2</sup> ,Ultimate Strength:29kg/mm <sup>2</sup> and % of elongation:10%	Yes / No / Explain		
30	6.Details of axis (movements) proposed (by Servo motors)	As per the following	Yes / No / Explain		
31	6.1)Bend: Bend die rotary movement (Rotary movement)	1st axis	Yes / No / Explain		
32	6.2)Push: Carriage movement for feeding of tube along Linear axis before bending – (Linear movement).	2nd axis	Yes / No / Explain		
33	6.3)Turn: Tube collect head rotation to get various angular bending positions / angles – (Rotary movement)	3rd axis	Yes / No / Explain		
34	6.4)Mandrel: Mandrel movement inside tube inner diameter from Tail Stock – (Linear movement)	4th axis	Yes / No / Explain		
35	6.5)Vertical: Die holder unit up and down movement to get dies with different bending radius – (Vertical movement)	5th axis	Yes / No / Explain		
36	6.6)Lateral: Bend die movement for changing from LH to RH (Linear movement)	6th axis	Yes / No / Explain		
37	6.7)Pressure die: Pressure die movement (Linear movement)	7th axis	Yes / No / Explain		
38	6.8)Clamp Bracket: Clamping bracket movement for clamping the tube (Linear movement)	8th axis	Yes / No / Explain		



39	6.9)Pressure Die Assist: Pressure die linear movement for clamping the tube during bending. (Linear movement)	9th axis	Yes / No / Explain		
40	7.Details of other movements in the machine	As per the following	Yes / No / Explain		
41	7.1)Clamping of collet on tube	Pneumatic	Yes / No / Explain		
42	7.2)Clamp bracket travel (lateral)	Pneumatic	Yes / No / Explain		
43	8.Mechanisms for different movements	8.1)Gear box directly mounted / Rack and Pinion / Ball screw with AC servo motor as prime mover. 8.2)Type of movement shall be properly selected to provide precise and accurate position as per inputs and with provision for adjustment of speed for different movements (Party shall give the type of mechanism for each movement for the quoted machine).	Yes / No / Explain		
44	9.Bending speed in each axis (1 to 9 axis)	To be specified by supplier	Yes / No / Explain		
45	10.Repeatability in each axis (1 to 9 axis)	To be specified by supplier	Yes / No / Explain		
46	11.Accuracy in all axes	± 0.1 degree or better for angular movement,± 0.1mm or better for linear movement	Yes / No / Explain		

47	12.Motor Capacity & Connected Load (approx) in kW	<p>12.1)Motors shall be from reputed make, rugged and complying with prevailing industrial standards.</p> <p>12.2)Motor capacity needed for each movement (with sufficient margin as per industry standards) for bending tubes of above mentioned tube material and sizes shall be selected by the manufacturer.</p> <p>12.3)Motor capacity in kW for each axis movement shall be clearly mentioned in the quote.</p>	Yes / No / Explain		
48	13.Tube clamping	<p>13.1) Collet type Chuck-Pneumatically operated</p> <p>13.2) Quick setting collets shall hold the tubes being bent such that holding force for each tubes shall be adjustable to avoid crushing of thin walled tubes while clamping.</p>	Yes / No / Explain		
49	14.Electronics & Software details	As per the following	Yes / No / Explain		

50	14.1)CNC Control& HMI	(I) CNC control system & HMI shall be from reputed suppliers like Bosch/Rexroth/MTX/OEM/Equivalent and it is essential that supplier have local service support in India. (II) Open architecture PC based control. (III) Programmable control for all the 9 axis - Tube rotation, length feeding, Clamping die movement, Pressure die movement, Mandrel feeding, etc. (IV) Individual speed programming in all axis independently based on the requirement. (V) Real time display and control for all machine motions. (VI)Provision for providing input for spring back compensation for different materials shall be available.	Yes / No / Explain		
51	14.2)Machine memory capacity	10 lakhs program (minimum)	Yes / No / Explain		
52	14.3)Monitor size	12.1"or larger Colour monitor, LCD/LED type, Touch screen with key board. Monitor shall be of reputed brand, rugged construction and suitable for industrial environment.	Yes / No / Explain		
53	14.4)Operating system	Latest Version of Linux based or Windows based	Yes / No / Explain		
54	14.5)Data entry (Input data)	By way of X-Y-Z coordinates of bent tube (final product level).3D line drawing format from AutoCAD drawing of bent tube(final product level)	Yes / No / Explain		

55	14.6)Spring back calculation	Provision for inputting spring back compensation off line shall be available.	Yes / No / Explain		
56	14.7)Machine error /problem diagnostics.	Online and off-line diagnostics provision shall be available	Yes / No / Explain		
57	14.8)Communication for Input / Output	Machine shall be supplied along with standard industrial grade PC with built in operation software(s) and application software(s), key board and mouse for machine programming.Machine shall have provision for communicating through USB memory for providing input / output when network is not available. PC / Machine shall have database for tool parameters and materials.	Yes / No / Explain		
58	15.Electrical specifications	As per the following	Yes / No / Explain		
59	15.1)Input power supply	3 Phase AC, 415V±6%,50Hz ±3%, 4wire	Yes / No / Explain		

## 2. Die and tooling

**Standard Tooling for CNC Tube Bending Machine,Tube OD:1/4",Centre Line Radius(CLR):9/16"**

### Item specifications for Die and tooling

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Tube size	1/4" OD x 0.7 mm WT x 9/16" CLR	Yes / No / Explain		

## 3. Die and tooling

**Standard Tooling for CNC Tube Bending Machine,Tube OD:6 mm,Centre Line Radius(CLR):15 mm**

### Item specifications for Die and tooling

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Tube size	6mm OD x 1.0 mm WT x 15mm CLR	Yes / No / Explain		

#### 4. Die and tooling

**Standard Tooling for CNC Tube Bending Machine,Tube OD:8 mm,Centre Line Radius(CLR):15 mm**

##### Item specifications for Die and tooling

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Tube size	8mm OD x 1.0 mm WT x 15 mm CLR	Yes / No / Explain		

#### 5. Die and tooling

**Standard Tooling for CNC Tube Bending Machine,Tube OD:8 mm,Centre Line Radius(CLR):24 mm**

##### Item specifications for Die and tooling

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Tube size	8mm OD x 1.0 mm WT x 24 mm CLR	Yes / No / Explain		

#### 6. Die and tooling

**Standard Tooling for CNC Tube Bending Machine,Tube OD:10 mm,Centre Line Radius(CLR):24 mm**

##### Item specifications for Die and tooling

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Tube size	10 mm OD x 1.0 mm WT x 24 mm CLR	Yes / No / Explain		

#### 7. Die and tooling

**Standard Tooling for CNC Tube Bending Machine,Tube OD:12 mm,Centre Line Radius(CLR):38 mm**

##### Item specifications for Die and tooling

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Tube size	12 mm OD x 1.0 mm WT x 38 mm CLR	Yes / No / Explain		

### 8. Die and tooling

**Standard Tooling for CNC Tube Bending Machine,Tube OD:19 mm,Centre Line Radius(CLR):56 mm**

#### Item specifications for Die and tooling

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Tube size	19 mm OD x 2.0 mm WT x 56 mm CLR	Yes / No / Explain		

### 9. Die and tooling

**Standard Tooling for CNC Tube Bending Machine,Tube OD:20 mm,Centre Line Radius(CLR):56 mm**

#### Item specifications for Die and tooling

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Tube size	20 mm OD x 1.5 mm WT x 56 mm CLR	Yes / No / Explain		

### 10. Die and tooling

**Standard Tooling for CNC Tube Bending Machine,Tube OD:25 mm,Centre Line Radius(CLR):82 mm**

#### Item specifications for Die and tooling

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Tube size	25 mm OD x 2.5 mm WT x 82 mm CLR	Yes / No / Explain		

### 11. Die and tooling

**Standard Tooling for CNC Tube Bending Machine,Tube OD:30 mm,Centre Line Radius(CLR):112 mm**

#### Item specifications for Die and tooling

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Tube size	30 mm OD x 2.5 mm WT x 112 mm CLR	Yes / No / Explain		

**Common Specifications (Applicable for all items)**

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	1.Scope of work	Supply, Installation, Commissioning and Demonstration of Multi axis, CNC Tube bending machine as per the detailed specification furnished below. Machine is intended for precise bending of tubes made out of Alloys of Stainless Steel / Aluminum / Titanium to complicated shapes for aerospace application.	Yes / No / Explain		
2	2.Additional features	2.1)Machine shall be supplied with ultra Isolation transformer with spike buster to protect the CNC Control System. 2.2) Electrical control panel would be dust proof confirming to CE norms and the cabinet would have an A/C cooling unit. 2.3)UPS with a backup of 30 Minutes shall be supplied with the machine to meet the backup of CNC/PC attached to the machine.	Yes / No / Explain		

3	3.Safety features	<p>3.1) The machine must be provided with all standard safety features necessary to protect the machine, control system and the operator while in operation from possible damage / injury.</p> <p>3.2) Standard safety features like emergency stop using foot pedal as well as in control panel shall be available.</p> <p>3.3) Laser based scanner to protect swing arm area/Safety fence in the area of swing arm shall be provided. This feature shall enable the machine to switch off automatically or machine shall not switch ON when person / object is in the vicinity of machine within the swing arm area.</p> <p>3.4) The equipment should be so designed such that in the event of power failure there should not be any over shooting in any of the axes.</p> <p>3.5) Automatic shut off of the machine in case of major spikes in the incoming supply which affects the machine functions.</p> <p>3.6) A detailed list of all alarms / indications provided on machine should be submitted.</p> <p>3.7) All the pipes, cables etc. on the machine should be well supported and protected. These should not create any hindrance to machine / operator's movement for effective use of machine.</p> <p>3.8) Machine should have adequate and reliable safety interlocks / devices to</p>	Yes / No / Explain		
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	<p>avoid damage to the machine, work piece and the operator due to the malfunctioning or mistakes.</p> <p>3.9) All the rotating / moving parts used on machine should be statically &amp; dynamically balanced to avoid undue vibrations and suitably guarded.</p> <p>3.10) Emergency Switches at suitable locations as per international norms should be provided.</p> <p>3.11) Machine shall be complying with all relevant international safety standards as detailed below.</p> <p>3.11.1) ISO 12100:2010 or equivalent for machine safety basic concepts and design</p> <p>3.11.2) ISO 13857:2008 or equivalent for protective distance to risk areas</p> <p>3.11.3) EN61000-6-1,2,3&amp;4 or equivalent for electromagnetic compatibility</p> <p>3.11.4) Other relevant standards as applicable.</p> <p>3.12) Machine shall run silent without creating much noise (75db maximum).</p> <p>3.13) All electronic components used in machine shall comply with relevant international standards. Party shall mention the standards complying with for the electronic components.</p>			
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4	4.Tooling, Attachment, Spares & Accessories	<p>4.1)1 set of standard tooling viz. bend die, pressure die, Clamp die, Collets etc., for pipe details as per indent serial number 2 to 11 shall be quoted with part no., part name and its cost separately.</p> <p>4.2)1 set of Optional accessories like Mandrel with extension rod etc required for bending of pipes as mentioned in indent serial no.13 shall be quoted with part no., part name and its cost separately.</p> <p>4.3)Tooling's that are common for different pipes shall be clearly mentioned with details and for such items party shall quote for one set / one number only.</p> <p>4.4) Essential spares to be stockpiled for trouble free maintenance of machine for a period of 10 years as per indent serial number 12 shall be quoted separately with name, part number and its usage.</p> <p>4.5)We reserve the right to order either full or part of the standard / special tools, Attachments, spares or accessories quoted.</p>	Yes / No / Explain		
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5	5.Other features	<p>5.1)Machine shall be capable of bending tubes of different diameters to complex shapes in single setting.</p> <p>5.2)Machine shall be capable of performing right hand and left hand bending operations continuously using all 3 bending dies.</p> <p>5.3)Machine shall have provision for parallel operation of more than one servo motor to get simultaneous movement in multiple axes so as to bend tubes in lesser time and to get higher productivity.</p> <p>5.4)Machine shall be capable of bending thin walled Stainless Steel / Titanium alloy tubes without any defects such as No visible damage on surface is permitted and Line mark is not permitted in bent portion.</p> <p>5.5)Machine shall have additional features essential to control the elongation and thinning of tubes in bent portion within acceptable limits as per aerospace standards. Additional features available in the machine shall be mentioned clearly in technical details.</p> <p>5.6)Machine shall have feature for gradual withdrawal of mandrel during bending prior to completion of bend.</p> <p>5.7) Machine shall have provision for bending tubes with large bend radius i.e. tube OD x 10 or more for future requirements.</p> <p>5.8)The machine shall</p>	Yes / No / Explain		
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be manufactured by casting / fabrication and shall be of rugged construction, stress relieved with vibration damping characteristics and adequately ribbed to provide maximum stiffness. Bed shall be of rigid construction to withstand shock loads.

5.9) Machine shall have feature for movement of carriage along with the tube while bending to reduce the cycle time.

5.10) Electric Servo motors shall have all standard features for consistent and safe operation so that machine shall have longer working life.

5.11) Machine shall have centralized lubrication system for on-line lubrication of all essential points during bending.

5.12) Machine shall be supplied with simulation software (anti-collision software) to ensure tube being bent shall not interfere with machine while bending. Simulation software shall ensure tube shall not collide with machine parts prior to tube bending.

5.13) Machine shall operate quietly with less noise during production.

5.14) Machine shall occupy less floor space and effective operating area shall be minimum.

5.15) Machine shall be painted with Red and Milky white colour(s) at appropriate portions as per industrial standards.

6	6.Warranty	Party shall provide warranty for a period of 1 year (minimum) for the machine from date of installation and commissioning. Extended warranty, if any, shall be mentioned explicitly with maximum period of coverage.	Yes / No / Explain		
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7	7.Acceptance test and inspection	<p>On placement of purchase order, party shall submit following information to us.</p> <p>7.1) Standard inspection schedule for acceptance including relevant standards and this shall be discussed &amp; agreed upon between the vendor and ISRO mutually.</p> <p>7.2) The entire tests required for conforming the geometrical and positioning accuracies as per machine specifications should be demonstrated to ISRO engineers for acceptance at manufacturer's site as well as ISRO site. Details of tests proposed shall be submitted to LPSC.</p> <p>7.3) Tubes needed for initial trials at party's site shall be procured by vendor and LPSC shall not supply tubes for carrying out initial trials.</p> <p>7.4) Final trials shall be carried out by vendor at his site in presence of LPSC engineers. For final trials and inspection LPSC shall supply tubes of following sizes as per standard specifications.</p> <p>7.4.1) AISI 304L tubes 6 mm OD x 1.0 mm WT – 20 meters</p> <p>7.4.2) AISI 304L tubes 10 mm OD x 1.5 mm WT – 20 meters</p> <p>7.4.3) AISI 304L tubes 25 mm OD x 2.5 mm WT – 10 meters</p> <p>7.4.4) AISI 304L tubes 38 mm OD x 2.5 mm WT – 10 meters</p> <p>Supplier shall demonstrate the capability of machine by bending the tube</p>	Yes / No / Explain		
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		<p>using the machine as per LPSC supplied drawing and dispatch the bent tubes to LPSC. Quality Assurance division of LPSC shall inspect the bent tubes at LPSC premises and ensure its conformance to drawing and accord clearance for dispatch of machine based on satisfactory results.</p> <p>7.5) LPSC Engineers shall carryout inspection of machine at manufacturer's site and witness the demonstration of the machine as part of dispatch clearance. Party shall despatch the machine after inspection and after obtaining written clearance from us.</p>			
8	8. Transportati on of machine to LPSC Valiamala	<p>8.1) Party is responsible for proper packing the machine in suitable boxes prior to despatch of machine and its accessories to LPSC, Valiamala. 8.2) Party is responsible for transporting the machine and its accessories from their premises to LPSC Valiamala. 8.3) Transit insurance, if any, needed shall be availed by party and LPSC is not responsible for the same. 8.4) Party shall depute their engineer / representatives for safely unloading the machine and its accessories at identified location at LPSC campus.</p>	Yes / No / Explain		

9	9. Installation & Commissioning	<p>LPSC shall give go ahead for commissioning of machine after receipt of the machine. The installation and commissioning shall be totally completed by supplier at LPSC site within 1 month after receiving go ahead from LPSC. Vendor shall provide foundation Drawing and all related details in Technical Bid including following.</p> <p>9.1) Overall dimensions of machine, area required and weight of the machine with all accessories for regular operation of machine for finalising the site details.</p> <p>9.2) Foundation kit like Vibro mounting pads, bolts etc, if required, and its interface details. Items shall be supplied by vendor with the machine.</p> <p>9.3) Requirements of power and compressed air shall be specified.</p> <p>9.4) Special requirements like isolation, vibration criteria, air conditioning, dust free atmosphere and flooring for safe operation of machine shall be specified.</p> <p>9.5) Details of calibration that shall be carried out as part of installation and commissioning at party's site as well as at our site. Party shall mention the acceptance values for each parameter and comparison of output values against acceptance values. The commissioning will be treated as complete if LPSC</p>	Yes / No / Explain		
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		<p>issues the certificate of acceptance. 9.6) Data Backup for reinstallation in case of Hard Disc failure should be supplied on CD/Flash Disk at the end of commissioning. The data should include NC, MMC, PLC Archive files, Alarm text, fixed cycles etc.</p>			
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10	10.Machine installation requirements	<p>The Supplier shall carry out following activities as part of preparation for installation at LPSC premises.</p> <p>10.1) Inspection of the site for preparatory work as required by the installation drawing.</p> <p>10.2) Inspection of machine /system and ensure no damages during transportation / handling.</p> <p>10.3) Support and movement of machine to installation area and settling the machine onto levelling shoes.</p> <p>10.4)Detailed procedure to be followed for installation and other detailed requirements shall be provided by vendor after PO placement. It should contain electrical requirements of the supply system, control voltage, ambient conditions, compressed air supply, detailed foundation drawings and other details.</p> <p>10.5) Any special tools required for lifting / handling the machine at LPSC for installation shall be arranged by supplier.</p> <p>10.6) First fill of coolant, lubricant, consumables etc wherever applicable should be supplied and filled to the machine by supplier during installation and commissioning.</p> <p>A sample tube shall be bent for all sizes at the time of commissioning of machine at LPSC. Drawings of sample tube and tube material shall be provided by LPSC at time of installation and vendor shall bend the tube to</p>	Yes / No / Explain		
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		different configurations as per drawings supplied by LPSC. Vendor shall demonstrate the capability of machine to produce defect free tubes and its repeatability and prove the die design & manufacturing accuracy claimed.			
11	11.Training	Supplier should provide necessary training to two Engineers, two Supervisors and two Technicians free of cost in the following areas at LPSC site. 11.1) Machine operations 11.2) Programming & CNC Control 11.3) Mechanical Maintenance 11.4) Electrical Control System Maintenance 11.5) Essential safety procedures to be followed During commissioning visit, supplier should provide 5 days training on machine operation and maintenance to LPSC Engineers/Technicians	Yes / No / Explain		

12	12.Experience/ Clientele and eligibility for participation in tender	<p>Quote from suppliers who have supplied similar pipe bending machines to aerospace / defence / PSU type industries shall only be considered. Following information shall be furnished by vendor along with the technical quote.</p> <p>12.1) Vendor should furnish the list of supplier's viz. to aerospace / defence / PSU type industries to which identical / similar machines have been supplied within past 5 years and are in operation.</p> <p>12.2) Supplier shall furnish details like PO copy with complete details of the buyer such as mailing address, contact person's name, fax phone and email address etc.</p> <p>12.3) LPSC reserves the right to verify the information provided by the suppliers. In case the information provided found to be incorrect or false, the offers shall be summarily rejected.</p> <p>12.4) For tender evaluation quotations of the machines that is already in the market shall only be considered.</p> <p>12.5) The offer will be ignored / disqualified in case the supplier is designing and manufacturing the machine for the first time to our specification.</p>	Yes / No / Explain		
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13	13.AMC contract	<p>13.1)Party shall quote separately for Non-comprehensive AMC (Annual Maintenance Contract) for the offered machine for a period of three years after completion of warranty (or after completion of extended warranty, whichever may be the case.)</p> <p>13.2)AMC shall include two preventive maintenance visits in one year and unlimited number of breakdown calls during the contract period. AMC will be placed on supplier or supplier's agent in Indian rupees. AMC rates shall be quoted separately with details of rates for each year for preventive as well as breakdown visits. However, LPSC reserves the right to enter into AMC after warranty period.</p>	Yes / No / Explain		
14	14.After Sale Support	The supplier shall guarantee supply of spares, service and extend AMC support for a period of minimum 10 years from the date of installation, commissioning and acceptance of the machine	Yes / No / Explain		

15	15.Documentation	<p>3 sets of following documents printed in English language shall be supplied along with the machine:</p> <p>15.1) Operator manual  15.2) Machine programming manual  15.3) List of spare parts and its usage  15.4) Electrical and Electronic circuit diagram for control system, DC/AC drives and interface for component level trouble shooting.  15.5) Preventive maintenance check list for stipulated period(s) including trouble shooting charts and guidelines.  15.6) Machine maintenance drawings.  15.7) Special tools for maintenance of machine  15.8) One set of standard tool drawings.</p>	Yes / No / Explain		
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16	16. Party's shall submit following technical details in their quote	<p>16.1) Printed catalogue of the machine detailing major elements, machine description, features, overall size, weight and effective floor area needed.</p> <p>16.2) Detailed technical specifications for each parameter as mentioned in the above table including additional technical details and specific features, if any.</p> <p>16.3) Details of standard safety features available in the machine and additional safety features that can be provided by attaching extra accessories.</p> <p>16.4) Details of the additional accessories for value addition, including part no. location on the machine and its usage.</p> <p>16.5) Applicable international standards compliance for safety, electrical and mechanical items.</p> <p>16.6) Duly filled compliance matrix enclosed.</p>	Yes / No / Explain		
17	17. Compliance	The Supplier shall provide detailed specification of the quoted product and one-to one compliance table as per the technical specifications. The offer should be complete with compliance statement for each of the specifications, offering features, and optional items. Indicating merely 'YES', 'NO', or 'OKAY' in the compliance statement will not be considered	Yes / No / Explain		
18	18. Make In India Category	Class I/Class II	Yes / No / Explain		

19	19.Payment Terms	90% of PO value including taxes on receipt of items at LPSC, Valiamala after successful PDI by LPSC engineers at party's site. Balance 10% payment on completion of Installation, commissioning, demonstration, training and acceptance of item at LPSC Valiamala.	Yes / No / Explain		
20	20.Mode of Tender	This indent is processed on two-part tendering basis. Part 1 is Techno commercial bid and Part 2 is price bid. Party shall not provide any price related details in the techno-commercial bid ( Part-1).	Yes / No / Explain		
21	21.Delivery Period	Item shall be delivered within 10 months from the date of release of purchase order.	Yes / No / Explain		

### Supporting Documents required from Vendor

1. As per serial No.15 of the general specification
2. Compliance Matrix / Statement as per indent specification
3. As per serial No.16 of the general specification along with technical specifications.

5 additional documents can be uploaded by the vendor



## C.2 Commercial Terms / Bid

Sl. No.	Description	Compliance	Vendor Terms
1	ISRO is eligible for Customs Duty Concession vide Notification No. 050/2017 539 A-CUSTOMS DTD. 30.06.2017 [We will provide Customs Duty Concession Certificate for bought out items being imported for manufacturing the ordered items (List of items to be imported with quantities to be enclosed along with offer) OR for Orders placed on Foreign Vendors OR for High Sea Sale orders)	Yes / No / Explain	
2	Installation Charges, if any shall be mentioned (If mentioned as EXTRA OR INCLUDED in your quote, please mention the percentage in Vendor Terms Column).	Yes / No / Explain	
3	Payment Term: 100% payment shall be made through RTGS within 30 days of receipt and acceptance of the item at our site.	Yes / No / Explain	
4	P & F charges, if any, shall be mentioned (If mentioned as EXTRA OR INCLUDED in your quote, please mention the percentage in Vendor Terms Column).	Yes / No / Explain	
5	Delivery Term: FOR: LPSC, VALIAMALA	Yes / No / Explain	
6	Freight charges, if any, shall be mentioned (If mentioned as EXTRA OR INCLUDED in your quote, please mention the percentage in Vendor Terms Column).	Yes / No / Explain	
7	Whether applicable GST percentage mentioned in offer (If mentioned as EXTRA OR INCLUDED in your quote, please mention the percentage in Vendor Terms Column).	Yes / No / Explain	
8	Delivery Period (If any specific delivery period is mentioned in the tender, please comply the same. If not agreed, please mention your delivery period in Vendor Terms column OR if already mentioned in your quote please mention as already furnished in the quote)	Yes / No / Explain	

9	Liquidated Damages (LD) If the ordered items are not supplied within the delivery schedule, LD shall be levied from your bill @ 0.5% per week for the undelivered items subject to a maximum of 10% of the order value for the delayed period.	Yes / No / Explain	
10	Warranty: Warranty for the offered item shall be from the date of installation/acceptance of the item at our site for a minimum period of one year or as specified in the tender document.	Yes / No / Explain	
11	Security Deposit (SD) (only for order value above Rs.5 Lakh): You have to furnish a Bank Guarantee from a Nationalised / Scheduled Bank in 200 Rs. Stamp Paper for 3% of the order value within 10 days of receipt of Order towards the faithful execution of the order valid till the completion of the scope of work as per order plus sixty days. (This will be returned to you immediately on execution of the order satisfactorily as per order terms. In case of non-performance / poor performance, the amount will be forfeited).	Yes / No / Explain	
12	Performance Bank Guarantee (PBG) : You have to submit a PBG from a Nationalised / Scheduled Bank in 200 Rs. Stamp Paper for 3% of the order value towards the performance of the system at the time of supply valid till the completion of warranty period plus 60 days as per the format provided by the Department. OR 3% OF THE ORDER VALUE SHALL BE WITH HELD TILL THE COMPLETION OF WARRANTY PERIOD PLUS 60 DAYS.	Yes / No / Explain	
13	In case, if parties are unable to provide two separate BGs, i.e., one for SD and one for PBG, they can submit a combined BG for SD & PBG within 10 days of receipt of order for 3% of order value valid till the completion of total contractual obligation (i.e., supply period plus warranty period plus 60 days) as per the format provided by the Department.	Yes / No / Explain	

14	Insurance : Being a Govt. Of India Dept., Insurance is not required at our cost. Please ensure the safe delivery of the ordered item with proper AIR / SEA / ROAD worthy packing	Yes / No / Explain	
15	Validity of Offer : (a)The validity of the offers should be 90 days (in case of single part tender) from the date of opening of the tenders. (b)The validity of the offers should be 120 days (in case two part tender) from the date of opening of the tenders.  Note :-Tenders having shorter offer validity will not be considered for evaluation	Yes / No / Explain	
16	Bank Details, viz., Bank Name, Branch, Address, Account No., IFSC (Details to be given in Vendor Terms Column)	Yes / No / Explain	
17	PAN No. (Details to be furnished in Vendor Terms Column)	Yes / No / Explain	
18	GST No. (Details to be given in Vendor Terms Column)	Yes / No / Explain	
19	Purchase Order to be placed on whom (Please mention the Address, Phone No. & E-mail id )	Yes / No / Explain	
20	Local content involved in the quoted item shall be declared/ certified in percentage.	Yes / No / Explain	
21	Furnish the details of place(s) where the value addition for the quoted item takes place.	Yes / No / Explain	
22	State whether MSE or not. If yes, please provide the necessary documentary proof	Yes / No / Explain	
23	HSN Code of offered items	Yes / No / Explain	
24	Other terms, if any shall be mentioned in Vendor Terms column	Yes / No / Explain	

### C.3 Price Bid

Sl. No.	Item	Quantity	Unit Price	Currency	Total Price	Other Costs, if any	Remark
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1	TUBE BENDER Supply, Installation, Commissioning and Demonstration(Including Packing, Forwarding & Transportation) of Multi axis, CNC Tube bending machine with Simulation Software and essential accessories for safe operation of the machine.	1.00 Nos.		-			
2	Die and tooling Standard Tooling for CNC Tube Bending Machine, Tube OD:1/4", Centre Line Radius(CLR):9/16"	1.00 Sets		-			
3	Die and tooling Standard Tooling for CNC Tube Bending Machine, Tube OD:6 mm, Centre Line Radius(CLR):15 mm	1.00 Sets		-			

4	Die and tooling Standard Tooling for CNC Tube Bending Machine, Tube OD:8 mm, Centre Line Radius(CL R):15 mm	1.00 Sets		-			
5	Die and tooling Standard Tooling for CNC Tube Bending Machine, Tube OD:8 mm, Centre Line Radius(CL R):24 mm	1.00 Sets		-			
6	Die and tooling Standard Tooling for CNC Tube Bending Machine, Tube OD:10 mm, Centre Line Radius(CL R):24 mm	1.00 Sets		-			
7	Die and tooling Standard Tooling for CNC Tube Bending Machine, Tube OD:12 mm, Centre Line Radius(CL R):38 mm	1.00 Sets		-			
8	Die and tooling Standard Tooling for CNC Tube Bending Machine, Tube OD:19 mm, Centre Line Radius(CL R):56 mm	1.00 Sets		-			

9	Die and tooling Standard Tooling for CNC Tube Bending Machine, Tube OD:20 mm, Centre Line Radius(CL R):56 mm	1.00 Sets		-			
10	Die and tooling Standard Tooling for CNC Tube Bending Machine, Tube OD:25 mm, Centre Line Radius(CL R):82 mm	1.00 Sets		-			
11	Die and tooling Standard Tooling for CNC Tube Bending Machine, Tube OD:30 mm, Centre Line Radius(CL R):112 mm	1.00 Sets		-			

**Common charges (Applicable for all items)**

<b>Additional Costs, if any</b>	
<b>Additional Costs, if any (Value)</b>	