

## **Annexure 1: Specification for Fabrication of Mixer**

### **1. Introduction**

This requirement is for fabrication of mixer using micro machining process. This component is made of two halves, named 1) Mixer Bottom and 2) Mixer Top. Mating plane of both halves are having micron scale cavities/features. Alignment of these cavities are very critical and in the order of 10 microns. Provision of dowel pins are provided for alignment of both cavities. Once both cavities are aligned using dowels, both halves will be assembled using screws. Drawings of both the halves are enclosed for reference.

1. Drawing Title: TDP MIXER TOP; Drawing No.: MMDD-TDP-230MIX-AL-TOP-01
2. Drawing Title: TDP MIXER BOTTOM; Drawing No.: MMDD-TDP-230MIX-AL-BOTTOM-01

### **2. Scope of Work**

Scope of work includes fabrication of mixer bottom and mixer top. Material for fabrication is Al 6061-T6 and pre-machined blocks will be provided by SAC as free issue material for further fabrication of micro-machined features, precision alignment features & mounting interfaces on mixer bottom and top. Refer following enclosed drawings for details of premachined mixer top and bottom parts.

1. Drg. Title: TDP MIXER TOP – Pre Micromachining and Drawing No.: MMDD-TDP-230MIX-AL-PMT-01
2. Drg. Title: TDP MIXER BOTTOM – Pre Micromachining and Drawing No.: MMDD-TDP-230MIX-AL-PMB-01

Pre-machined blocks of mixer top – 3 Nos. and mixer bottom – 3 Nos. will be provided by SAC and using the drawings mentioned in the introduction, manufacturer has to fabricate the top & bottom mixer. One additional pre-machined block of mixer top and bottom will be provided for machining trials and optimization of machine parameters before starting the machining of final products. All 6 pieces should be returned to SAC once work is completed.

#### **SAC's Responsibility:**

- a. Supply of pre-machined blocks as free issue material to manufacturer.
- b. Review of all dimensional test reports after completion of fabrication and issue clearance for dispatch.

#### **Manufacturer's Responsibility:**

- a. Review of all four drawings (pre-machining & final) and communicate acceptance for micro machining and associated features as per drawings along with technical bid.
- b. In case any clarification is required in the drawings or any additional machining allowance is required on the pre-machined blocks, same is to be communicated along with the technical bid.
- c. Conducting machining trials after receipt of pre-machined blocks and optimization of machining parameters.

- d. Generating alignment references on both parts and machining of mixer top and mixer bottom as per the enclosed drawings. Note:- The tolerances on dimensions and geometrical features are of paramount importance and must be maintained as per the drawings.
- e. Hole drilling and tapping on both parts for joining both halves.
- f. Machining on base and three faces after joining both halves to achieve same plane for mounting of mating components as mentioned in the drawings.
- g. Disassembly of both halves and measurement of all features given in both the drawings including flatness, parallelism, perpendicularity.
- h. Measurement of Taper with respect to width and depth of micron-scale cavities made on mixer top and bottom.

**Note:**

- Read all notes and details given in the drawings carefully.
- Scope of supply includes fabrication of dowel pins as per the details given in Drawing title “TDP Mixer Top” using Austenitic Stainless Steel (SS304/316).
- **Drawing and Models:** Soft copy of drawings – 4 Nos. (in pdf format) as mentioned in the “Introduction” and “Scope of Work” and CAD models are available in form of step files as an attachment in the drawings. Manufacturer shall carefully study the drawings and models with special attention to notes.

**3. Deliverables**

Sl. No.	Item Description	Quantity	Remarks
a.	Mixer Top as per Drg. No. MMDD-TDP-230MIX-AL-TOP-01	2 Nos.	Dowel Pins – 4 Nos. are to be provided on each part
b.	Mixer Bottom as per Drg. No. MMDD-TDP-230MIX-AL-BOTTOM-01	2 Nos.	Dowel Pins – 2 Nos. are to be provided on each part
c.	Trial specimen of mixer top	1 No.	-
d.	Trial specimen of mixer bottom	1 No.	-
e.	Dimensional Inspection Report(s)	1 Set	As described in scope of supply

**Handling and Transportation:**

These fabricated mixer blocks are to be handled with utmost care & precaution must be exercised to avoid any scratch or dent mark. All parts are to be separately packed using proper packaging material to avoid any damage during transportation

#### 4. Delivery Period and Milestones

Delivery period for fabrication of mixer is **16 weeks** from the date of Purchase Order. After placement of P.O., pre-machined blocks will be provided to Manufacturer.

During entire duration of the P.O., SAC representative will monitor the activities. Manufacturer has to provide all required support for in-stage inspection to monitor the progress of the work.

Sl. No.	Activity / Milestone	Timeline
a	Placement of order	T0
b	Supply of Pre-machined blocks 1) 3 Nos. for Mixer Top and 2) 3 Nos. for Mixer Bottom	T0 + 4 weeks
c	Delivery as per scope given in Section 3 Deliverables	<b>T0 + 16 weeks</b>

**Note:**

- T0 is the Date of Purchase Order.

#### 5. Non-Disclosure Clause and Intellectual Property Rights

Acceptance of Purchase Order construes that vendor has agreed to Non-disclosure Agreement for not using and disclosing, for any purpose, any drawing and models of Space Applications Centre or any other unit of Indian Space Research Organization without written approval from Space Applications Centre. All intellectual property rights belong to Space Applications Centre, ISRO.

#### 6. Vendor/Manufacturer Qualification Criteria

Offers from those manufacturers will be considered for evaluation who have prior experience of micro machining on metal components using precision micro machining processes. Suitable documents in form of P.O./MoU/Technical Publication is to be submitted along with the technical bid. If bidder has not submitted documentary evidence as mentioned above, their offer will be summarily rejected.

#### 7. General Instructions to Bidders

Bidders should carefully read the specifications and enclosed drawings and offer their remarks in form of Compliance/Non-compliance. Bidder has to explicitly provide response against each specification point given in the “Bidder response” column. In case response against any specification clause is not provided either in the form of compliance or non-compliance, offer submitted by the bidder will be summarily rejected.

Bidder shall submit the documents as asked in the qualification criteria. In case Bidder has not submitted required documents as asked, offer submitted by the bidder will be summarily rejected.

## 8. Bidder Response Table

Sl. No.	Qualification Criteria	Bidder Response (Documents to be submitted along with Technical Bid)
1	<b>Prior work experience:</b> Micro machining on metal components using precision micro machining process.	Bidder shall enclose copy of Purchase Order/MoU/Technical publication as an evidence for carrying out micro-machining work.
Sl. No.	Description/ Bid Documentation	Bidder Response (Compliance/Non-Compliance)
The following documents/details(in English) shall be provided by the Bidder along with the quotation		
1	Scope of Work as per Section 2	
2	Acceptability of drawings -4 Nos. for scope of work mentioned in Section 2 along with remarks or observations if any	
3	Deliverables as per Section 3 of Specification	
4	Delivery Period and Milestones as per Section 4 of Specification	
5	Non-Disclosure Clause and Intellectual Property Rights as per Section 5 of Specification	
6	A. Details such as Machine Make, Max Spindle Speed and Spindle run out of proposed machine to be used for this work. B. Make of tool & sizes.	Provide necessary details along with the technical bid.
<b>The following documents (in English) shall be provided by the Bidder after fabrication and inspection of Mixer</b>		
7	Dimensional Inspection Report	