Government of India
Bhabha Atomic Research Centre
Multidisciplinary Research Group
Applied Physics Division

ENQUIRY

Ref: APD/CB/MF/22/MDK/410/P-28796 10/03/2022

Sub: - **"Supply and warranty of LF2 Flanges fabrication and related jobs''**

Due Date: 21/03/2022

Dear Sirs,

1. Quotations are invited for the minor fabrication job, as per the enclosed specifications and drawings.
2. Bidder shall quote for fabrication of these components with material.
3. Bidder shall take out an insurance policy in favor of BARC for any free issue material supplied.
4. Taxes shall be quoted separately. Form H shall be provided where necessary.
5. The quotations must reach Head, Applied Physics Division on or before the due date referred.
6. **The bidders must quote in a two-part tendering system**, which means that they will mention the technical specifications and financial terms in separate sealed envelopes, clearly mentioning which is which. These two separate envelopes viz. technical and financial will be enclosed in a bigger sealed envelope super scribed with the above reference number and due date.
6. The address on the envelope should read:

The Head,
Applied Physics Division, PURNIMA LABS,
Bhabha Atomic Research Centre
Trombay, Mumbai - 400 085.
Attn: **Mr. Mahesh D. Kale**

7. The fabrication work shall be subject to inspection by our representative. The finished components shall not be dispatched prior to approval by our representative at the bidder's works. Necessary inspection facilities should be provided to our engineers during fabrication at bidder's premises.
8. The bidder shall deliver the finished components after approval by our representative, within 45 days from the date of the firm purchase order issued to the bidder. The finished components shall be delivered by the bidder at **Applied Physics Division, Purnima Laboratory, (Near Plutonium Plant), Bhabha Atomic Research Centre, Trombay, Mumbai-400 085**.
9. Head, Applied Physics Division, BARC, reserves the right to accept/reject any or all quotations without assigning any reason.
10. Payment will be made by cheque only after satisfactory completion of work on production of bill, delivery challan and advance stamped receipt. It may be noted that IT @ 2% and surcharge on tax at 15% shall be deducted from your bills.
11. Job will be guaranteed against material and manufacturing defects for 1 year from the date of supply.

(Mr. Mahesh D. Kale)
For and on behalf of
Head, Applied Physics Division

Technical Specification
for
LF2 FLANGES, FABRICATION & RELATED JOBS.

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Technical Specification for

SA350LF2 FLANGES, FABRICATION & RELATED JOBS.

1. **SCOPE OF WORK:** Fabrication, Assembly, and Supply of SA350LF2 flanges, high pressure test chamber and related structural enclosure with as per drawings and detailed specifications.

The detailed scope of work is as follows:

a. Preparation of detailed method of fabrication for all below mentioned jobs and submission to BARC in technical part of quotation/offer.

b. Preparation of GA, part drawings with BOM and getting BARC approval post PO.

c. Preparation of QAP and submission to BARC for approval post PO.

d. Raw Material identification, Procurement and testing post PO.

e. Performance evaluation of the system at suppliers site as per the Factory Acceptance Test Criteria post PO.

f. Packing, Transportation, supply and delivery of the items covered under work order to EHPPL, BARC, Kalyan post PO.

2. **COMPONENTS:**

a. The tendered item is required for optical ports.

b. The various components associated with optical ports and their quantity under the scope of work are given below in table form:

Sr. No.	Job/Work	Quantity	Remarks
1	H &T BOLT M27X120LG	30 NOS	
2	H &T NUT M27	12 nos.	
3	HEAVY DUTY WASHER FOR M27 BOLT	12 nos.	
4	SA350GLF2 flange with chemical and physical reports with lifting arrangement.	04 Nos.	Draft drawing as per Annexure-1
5	SS flange	04 Nos.	
6	Design & Development of PRESSURE TESTING CHAMBER WITH INLET & OUTLET 1/4" & VALVES for above flanges.	01 No.	Draft drawing as per Annexure-2
7	Trapezoidal Plates	02 Nos.	Draft drawing as per Annexure-3
8	Acrylic Holder	02 Nos.	
9	Wooden Table	02 Nos.	
10	Delrin studs with Heli-coil arrangement	18 Nos.	

3. SCOPE OF DRAWINGS, APPLICABLE CODES AND STANDARDS:

3.1 Scope of Drawings: **Drawings enclosed are draft drawings for estimation purpose only.** Supplier shall make his own design and fabrication drawings after verification of design for desired functionality and operating requirement and get it approved by the purchaser before starting the fabrication of job. Minor changes can be done by indenter at any time which should in-corporate by fabricator without any charge.

3.2 Preparation of detailed manufacturing drawing: All parts should have unique identification numbers mentioned in drawing for ease.

Important:

The supplier has to visit the site before submitting the quote to understand the work involved, quantum of the work etc.

- Purchaser reserves the right to make necessary changes in the fabrication drawings during approval process.
- Purchaser also reserves the right to make some minor modifications during the stages of the fabrication. These modifications shall also be within the scope of the work without any extra cost.

3.3 Applicable codes, standards and guides:

Sr no.	Detail	Code / standards/Guides
1	Manufacturing and fabrication	ASME Section VIII, Div I
2	Material spec FLANGES Nuts and washers	 350GFLF2 Grade. High tensile steel as per IS-3757
3	ALUMINIUM	6061T6

4. QUANTITY: AS PER BOM

5. MATERIAL:

i. **Chemical composition:**

ii. Mechanical Testing

iii. Uniform thickness of Aluminium.

5.1 Test certificate for all materials required from Government of India recognized NABL labs should be provided.

5.2 Acceptance criteria:

i. A sample from same lot block should be taken for testing from NABL laboratory.

ii. Density of all materials should be measured and it should be same for all.

5.3 Material Procurement: The vendor shall procure all materials after purchaser's approval. All materials used shall be in accordance with relevant codes & standards. All material shall be new and purchased from reputed manufacturer/supplier. The vendor will ensure the compliance of all bought out materials to standards and quality stipulated in the specifications and shall provide all necessary material mill / test certificates or shall be validated by a government approved test laboratory at vendor's cost for chemical composition.

5.4 All fasteners used shall be suitable grades of Steel & make Unbrako/APL or Kundan.

6. **FREE ISSUE MATERIAL (FIM):** No FIM issued to fabricator.
7. **CLEANING, DEGREASING AND ACID CLEANING:** All the materials shall be cleaned, degreased to remove scale, oxide, oil, chips and other foreign materials etc. before any fabrication activity. All scale, oxide, weld spatter, oil, chips and other foreign material shall be completely removed on both side after completion of fabrication.
8. **CUTTING OF MATERIAL:** All material should be cut preferably by mechanical cutting process like shearing/hacksaw. For higher thickness, inert gas plasma cutting process may be adopted ensuring adequate edge allowance for complete removal of Heat Affected Zone (HAZ). Trimming of HAZ shall follow all plasma-cutting operations, by grinding or any other mechanical operation. During fabrication, the prepared edges of blocks shall be examined to detect defects such as lamination, cracks etc. All defects shall be removed /repaired as per procedure approved by the purchaser, and the repaired area shall be offered to the Inspector/Purchaser.
9. **WELDING:**
    a. Welding processes and filler metals: SMAW Welding process may be used with the electrodes approved by the purchaser's representative. The electrodes to be used are ER 7018 types.
    b. Edges to be welded shall be uniform and free of all foreign material. Parts to be welded shall be fitted, aligned and retained in position during the welding operation.
    c. Surfaces to be welded shall be clean and made free from foreign material such as grease, oil, lubricants and marking paints for a distance of at least 25 mm from the weld preparation area.
    d. Finished joints: Joints shall have complete penetration and shall be free from cracks, undercuts, overlaps, abrupt ridges or valleys. Fillet welds shall have complete fusion at the root of the fillet.
    e. All components shall be adequately supported during fabrication/testing to avoid any distortion, deflection, etc., and extreme care shall be taken in handling the materials at all stages of fabrication/ testing so as not to cause any damage. All butt welds shall be full penetration 'V' groove weld joints, back chipped & welded whenever accessible. All fillet welds shall be continuous welds.
    f. The fabricated components shall be assembled as per the drawing to achieved the desired functionality. Any minor modification required to achieve the desired functionality (up to 5 % of value) shall be carried out at no additional cost.
10. **MACHINING OF COMPONENTS:**
    a. The base plate shall be machined to achieve good surface finish.
    b. The fabricated block shall be machined to achieve good surface finish and the necessary parallelism between each other. This is to ensure the vertically block assembly can be verified by using Engineering Spirit level.
    c. The top sliding frame with roller assembly shall have the components machined to desired surface finish for smooth operation.
    d. The supplier shall submit proper part drawing with necessary dimensional / geometric tolerance for desired functionality and get purchasers approval. The firm should have adequate tools/instrument for measuring and establishing the desired geometric and dimensional features of the component as per the approved part drawing.

e. Supplier shall furnish as built dimension of the all components.

11. QUALITY CONTROL / INSPECTION AND TESTING: Quality Control: The vendor in his bid shall offer a detailed Quality Assurance Plan (QAP). The QAP offered shall be reviewed and a mutually agreed QAP to ensure the quality of the end product shall be prepared after placement of the order. The QAP shall be under review during fabrication process and in case it is observed that the desired quality is not being achieved at any stage of manufacturing, the QAP shall be modified accordingly if required. The changes thus made shall be binding on the vendor.

This Quality Assurance Plan includes the following:

a. Raw Material Testing, Manufacturing operations, In- Process Inspection stages, Final Testing methods in sequence.

b. Procedure such as machining, welding, weld sequencing and cleaning procedures.

c. Stage Inspection: The purchaser shall have access at all reasonable times to all shops and the sub-contractors where the work is being fabricated / assembled. All reasonable facilities required for the inspection shall be provided. Inspection and test records shall be maintained.

12. WORKMANSHIP: The workmanship shall be of high-grade quality and in accordance with the best practice of fabrication of different components. All edges and corners shall be smooth and round, machined surfaces shall be free from scratches, weld-lines shall be straight and ground to regular pattern and equipment surface shall be free from cuts, punch marks, patches and strips etc.

13. CLEANLINESS & SURFACE FINISH

a. All welds shall have smooth contour and merge smoothly into the parent metal. The welds on the inside surface of equipment are to be ground smooth and flush with the parent metal.

b. All scales, dents, burrs, weld spatter, oxide, oil and other foreign materials shall be completely removed from inside and outside of the equipment. Items that will not permit their cleaning after complete fabrication shall be cleaned prior to assembly.

d. Weld shall be smooth and free from surface irregularities. Hammering on weld is not permitted. Removal of undercut when carried out shall not result in under flushing of the parent plate.

e. Fabricator shall take care to see that all chemicals/materials used for cleaning, marking and degreasing etc. are iron, halogen and sulphur free.

f. Block surface and edge shall be smooth and free from surface irregularities.

14. PAINTING: All surfaces of structure and Cadmium shall be cleaned thoroughly. All oils and greases shall be removed prior to painting. One coat of EPOXY primer (60 micron) and two coats golden yellow (@ 125 micron) shall be provided at the supplier's works. Minimum DFT (Dry Film Thickness) shall not be less than 150 microns.

15. INSPECTION, TESTING & PRE-DISPATCH ACCEPTANCE CRITERIA:

a. BARC Engineer will carry out the stage wise as well as final inspection. The supplier shall arrange all the arrangements required for the inspection.

b. However, inspection by the purchaser shall not relieve the contractor from his responsibilities of the requirements specified.

c. The inspector shall be permitted free access, at all times while work on the fabrication is being performed, to all parts of the fabricator's shop

d. The inspector shall inspect the machined components for the designed dimensions, tolerance and the various geometric features indicated in approved shop drawing.

Any Modification arising after assembly required for desired modification shall be carried out the supplier at no additional cost

16. **GENERAL REQUIREMENTS:** The fabricator shall be responsible for performing all the inspection and testing required as per this specification. The fabricator shall have a full-fledged quality assurance department equipped with calibrated testing instruments and qualified staff to carry out the work. If any part of quality assurance work is proposed to be sub-contracted to outside agencies, the same should be clarified in the offer. The fabricator shall submit for Purchaser's approval a detailed Quality Assurance Plan (QAP) for fabrication of these equipment. The fabricator or the sub-contractor/ sub-vendor employed shall have adequate and appropriate instrumentation for inspection and testing. All the instruments used in the inspection/ testing shall be calibrated and shall have a valid calibration certificate. The fabricator shall demonstrate the calibration of instruments used to BARC or its designated QA, in case of any uncertainty arising there off.

17. **SUB-CONTRACTORS/ SUB-VENDORS:**

a. Sub-contracting of the work shall not be permitted. Fabricator shall make clear in his offer the names and full details of the sub-vendors whom they propose to employ for part work and also specify which all parts of the work are proposed to be sub-contracted. The sub vendor selected by supplier shall have adequate experience in similar works as required by the tender and the same may be verified by the indenter prior to placement of order.

b. The facilities of the sub-vendor shall be subject to inspection and approval of the Purchaser before start of fabrication. Written procedures with regard to the work to be carried out by the sub-vendor shall be submitted by the fabricator that shall also be subject to approval by the Purchaser.

18. **PRE-REQUISITES FOR OFFER**

a. Offers from the firms with prior experience in design & manufacture of similar type of equipment only will be accepted. The firm shall provide the details of similar work executed in the past, along with offer.

b. The firm shall have prior experience of fabrication of similar item etc. and may provide details of the work in their offer.

c. The offer shall clearly mention make of bought out items, are of excellent quality for reliable and durable operation of the equipment as per the specification.

19. **DOCUMENTATION:** The supplier shall also provide under mentioned documents:

a. Design, Fabrication & As built drawings of individual components.

b. Approved Assembly Drawing to the Inspecting authority while inspecting.

c. Material test certificates for chemical composition of the raw material of the original manufacturer / test carried out supplier through approved lab shall be furnished by the supplier and approved by the BARC.

d. Supplier shall submit the dimensional inspection record showing finally achieved dimensions of components and assemblies against the designed dimensions. Similarly, it should also mention all the geometrical features and tolerances of the components and what was finally achieved.

e. The relevant test certificate of bought out components with detailed catalogue.

f. Supplier shall provide the two set of final as built drawings of assembly and parts in hard copy as well as soft (AUTO CAD) format.

A set of 2 (Two) nos. all mentioned above documents shall be submitted by the fabricator to Purchaser for reference and records in a single documentation docket.

PACKING & TRANSPORTATION: After carrying out the tests at manufacturing works as specified in this tender specification and after match marking, the equipment covered in the contract shall be carefully disassembled into major completed subassemblies and then properly packed, suitably crated and protected from damage during transport, transit and storage at site. The material shall be transported to destination at, Assistant Stores Officer, EHPPL, Kalyan, Mumbai

Safety of the items been transported shall be the responsibility of supplier. Supplier shall make arrangement to deliver the goods safely to the respective stores mentioned above.

20. GUARANTEE: The item covered under this work order shall be guaranteed for satisfactory performance against manufacturing defects and faulty workmanship, for period of 12 months from the date of supply. If the item becomes defective during this period, the contractor shall be responsible for making arrangement for repair/ replacement at his own cost.

21. COMPLETION PERIOD: The work covered by this order shall be completed within 60 days from the date of issue of Work Order.

22. OTHER REQUIREMENTS:

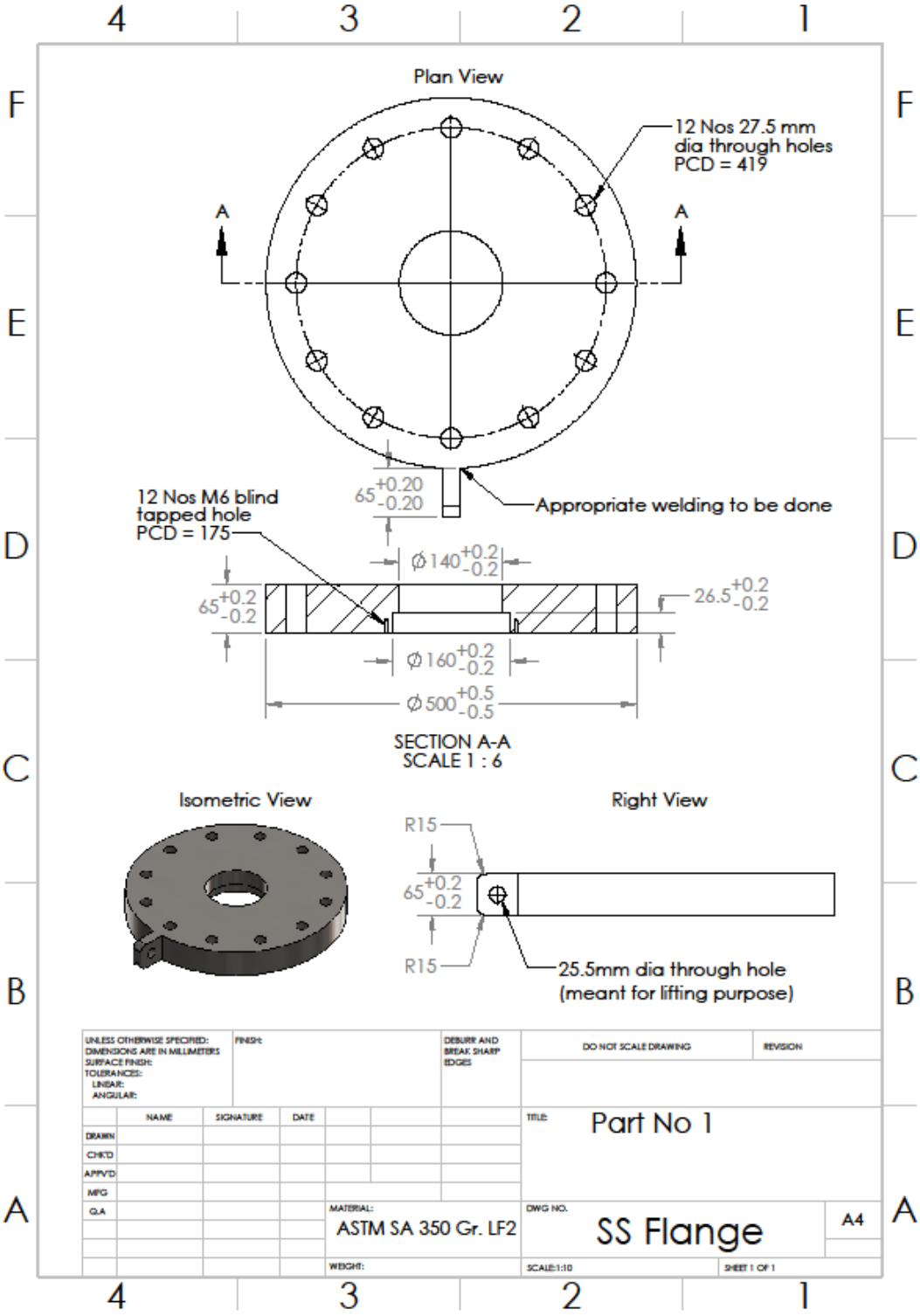
a. The supplier shall acknowledge the receipt of the said work order.

b. Bill of materials shall be prepared by the supplier based on the scope drawing and the same shall be submitted for the approval from BARC.

c. Due care shall be taken during packing and transportation of equipment to avoid any damage to the equipment.

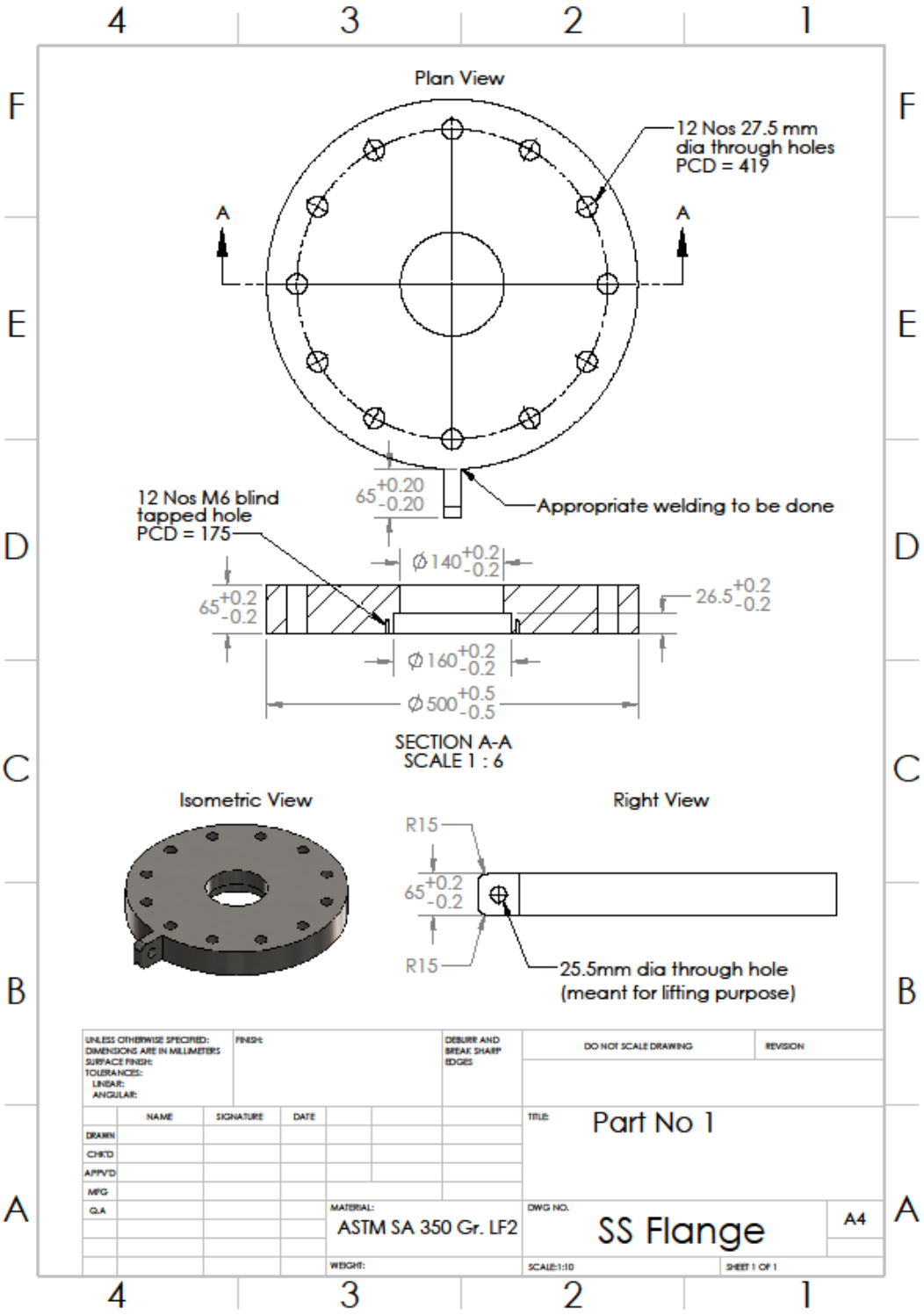
ANNEXURE-1

SA350LF2 FLANGES



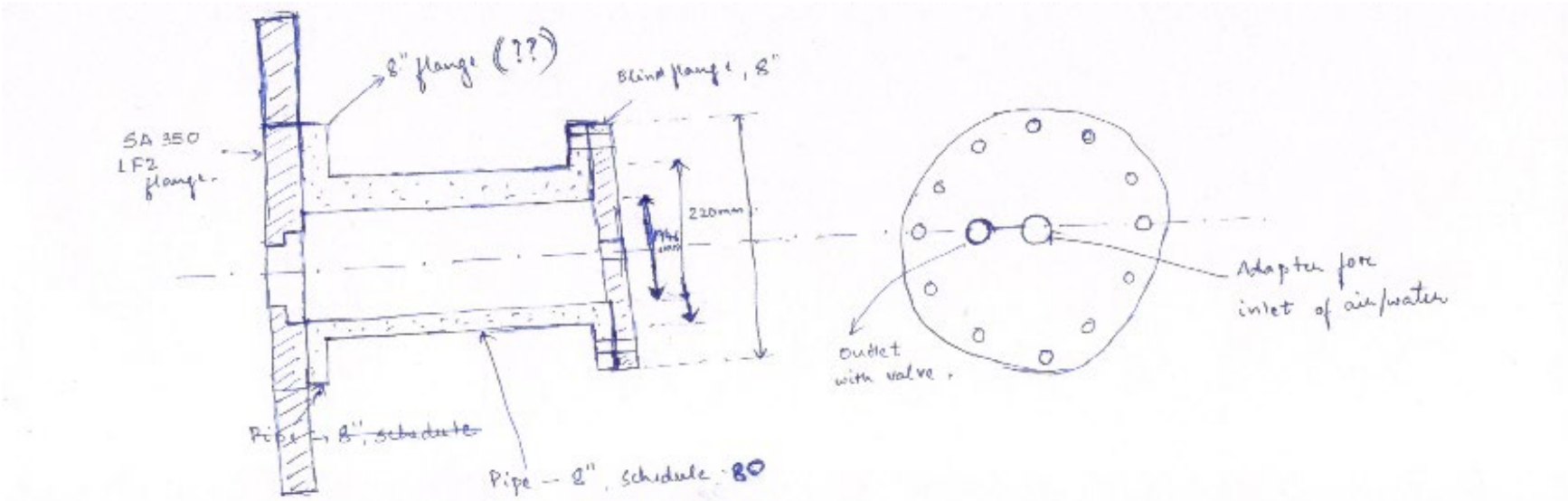
ANNEXURE-1

SS FLANGE



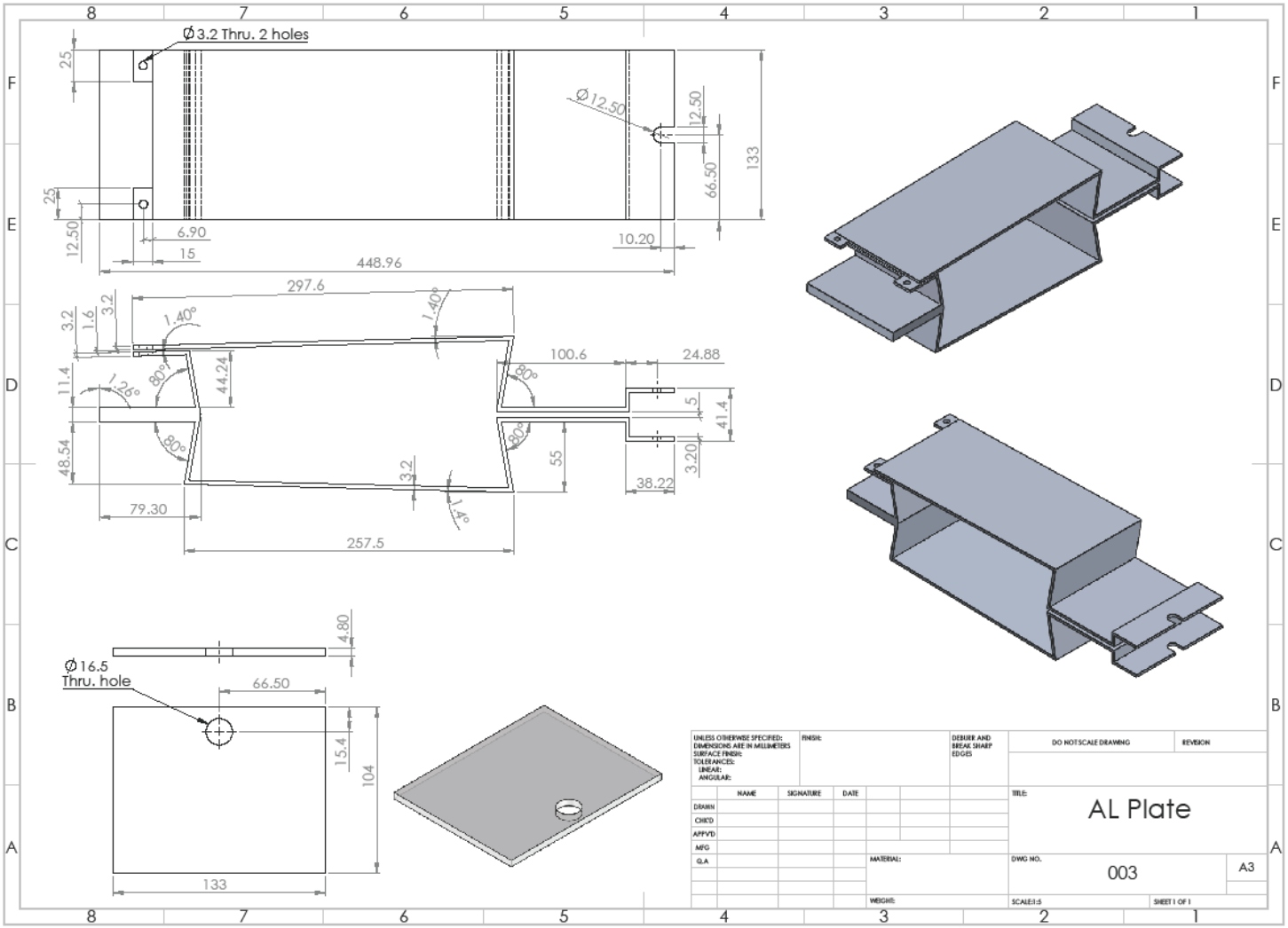
ANNEXURE-2

PRESSURE TESTING CHAMBER



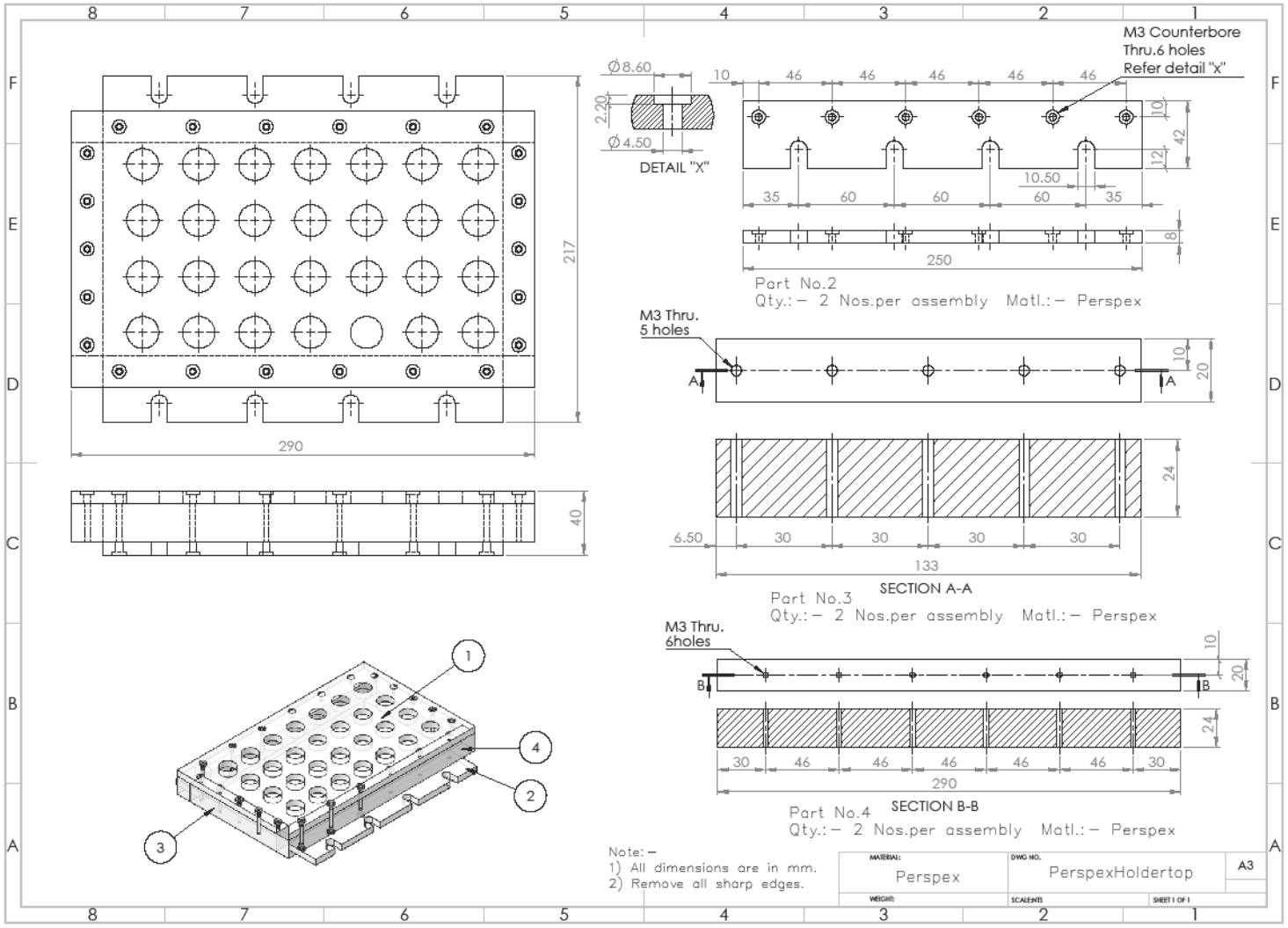
ANNEXURE-3

TRAPEZOIDAL PLATES



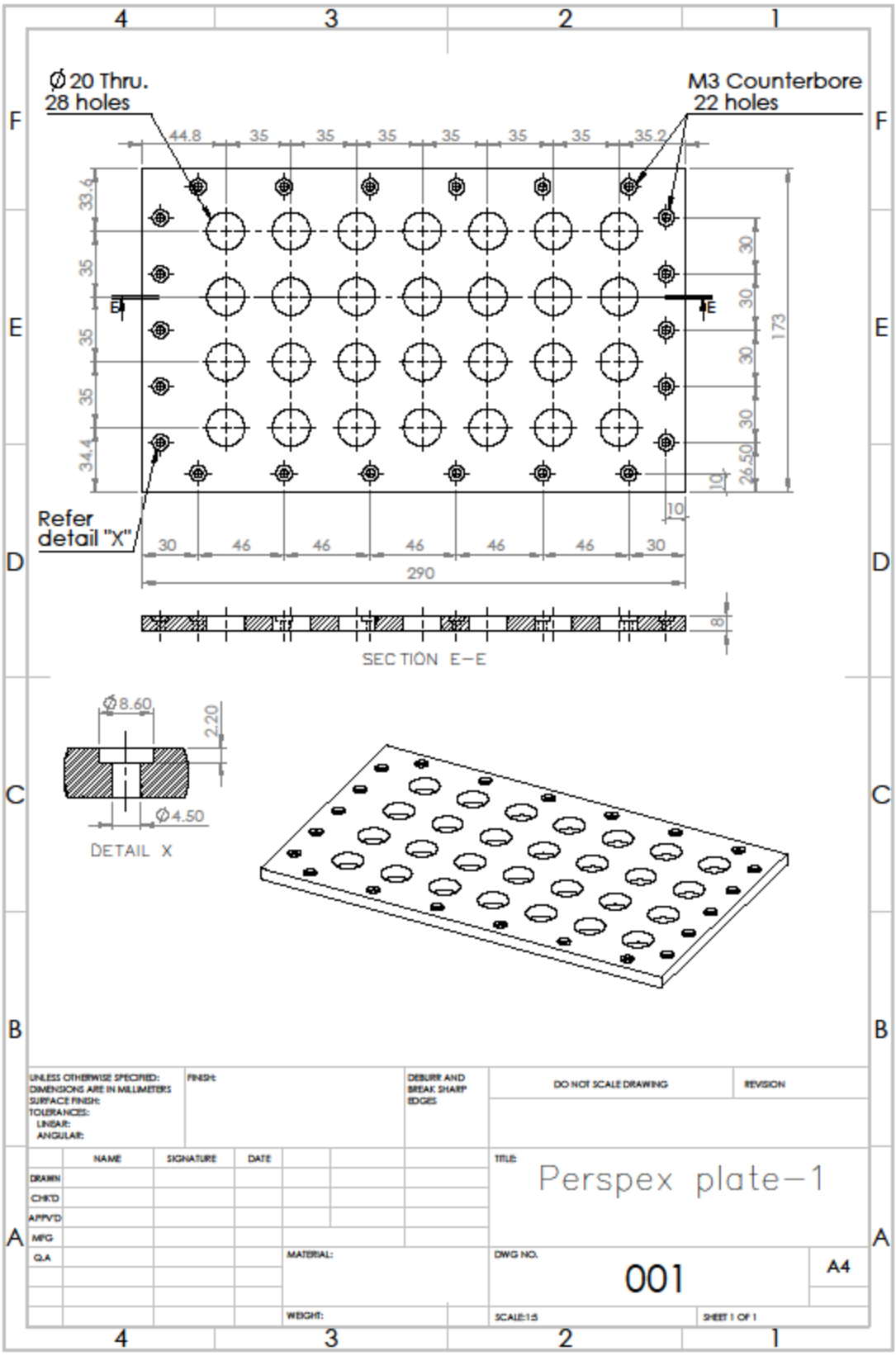
ANNEXURE-3

ACRYLIC HOLDER (Part-1)



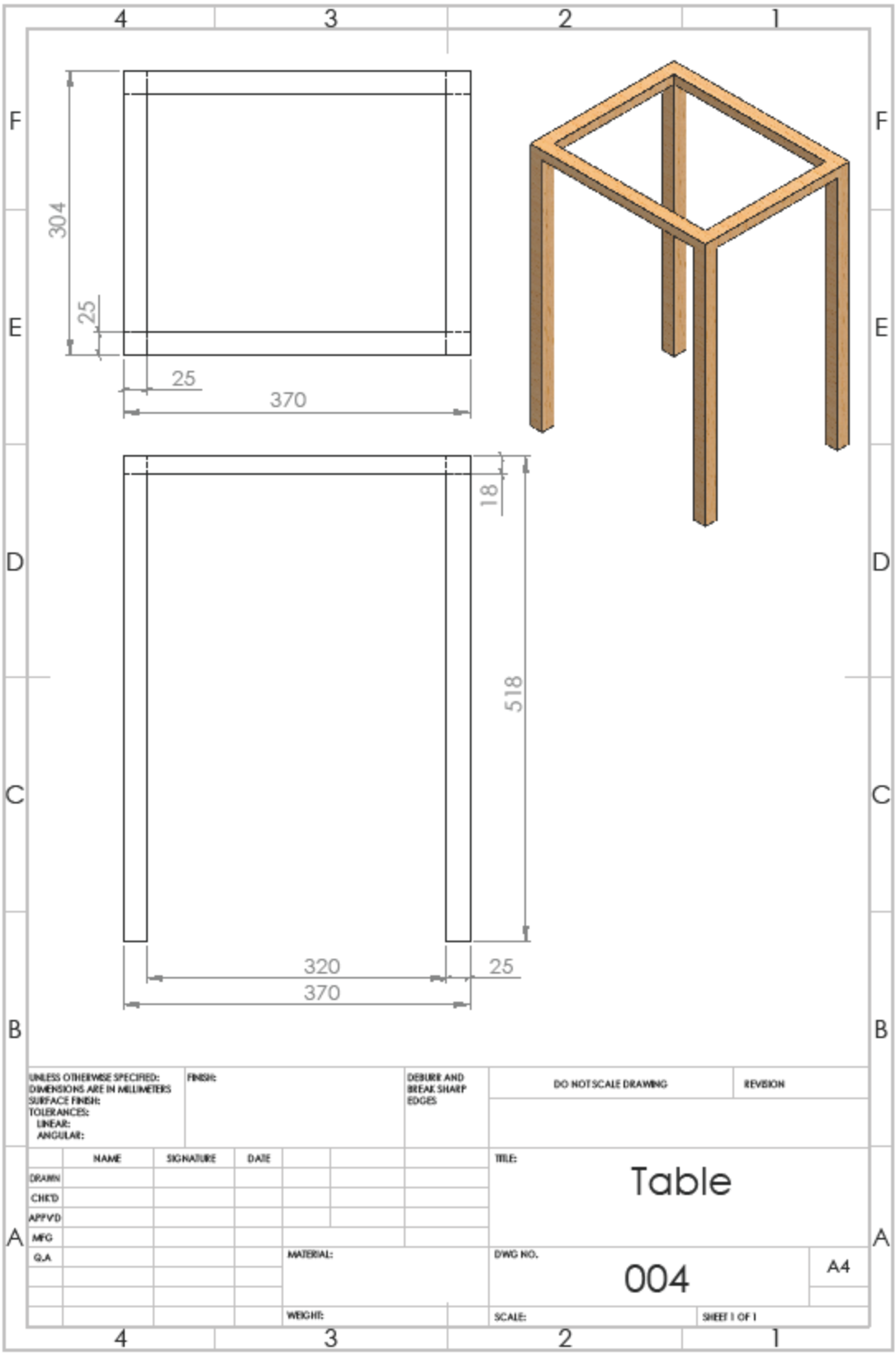
ANNEXURE-3

ACRYLIC HOLDER (Part-2)



ANNEXURE-3

WOODEN TABLE



ANNEXURE-3

DELRIN STUDS WITH HELI-COIL ARRANGEMENT