GOVERNMENT OF INDIA
Bhabha Atomic Research Centre
Applied Physics Division

Due on 06/ 12 /2021 at 16:00 hrs

Tender No. APD/EHPPL/DKP/MF/2021/02 Date: 18/11/2021

Sub: Minor Fabrication-Invitation of Quotations

Dear Sir,

1) Quotations are invited for the minor fabrication job of **Design, drawing, fabrication,inspection, testing and supply of 02 Sets of "Pressure Test Rigs" at EHPPL, Chinchovli village, Kalyan (E) as per attached Annexure-1.**
2) Bidder shall quote for fabrication of the same.
3) Taxes shall be quoted separately.
4) Quotation must be in the printed letter head/quotation format, which should consist of GSTIN, registration number registered with local ST authority/CST authority, PAN number of the firm etc. Quotations that are received in computer-generated form shall be construed as invalid and rejected.
5) GST Exemption certificate will be provided by BARC as per CBEC (Central Tax Rate) Notification no.45/2017 and 47/2017 dated 14 th November, 2017.
6) ***The Bidder shall submit his quotation in two parts: Part-I: Technical bid and Part-II: Financial bid. The Bidder is strictly instructed NOT to submit Price bid in Part-I of his quotation. Bidder is required to quote the Price separately as Part-II of his quotation. If the Price bid is submitted in Part-I, the quotation will be rejected without any further consideration.***
7) Any deviation from the requirements indicated in the specification, drawings, annexure etc. shall be brought to notice of the Purchaser by the Bidder in his Part-I quotation.
8) **Bids lacking details sought as per this document will be summarily rejected without expecting any further communication.**
9) The price quoted must be firm for the entire period of contract and shall not be subjected to any change.
10) **Part-I: Technical bid and Part-II: Financial bid shall be sealed in two separate envelopes super scribed with the above reference number and Part-I: Technical bid or Part-II: Financial bid. Both sealed envelopes (two parts) shall be submitted inside another sealed envelope.**
11) The quotations must strictly reach,
    Head, Applied Physics Division
    Purnima Laboratory
    Bhabha Atomic Research Centre,
    Trombay, Mumbai 400085.
    Attn: **Shri. Deepak K Pradhan**
    on or before **06/12/2021, 16:00 HRS** and must be sent in a sealed envelope using **Speed-Post** super scribed "MINOR FABRICATION" with the above reference number and due date given above.
5) The fabrication work shall be subject to inspection by our engineer. The work will be considered acceptable, after inspection by the purchaser's inspector and on issue of Test certificate of the purchaser's inspector.
12) The bidder shall specify the **delivery period**.
13) Any delay which is attributable to the supplier is liable for penalty @ 0.5 % per week (max 10%) to be imposed on the supplier.

Deepak pradhan

14) **Income Tax:** Income Tax @ 2% and GST TDS@ 2% of basic cost will be deducted from your bill in case of order.

15) **Head, Applied Physics Division, B.A.R.C,** reserves the right to accept/reject any or all quotations without assigning any reason.

16) **Payment** will be made as per rules after completion of the job satisfactorily.

17) **Validity**: The offer shall be kept open for acceptance for a period of **60 days** from the date of opening of quotation

18) **Proof of ability** - The Bidder shall submit a brief list of works (**with purchase order copy and work completion certificates of that particular work**) executed by him in past for designing, manufacturing and handling of Pressure vessels of similar capacity as a proof to the standards and quality specified in the quotation failing which the offer may be rejected.

19) **Compliance report as attached shall be submitted with remarks by the vendor in Part-I, Technical bid failing which the offer may be rejected.**

20) **Delivery**: The bidder shall deliver the finished components after approval by our engineer, and scrap form the free issue material shall be delivered by the bidder at **EHPPL, BARC,Chinchovli village, Kalyan (E)** at free of cost.

21) The Purchaser reserves the right to accept the Quotation in whole or in part or reject any or all the quotations without assigning any reason. The lowest or any quotation shall not necessarily be accepted. Quotation not supported by the information requested in the tender document, or not complying with the tender document will not be accepted.

22) **Confidential Information:** The drawings, specifications, reports, samples and such other information furnished to Supplier relating to the supply/works, sub-system/equipment etc. are to be treated as confidential which shall be held by Supplier in confidence and shall not be divulged, transferred, exchanged, published, gifted or communicated to any third party without the prior written consent of Purchaser. Supplier therefore binds himself, his successors, heirs, executors, administrators, employees and the permitted assignees or such other persons or agents directly or indirectly concerned with the works/supply to the confidential nature of the drawings, specifications, reports, samples etc

Enclosure: Annexure-1(06 pages).

Drawings and Sketches: 10 sheets **(GA/PTR/01), (DD/PTR/01), (DD/PTR/02a), (DD/PTR/02b), (DD/PTR/03), (DD/PTR/04), (DD/PTR/05), (DD/PTR/06), (DD/PTR/07) & sketch-1**

Deepak Pradhan 18/11/2021

(Deepak Pradhan)
SA/E, APD, BARC

Note:-In case of any queries, the bidder shall contact to Sri. Deepak Pradhan or Gaurav Pandey on 022-2559 1327/6731

Compliance Report for Pressure Test Rigs

Sr. No.	Description of Works	Remarks
1.	Design, drawing, fabrication, inspection, testing and supply of 02 Sets of "Pressure Test Rigs" as per the attached drawing nos:- (GA/PTR/01), (DD/PTR/01), (DD/PTR/02a), (DD/PTR/02b), (DD/PTR/03), (DD/PTR/04), (DD/PTR/05), (DD/PTR/06), (DD/PTR/07) & sketch-1 and specifications as per attached Annexure-1.	
2.	Design , Preparation and submission of fabrication drawings	
3.	Submission of Manufacturing procedures, hydro test and helium leak test procedures	
4.	Submission of Original Manufacturer's Test Certificate (Original Mill test certificate).	
5.	Destructive (Tensile, Charpy, Hardness and Chemical etc) testing of raw materials at recognized test labs to ensure the correctness of material as per relevant standard and all the test certificates shall be submitted to Purchaser for acceptance.	
6.	All the materials used shall be in conformance with the relevant IS/BS/ASTM specifications .All raw materials shall be got stamped by the purchaser's representative at procurement stage to enable subsequent identification and verification giving heat numbers, sizes etc.	
7.	For critical materials such as forgings and SA 320 L43 high tensile bolts, the supplier shall arrange confirmatory testing of materials properties (chemical, tensile, hardness and charpy test as per relevant standard) at recognized test labs in the presence of purchaser's representatives and the test certificates shall be submitted to Purchaser for acceptance.	
8.	All the raw materials like plates, pipes, forgings etc shall be subjected to 100% ultrasonic test as per ASME Section-VIII Div.3 and specifications referred by this code before fabrication. Material inspection and testing requirements shall be as per applicable standard specifications and ASME Section VIII Div.3.	
9.	Manufacturing of all the components as per approved procedures and relevant code and Inspection of all the components as per approved procedures and relevant code.	
10.	Only TIG welding shall be used for all welding joints of Pressure Test Rigs	
11.	DP test of the ROOT weld joints shall be carried out in the presence of purchaser's representative.	
12.	100% DP, RT and UT of all welded joints as per ASME section VIII div. III and submission of testing reports for approval.	`
13.	Acceptance criteria of NDT shall be as per ASME Section-VIII Div.3	
14.	Repair of welds required if any should meet the requirements of ASME B&PVC, Sec.VIII, Div. 3 requirements.	
15.	Test Rigs shall be subjected to Hydrostatic pressure test at 75 Bar gauge pressure, at room temperature, using water as a test fluid. Hydrostatic pressure testing shall be performed as per ASME Section-VIII Div.3 and approved procedures.	
16.	The Pressure Test Rig Enclosure shall be assembled at supplier's shop and subjected to He leak testing at 4 bars gauge pressure as per approved procedures to ensure leak tightness of all joints, seals, and other openings in the assembled condition. The cumulative leak rate shall not be more than 10-5 std. cc/sec.	
17.	Packing, loading, supply and unloading of Pressure Test Rigs with spares listed in this document, at purchaser's Premises.	
18.	The Pressure Test Rigs shall have minimum one year warranty against any manufacturing defects and for its general appearance and finishes.	

(Sign and seal with date)

Annexure- 1

Scope: -

Design, drawing, fabrication, inspection, testing and supply of **02 Sets** of "**Pressure Test Rigs**" as per the attached drawing nos:- **(GA/PTR/01), (DD/PTR/01), (DD/PTR/02a), (DD/PTR/02b), (DD/PTR/03), (DD/PTR/04), (DD/PTR/05), (DD/PTR/06), (DD/PTR/07) & sketch-1** and specifications as per this document. The quantities of each component, spare parts and material of construction shall be as per the bill of materials specified in attached GA drawing no. **(GA/PTR/01).** Purchasers have provided overall schematic drawings and sketches. However, the supplier shall design, prepare the fabrication drawings and inform the manufacturing procedure, inspect, assemble, shop test, prepare for shipment of the **Pressure Test Rigs** at site. Loading, Unloading and handling of the assemblies/components shall be in the scope of supply. **The supplier shall quote a lump sum amount for each Pressure Test Rig per no basis instead of quoting for individual components and spare parts separately.**

1. **Fabrication/Execution shall be done in following stages: -**

   I. **Design**

   II. **Submission of fabrication drawings of all the components of the assembly, manufacturing procedures, hydro test and helium leak test procedures for approval of the purchasers.**

   III. **Procurement of raw materials and submission of Original Manufacturer's Test Certificate (Original Mill test certificate).**

   IV. **Destructive and non-destructive testing (UT) of raw materials and submission of test reports.**

   V. **Manufacturing of all the components as per approved procedures and relevant code and Inspection of all the components as per approved procedures and relevant code.**

   VI. **NDT: DP, RT and UT of all welded joints and submission of testing reports for approval.**

   VII. **Pre- Delivery Inspection: Assembly, Hydrostatic pressure testing and Helium leak testing at shop.**

   VIII. **Finishing and painting,**

   IX. **Packing, loading, supply and unloading of Pressure Test Rigs with spares listed in this document, at purchaser's Premises.**

2. **DRAWINGS: -**

The Purchaser has prepared the basic design and general arrangement drawings for the Pressure Test Rigs. The nominal sizes and material of construction are specified for all the major components. Supplier shall prepare detailed fabrication drawings for all the components based on the above stated information furnished by the Purchaser and shall be approved from the purchaser before execution. The detailed drawings shall be completed with necessary fabrication details, tolerances as per assembly requirements; O-ring groove details and surface finish, chamfers, fillets, dowelling and fabrication procedure such as welding procedure, surface treatment like coating, painting etc. wherever required for the necessary components of the equipment etc. The detailed drawing prepared by the supplier must also include details of lugs, taps for eye-bolts etc. for handling of individual

Deepalpradhan

components, assembly and sub-assemblies.In the event, that requirement of drawings listed herein, conflict the decision shall be at the discretion of the purchaser.

The purchaser reserves the right to revise the drawings without materially altering the design prior to the approval of the contractor's shop drawings. Such changes shall be considered as within the scope of the specified work and shall not be considered extra.

The general design details of the Pressure Test Rigs shall be as per the attached drawings **(GA/PTR/01), (DD/PTR/01), (DD/PTR/02a), (DD/PTR /02b), (DD/PTR /03), (DD/PTR/04), (DD/PTR/05), (DD/PTR/06) and (DD/PTR/07).** The details of Leap seal cross section shall be as per attached **Sketch-1.**

3. **MATERIAL OF CONSTRUCTION:**

All the materials used shall be in conformance with the relevant IS/BS/ASTM specifications or any other standards shall have been tested as required by such standards and proof in the form of certified test reports or mill test certificates that the required tests have been carried out at source and shall be kept correlating the items to the test certificates .All the materials shall be of recent manufacture, free from all defects such as surface imperfections, pits, rusting. **The Supplier shall get the material tested (both physical and chemical) at recognized test labs to ensure the correctness of material as per relevant standard and all the test certificates shall be submitted to Purchaser for acceptance. All raw materials shall be got stamped by the purchaser's representative at procurement stage to enable subsequent identification and verification giving heat numbers, sizes etc.**

The material of construction of different parts shall be as per attached GA drawing **(GA/PTR/01).Almost all the parts of Pressure Test Rigs are made of either SS 304 or SS 304L except internal pipe assembly and high tensile bolts.** No free issue material shall be supplied by the purchaser. Supplier shall procure all the raw materials including consumables like paints, lubricants etc. required for manufacture and testing.

All the raw materials like plates, pipes, forgings etc shall be subjected to 100% ultrasonic test as per ASME Section-VIII Div.3 and specifications referred by this code before fabrication. Material inspection and testing requirements shall be as per applicable standard specifications and ASME Section VIII Div.3.

In addition, for critical materials such as forgings and SA 320 L43 high tensile bolts, the supplier shall arrange confirmatory testing of materials properties (chemical, tensile, hardness and charpy test as per relevant standard) at recognized test labs in the presence of purchaser's representatives and the test certificates shall be submitted to Purchaser for acceptance.

4. **MACHINING:-**

In general, machining shall be as specified. Care shall be taken to ensure that chatter marks, scratches and burrs are removed from the machined surfaces. All sharp corners are to be rounded with suitable radii. All tolerances, sizes and finishes shall be as per the drawings. General tolerance for vessel shall meet IS 2102: medium class unless otherwise specified.

5. **FABRICATION:-**

Supplier shall submit the detailed manufacturing procedures, process sheets and schedule to the Purchaser for approval before start of fabrication. Deviations if any shall be carried out with prior notice to the Purchaser. Workmanship shall be in accordance with high-grade practice and adequate to achieve the accuracy and finish mentioned in the drawings and specification and to ensure satisfactory operation throughout its service. **Only TIG welding shall be used for all welding joints of Pressure Test Rigs.** Care shall be taken during welding to avoid welding distortions. Prepare the edge as per standard wherever required for butt welding. **Care shall be taken during welding to ensure leak tight joint.** DP test of the ROOT weld joints shall be carried out in the presence of

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purchaser's representative. General tolerance for vessel shall meet IS 2102: medium class unless otherwise specified.

6. **Quality Assurance Plan (QAP)**

6.1. The supplier shall carry out inspection at all stages of fabrication to verify the workmanship, dimensions, tolerances, surface finish and cleanliness with requirements of drawings/specifications.

6.2. A systematic record of all inspection and testing carried out by the Supplier shall be maintained and offered to the purchaser for review from time to time.

6.3. All the tools, gauges, instruments etc used for inspection and testing shall be of proper range, type, accuracy and precision and shall be calibrated before use to maintain accuracy within necessary limits. Only calibrated and approved facilities shall be utilized for inspection.

6.4. All the raw materials like pipe, forgings, plates shall be subjected to both destructive (tensile, hardness, charpy etc) and 100% UT as per relevant standards and test reports shall be submitted to the purchaser's for approval.

6.5. All the weld joints shall be subjected to DPT and 100% radiography and ultrasonic tests as per ASME section VIII div. III

6.6. Repair of welds required if any should meet the requirements of ASME B&PVC, Sec.VIII, Div. 3 requirements.

7. **FITTINGS OF PNEUMATIC ACTUATOR, SOLENOIDVALVE**

One set of Pneumatic actuator with solenoid valve shall be mounted on each side of SS flange type-1&2 with swage lock fittings. For understanding mountings and fittings details, please refer attached drawing no.DD-PTR-02a&b. In case of doubt, contractor shall ask the purchaser and clarify the doubt before taking any final decision. Please note that no alternative fittings shall be acceptable in place of swage lock fittings.

Specification of Pneumatic actuator:

S/N	Features	Specification
1.	Actuator type	Normally closed type "Aira" make Double Acting Pneumatic Actuator
2.	ACTUATOR DESIGN	ISO 5211 (ACTUATOR CAN BE QUICKLY AND EASILY MOUNTING) METHOD OF TRANSMISSION : DOUBLE RACK AND PINION TYPE ROTATION : 90° DEG ACTUATOR TYPE : AIR TO OPEN, AIR TO CLOSE BODY MATERIAL : EXTRUDED ALUMINIUM HARD ANODIZED SHAFT (Piston) : EN8 CAPS AND RACK :ALUMINIUM PRESSURE DIE CAST TEMPERATURE : -20 °C to 90°C GUIDES : LOW FRICTION ACETALIC RESIN SEALS : BUNA – N AIR PRESSURE : NORMAL AIR SUPPLY PRESSURE – 4 KG/CM². MAX. AIR SUPPLY PRESSRUE – 7 KG/CM² MOUNTING FOR SOLENOID
3.	Port connection	¼" BSP
4.	Stroke	50 mm
5.	Quantity	03 nos
Specifications of solenoid valve		
1.	Type	¼" solenoid valve, 24V DC shall be compatible with the above pneumatic actuator.
2.	Quantity	03 nos

Note: The above mentioned quantities shall be considered for 01 set of Pressure Test Rigs. For 02 sets of Pressure Test Rigs, quantities shall be taken as multiple of two (02).

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8. **SPARES**

S/N	Part No.	Component	Spare Quantity for each set of Pressure Test Rigs
1.	12	Normally closed type "Aira" make Double Acting Pneumatic Actuator with fitting & accessories with ¼" solenoid valve, 24V DC	03 Sets
2.	07	EPDM 70 Shore A (Black),ID:200mm (ref attached Sketch-1)	02 nos
3.	06	High Tensile Hexagonal headed bolt, ASTM A320 L43 or grade 10.9, Size: M22x2.5Px240L with double nut & washer	08 Sets
4.	09	Plug (ref:DD-PTR-06)	06 Sets
5.	15	M8x120mm long stud with 04 Nuts and Washers, High Tensile Bolt Grade 10.9	02 Sets
6.	16	Commercial Ply 8'x4'x12 mm thick	02 Nos
7.	--	High tensile Hexagonal headed bolt, grade 10.9 Size:M12x1.75Px75L with double nut & washer	24 Sets
8.	--	High tensile Hexagonal headed bolt, grade 10.9 Size:M10x1.75Px65L with double nut & washer	24 Sets
9.	DD-PTR-04 Part12	High tensile Hex headed bolt, grade 10.9 Size:M10x1.5Px20L with nut & washer	16 Sets
10.	DD-PTR-05 Part07	Stud M10x1.5Px200 mm long (high tensile bolt grade 10.9)	02 Nos
11.	Refer DD-PTR-02b	1/8" male to 1/4" female brass Adaptors for actuator	06 nos
		1/4" BSP male-female Brass PU adaptors for 8 mm tube	06 Nos
12.	13	Ball Castors CHBU12(MISUMI Make)	06 Nos

Note: The above mentioned spare quantities shall be considered for 01 set of Pressure Test Rigs. For 02(two) sets of Test Rigs, quantities shall be taken as multiple of two(02).

9. **FINISHING AND PAINTING:**

All sharp corners and edges must be finished smooth. The finished parts shall be completely free from dirt, grease or other foreign material. All the MS parts shall be powder coated/enamel blue colour painted before delivery to Purchaser.

10. **CLEANLINESS:**

Proper cleanliness in the shop should be maintained during storage of materials, handling of materials and fabrication. Scales, oxides, oil, chips and other foreign materials shall completely be removed from surface. After all machining operations, the components shall be thoroughly cleaned with Acetone as per approved procedures to remove all traces of cutting oils, tool materials etc. After cleaning, the components shall be applied with approved rust preventives and stored in heat sealed polythene bags till they are taken up for inspection and assembly. Components awaiting next stage of machining operation shall also be protected with approved rust preventive and stored properly.

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11. **PACKING AND DELIVERY:**

The contractor shall ensure that the items covered by this Work Order is properly and sufficiently packed for shipment so as to ensure their being free from any loss, damage or deterioration during transit. Loading, transporting and Unloading at delivery place shall be in the scope of supply.

12. **INSPEPCTION AND TESTING: -**

1. 100% visual and dimensional inspection, including geometric features and surface finish, shall be performed on all dimensions of the components as per specification at supplier's site. All pipes shall be 100% visually checked for any surface defect from inside as well as outside and shall be free from any defect like surface corrosion, visible damage etc.

2. If any part fails to meet any inspection or test requirements of this specification, the Purchaser reserves the right to accept the part with deviation or accept the component after repair or totally reject the part without assigning any reason whatsoever. In case, the component/part is to be repaired, the Supplier shall submit a 'Design Concession Request' (DCR) with full details like descriptions of the deviations, method for removal of defect, procedure for repair, consequence thereof if any, and inspection procedure to the Purchaser for approval. The Supplier shall take up the rectification or use of the component, only after the approval of the DCR by Purchaser.

3. DP test of the weld joints shall be carried out at supplier's site. Any surface flaws shall be repaired by grinding only, No welding permitted.

4. **Radiography**: After clearance of DP test, the weld joints shall be subjected to 100% radiography. The radiography shall be carried out as per ASME Section-VIII Div.3 and specifications referred by this code. Acceptance criteria shall be as per ASME Section-VIII Div.3 Personnel performing the radiographic examination; evaluation and Interpretation of radiographs shall be qualified and certified as per ASNT SNT TC 1A or ASNT ACCP to a minimum of Level II. All radiography reports with films shall be submitted to the purchaser for approval. Defects shall be repaired if any and re-radiographed for clearance as per code.

5. **Ultrasonic Test**: After clearance in radiography test, the PTR shall be subjected to 100% UT. The UT shall be carried out as per ASME Section-VIII Div.3 and specifications referred by this code. Acceptance criteria shall be as per ASME Section-VIII Div.3 Personnel performing the UT examination; evaluation and Interpretation of flaws shall be qualified and certified as per ASNT SNT TC 1A or ASNT ACCP to a minimum of Level II. **Required Calibration block shall be in the scope of supply which shall be confirming to ASME BPCV, Section VIII Div.2.** All UT reports shall be submitted to the purchaser for approval. Defects shall be repaired if any and re-tested for clearance as per code.

6. **Hydro test:** After completion of manufacturing and clearance of NDT all the components of Pressure Test Rigs shall be assembled at supplier's shop for hydrostatic pressure testing as per approved drawings and procedures. Test Rigs shall be subjected to Hydrostatic pressure test at **75 Bar** gauge pressure, at room temperature, using water as a test fluid. Hydrostatic pressure testing shall be performed as per ASME Section-VIII Div.3 and approved procedures. **All the accessories required for hydro testing such as hydro test Kit/hydraulic pump, tubes, hoses, suitable vent plugs for flange holes, pressure gauge, NRV, associated instruments, pipe supports etc shall be arranged by the supplier.** After Hydrostatic test, the vessel shall be completely drained, dried and subsequently subjected to dimensional inspection, liquid penetrant testing of all accessible surfaces and Helium leak test as per standard procedure.

   The supplier should have proper arrangement for high pressure testing. Experienced and skilled Personnel shall be involved in high pressure testing.

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Note: Please note that for carrying out hydro test in PTR, all the actuators shall be plugged off and all the openings of the pressure vessel and flange holes shall be suitably blocked for hydro testing which shall be in the scope of supply.

7. **Helium Leak Test:** The Pressure Test Rig Enclosure shall be assembled at supplier's shop and subjected to He leak testing at 4 bars gauge pressure as per approved procedures to ensure leak tightness of all joints, seals, and other openings in the assembled condition. The cumulative leak rate shall not be more than 10^{-5} std. cc/sec. **All the accessories required for Helium Leak testing such as Helium cylinder, Mass Spectrometer, Helium leak detector, probe, piping, tubes, leak tight fittings and adaptors, gauges, isolation valves, associated instruments etc shall be arranged by the supplier.**

8. Assembly shall be checked as per GA drawings.

9. Performance of pneumatic actuator with solenoid valve shall be checked. For this, required tubing, connector & fittings and compressor for air supply shall be arranged by the supplier. Flanges, mounted with actuator and tubing & swage lock fittings shall be leak tested.

10. Original Manufacturer's Test Certificate (Original Mill test certificate) co-related to heat marks on pipe shall be offered during inspection. If supplier fails to offer Original Mill test certificate, the testing may be increased to 100% as per inspector requirement within the purchase order cost without addition of any extra charges.

11. Material test certificates (physical property, chemical composition, make, heat treatment report etc.) for pipes, flanges, plates etc. used in the Pressure Test Rigs shall be produced during inspection.

12. Quantities of the all the spare parts shall be checked as per order.

13. The general appearance and finishes of the finished product shall be inspected.

13. ACCEPTABILITY:-

a. The Pressure Test Rigs shall be considered acceptable if it passes through the Pre-delivery inspection, NDT examination, hydro testing and Helium leak testings at Supplier's site.
b. All the required documents (material test reports, test certificates etc) shall be produced during inspection.

14. WARRANTY:

The Pressure Test Rigs shall have minimum one year warranty against any manufacturing defects and for its general appearance and finishes.

15. PLACE OF DELIVERY:

EHPPL, BARC, Chinchovli village, Hazimalang Road, Kalyan (E), Pin: 421301

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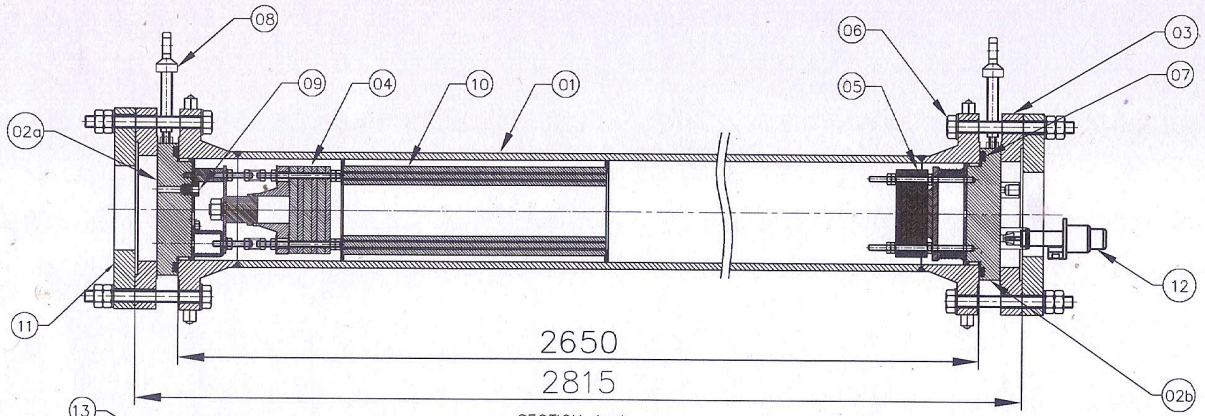
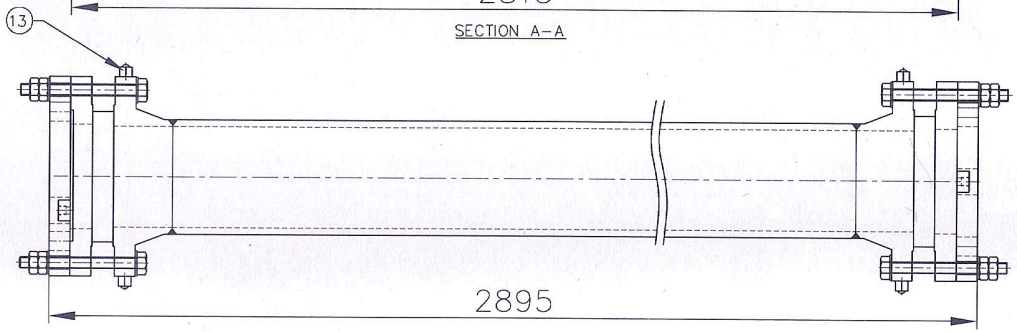
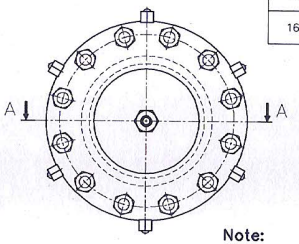


SECTION A-A





BILL OF MATERIAL

Part No.	Description	Materiol	Quantity	Remark /Spare qty.	Reference Dwg.No.
01	Pipe Assembly				
01a	8" SCH80 Seamless Pipe	SS304L	01 No.	2.43m Long	DD-PTR-01
01b	8" Weldneck Flange # 300	SS304L	02 Nos.	---	
02a	SS flange type -1	SS304	01 Nos.	---	DD-PTR-02a
02b	SS flange type -2	SS304	01 Nos.	---	DD-PTR-02b
03	End Flange	SS304	02Nos.	---	DD-PTR-03
04	Extension assembly type-1	AS per Drawing	01 Set	---	DD-PTR-04
05	Extension assembly type-2	AS per Drawing	01 Set	---	DD-PTR-05
06	Hex. headed bolt M22x2.5Px220L with double Nut & Washer	High Tensile Bolt ASTM A320 L43 or grade 12.9	24 Sets.	08 Set. Spares	
07	Leap seal ID 200mm	EPDM 70 Shore A (Black)	02 Nos.	02 Nos.	Ref Attached Sketch-1
08	Lifting I bolt	SS304	02 Nos.	--	DD-PTR-06
09	Plug	As per Drawing	06 Set.	06 Set.	DD-PTR-06
10	Internal Pipe assembly	As per Drawing	01 Set	---	DD-PTR-07
11	Bearing Flange	SS304	02 Nos.	----	DD-PTR-02a
12	Pneumatic Actuator with ¼" 24V DC solenoid valve with fittings & accessories	Normally closed type "Aira" make Double Acting Pneumatic Actuator	03 Set	03 Set Spare for each component	For details refer Annexure-1,para 7
13	Ball Caster	CHBU12 (MISUMI Make)	12 Nos.	---	06 Nos
14a 14b	Rectangular MS plate	MS	Each 01		DD-PTR-06
15	M8x120 mm long stud with 04 Nuts and 04 Washer	High Tensile Bolt Grade 10.9	02 Sets	02 Sets	Not shown in drawing
16	8'x4'x12mm thick sheet	Commercial Plywood	02 Sets	02 Nos	-do-

Note:

1) Adaptor for Pneumatic actuators
   a) ⅛" Male to ¼" female brass adaptor for actuator=03 Nos+06 Nos Spare
   b) ¼" BSP male-female brass PU adaptor for 8 mm tube.=03 nos +06 Nos Spare
3) For details of fitting of actuator,solenoid valve please refer drg.no. DD-HTR-02a&b
*4) Quantities including spares mentioned in the bill of materials and Notes shall be considered for each set of pressure test rig and for two sets,quantities shall be multiple of two including spares.

REV. NO.	DESCRIPTION	DRAWN	DATE
2.	Revised Drawing	DKP	08/11/21
1.	Revised Drawing	DKP	26/10/21

GENERAL TOLERANCE UNLESS OTHERWISE SPECIFIED SHOULD CONFIRM TO IS : 2102 VIZ : (MIDIUM CLASS)

LINEAR DIMENSIONS

UP TO -6	± 0.1
6 -30	± 0.2
30 -120	± 0.3
120 -315	± 0.5
315 -1000	± 0.8
1000-2000	± 1.2
2000-4000	± 2
4000 & ABOVE	± 3

LENGHT OF SHORTER SIDE OF ANGLE

1 - 6	±1°
6 - 30	±0° - 30'
30 - 120	±0° - 20'
120 - 400	±0° - 10'

SURFACE FINISH IN MICRON 3.15 CLA

CHAMFER 1x45°

NOTE: -
1) IF IN DOUBT ASK.
2) ALL DIMENSIONS ARE IN mm.
3) REMOVE SHARP CORNERS AND BURS.
4) DO NOT SCALE THE DRAWING.

	NAME	SIGNATURE	DATE
DRAWN	DKV		01.01.21
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL :- ---

SYMBOL :-

WEIGHT :-

TITLE :- Pressure Test Rig

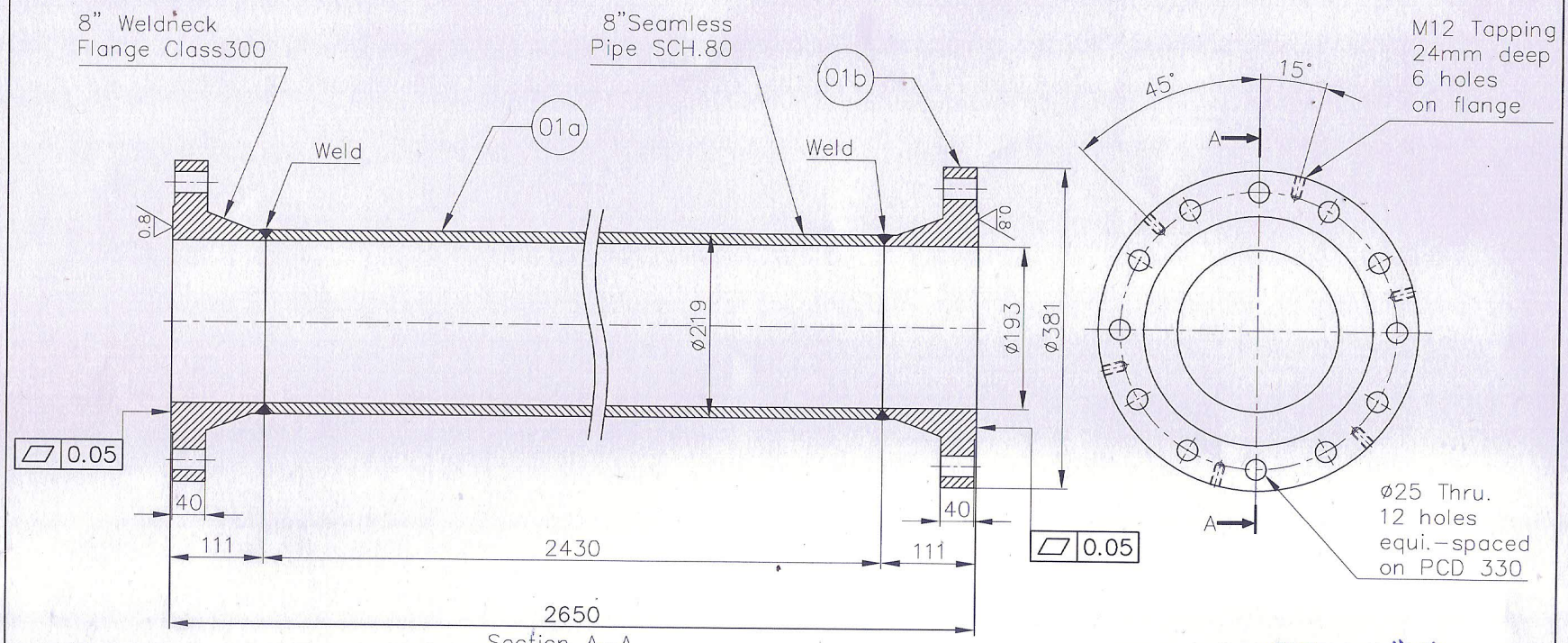
DWG. NO. :- GA-PTR-01

A3

REV. 01

SCALE :- 1 : 1

SHEET 01 OF 01



Section A–A

Part No.01 Pipe Assembly

Material:
1) Pipe:– SS304L
2) Weldneck Flange:– SS 304L

REV. NO.	DESCRIPTION	DRAWN	DATE
01	Revised drawing	DKP	26.10.21
01	Revised drawing	DKV	06/01/2020

GENERAL TOLERANCE UNLESS OTHERWISE SPECIFIED SHOULD CONFIRM TO IS : 2102 VIZ : (MIDIUM CLASS)

LINEAR DIMENSIONS	
UP TO –6	± 0.1
6 –30	± 0.2
30 –120	± 0.3
120 –315	± 0.5
315 –1000	± 0.8
1000–2000	± 1.2
2000–4000	± 2
4000 & ABOVE	± 3

LENGHT OF SHORTER SIDE OF ANGLE	
1 – 6	±1°
6 – 30	±0° – 30'
30 – 120	±0° – 20'
120 – 400	±0° – 10'

SURFACE FINISH IN MICRON 3.15 CLA

CHAMFER 1x45°

NOTE:–
1) IF IN DOUBT ASK.
2) ALL DIMENSIONS ARE IN mm.
3) REMOVE SHARP CORNERS AND BURS.
4) DO NOT SCALE THE DRAWING.

	NAME	SIGNATURE	DATE
DRAWN	DKV		01.01.21
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL :– SS304L

SYMBOL :–

WEIGHT :–

TITLE :– Pipe Assembly

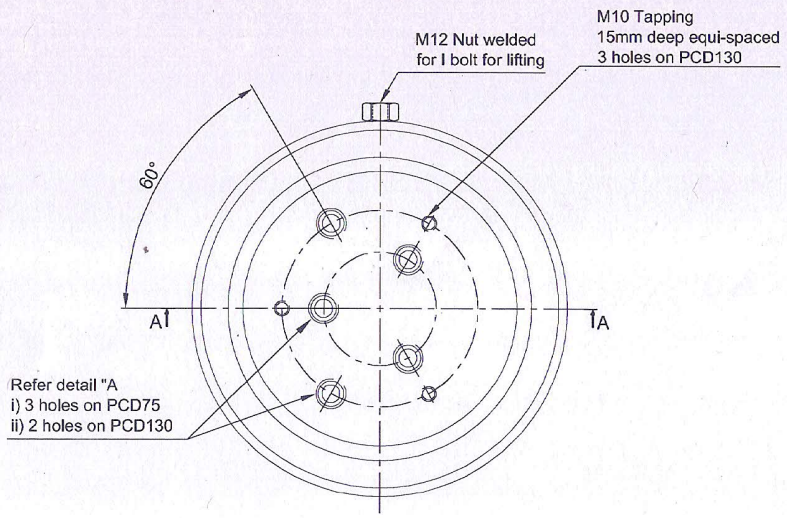
DWG. NO. :– DD–PTR–01

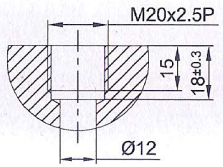
A3

REV. 01

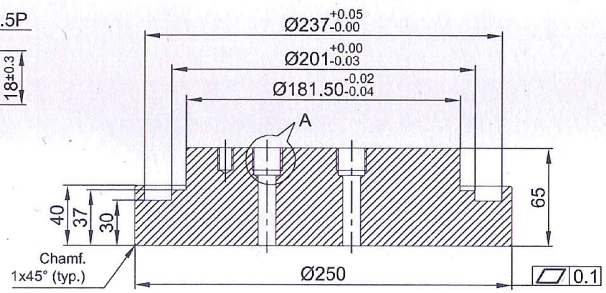
SCALE :– 1 : 1

SHEET 01 OF 01

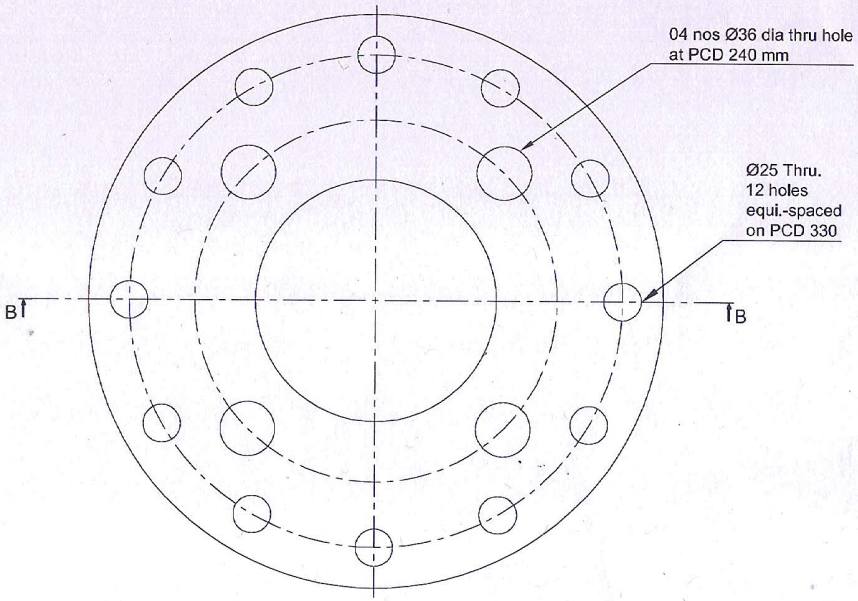


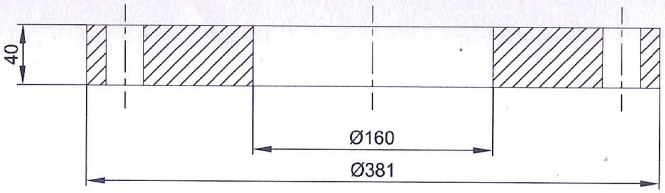


Detail 'A'
(Scale 2:1)



Part No.:-2a Section A-A
SS Flange type-1
Matl.:- SS304





Part No.:-11 Section B-B
Bearing Flange
Matl.:- SS304

Notes.:-
1) ALL DIMENSIONS ARE IN mm.
2) REMOVE ALL SHARP EDGES.

REV. NO.	DESCRIPTION	DRAWN	DATE
03	Revised Drawing	DKP	08/11/2021
02	Revised Drawing	DKP	26/10/2021
01	Revised Drawing	DKV	08/01/2021
00	Issued Drawing.	DKV	25/11/2019

GENERAL TOLERANCE UNLESS OTHERWISE SPECIFIED SHOULD CONFIRM TO IS : 2102 VIZ : (MIDIUM CLASS)

LINEAR DIMENSIONS

UP TO	- 6	± 0.1
6	- 30	± 0.2
30	- 120	± 0.3
120	- 315	± 0.5
315	- 1000	± 0.8
1000	- 2000	± 1.2
2000	- 4000	± 2
4000 & ABOVE		± 3

LENGHT OF SHORTER SIDE OF ANGLE

1 - 6	±1°
6 - 30	±0° - 30'
30 - 120	±0° - 20'
120 - 400	±0° - 10'

SURFACE FINISH IN MICRON 3.15 CLA

CHAMFER 1x45°

NOTE:-
1) IF IN DOUBT ASK.
2) ALL DIMENSIONS ARE IN mm.
3) REMOVE SHARP CORNERS AND BURS.
4) DO NOT SCALE THE DRAWING.

	NAME	SIGNATURE	DATE
DRAWN	DKV		08/01/2021
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL :- SS304

SYMBOL :-

WEIGHT :-

TITLE :- SS Flange type-1

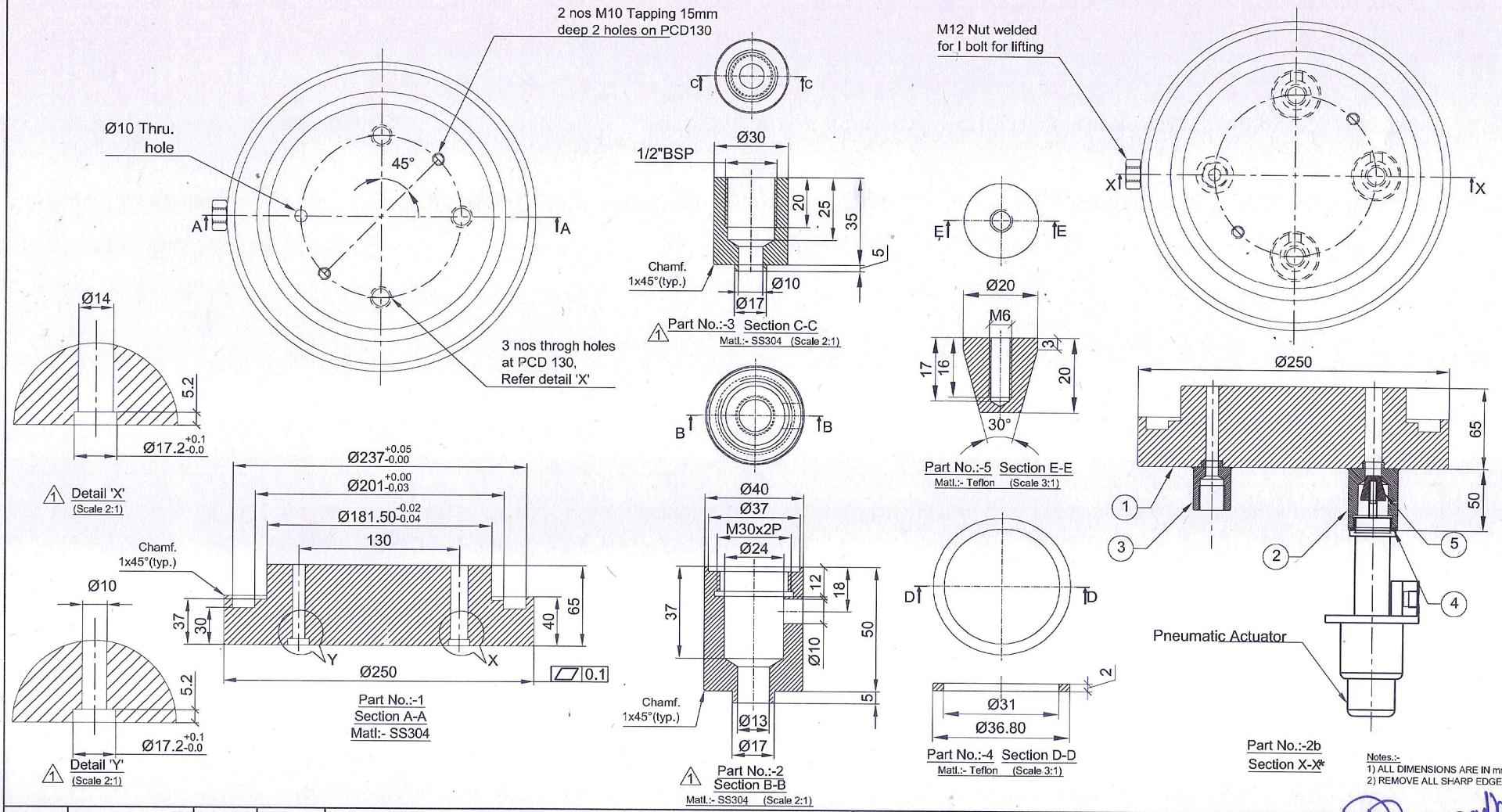
DWG. NO. :- DD-PTR-02a

A3

REV. 00

SCALE :- 1 : 1

SHEET 01 OF 01



Notes.:-
1) ALL DIMENSIONS ARE IN mm.
2) REMOVE ALL SHARP EDGES.

REV. NO.	DESCRIPTION	DRAWN	DATE
			08/11/2021
02	Revised Drawing	DKP	26/10/2021
01	Revised Drawing	DKV	08/01/2021
00	Issued Drawing.	DKV	25/11/2019

GENERAL TOLERANCE UNLESS OTHERWISE SPECIFIED SHOULD CONFIRM TO IS : 2102 VIZ : (MIDIUM CLASS)

LINEAR DIMENSIONS

UP TO	- 6	± 0.1
6	- 30	± 0.2
30	- 120	± 0.3
120	- 315	± 0.5
315	- 1000	± 0.8
1000	- 2000	± 1.2
2000	- 4000	± 2
4000 & ABOVE		± 3

LENGHT OF SHORTER SIDE OF ANGLE

1	- 6	±1°
6	- 30	±0° - 30'
30	- 120	±0° - 20'
120	- 400	±0° - 10'

SURFACE FINISH IN MICRON 3.15 CLA

CHAMFER 1x45°

NOTE:-
1) IF IN DOUBT ASK.
2) ALL DIMENSIONS ARE IN mm.
3) REMOVE SHARP CORNERS AND BURS.
4) DO NOT SCALE THE DRAWING.

	NAME	SIGNATURE	DATE
DRAWN	DKV		08-01-21
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL :- SS304

SYMBOL :-

WEIGHT :-

TITLE :- SS Flange type-2

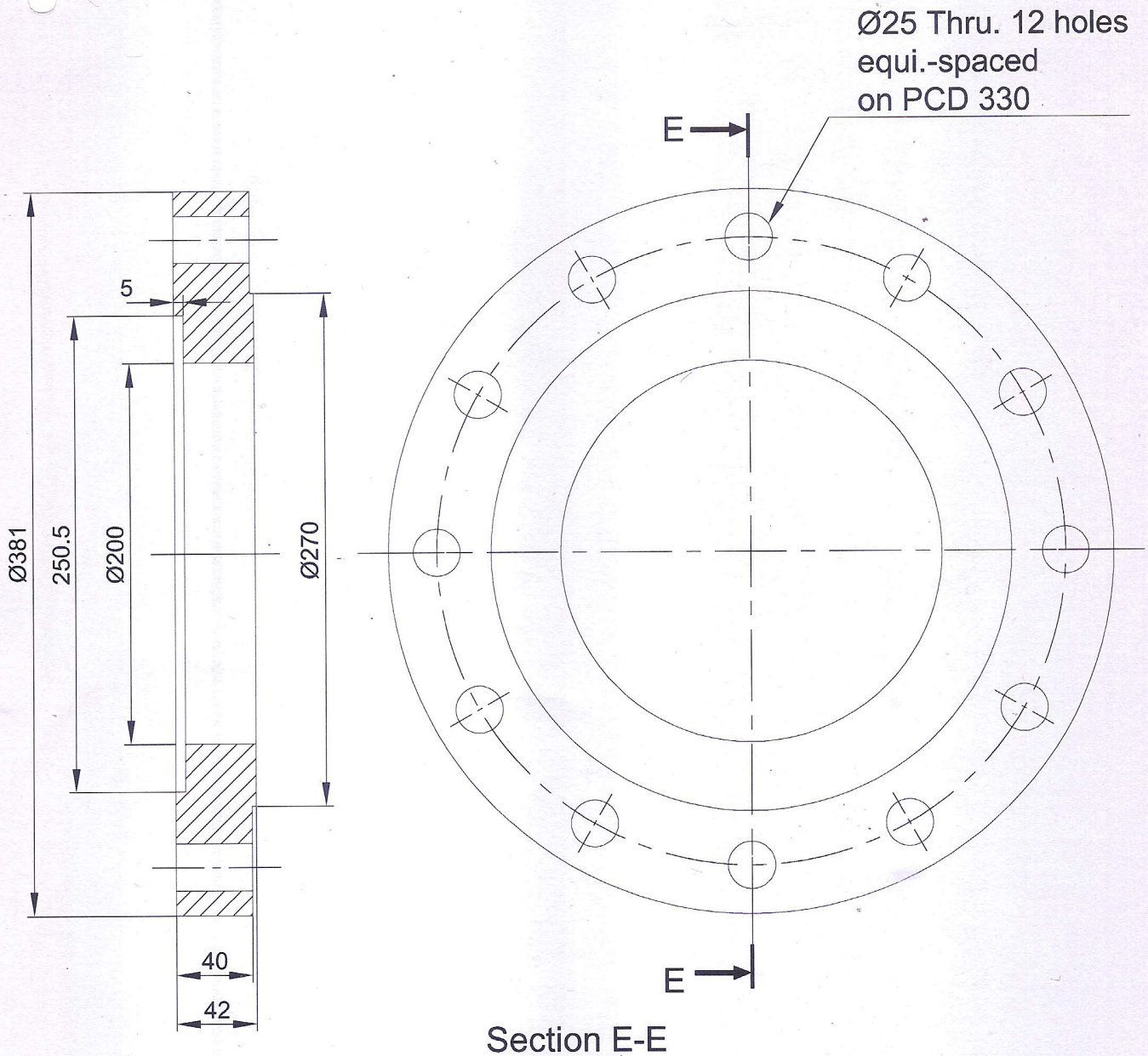
DWG. NO. :- DD-PTR-02b

A3

REV. 00

SCALE :- 1 : 1

SHEET 01 OF 01



Section E-E

Part No.:- 03 End Flange

Notes.:-
1) ALL DIMENSIONS ARE IN mm.
2) REMOVE ALL SHARP EDGES.

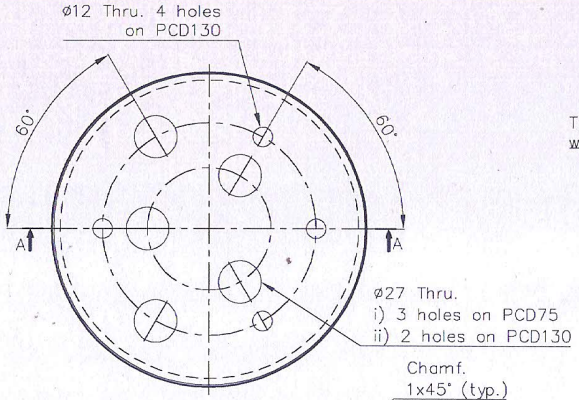
Thirupathan

	NAME	SIGNATURE	DATE
DRAWN	DKV	---	08/01/2021
CHK'D	---		
APPV'D	---		
MFG			
Q.A			

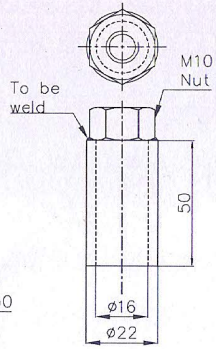
TITLE :-

End Flange

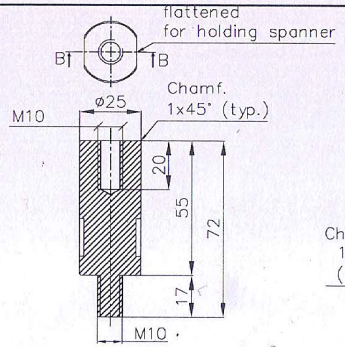
MATERIAL:	SYMBOL:-	DWG NO.:-	A4
SS304		DD-PTR-03	REV.00
WEIGHT		SHEET 1 OF 1	SCALE



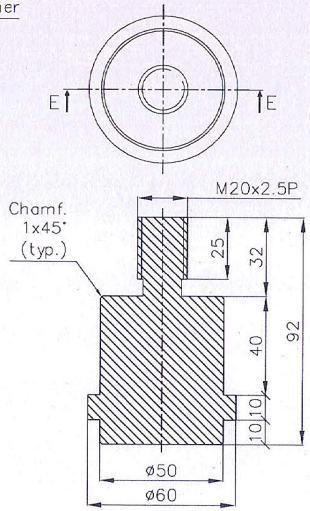
Part No.: 01 Section A–A



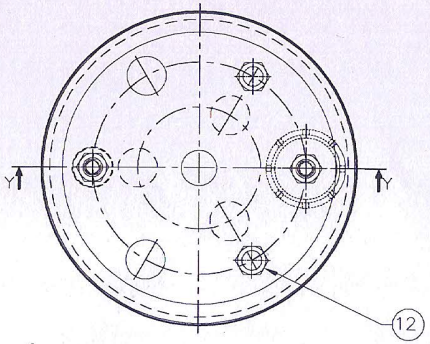
Part No.08
(SCALE :– 2 :1)

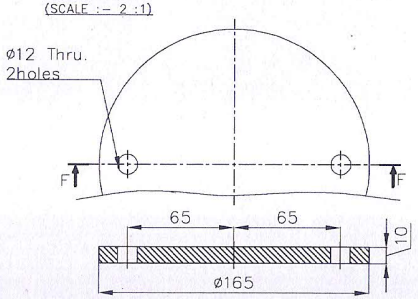


Part No.02 Section B–B
(SCALE :– 1.5 :1)

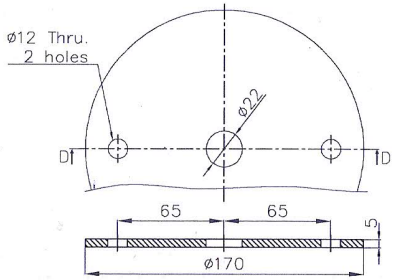


Part No.07 Section E–E
(SCALE :– 1.5 :1)

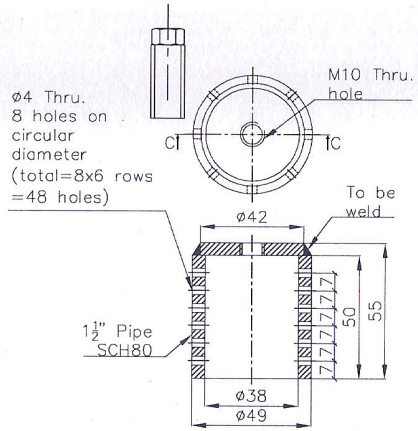




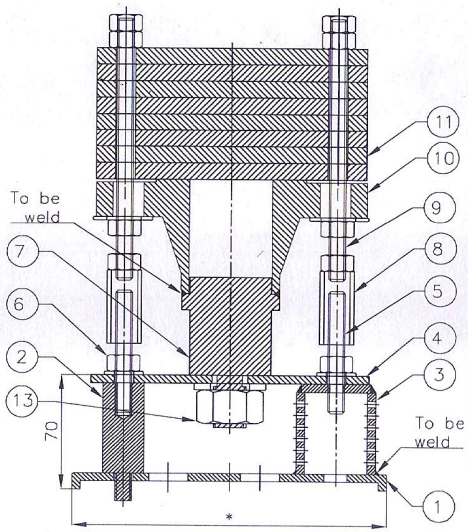
Part No.: – 11 Section F–F



Part No.04 Section D–D



Part No.03 Section C–C
(SCALE :– 1.5 :1)



Section Y–Y

EXTENSION ASSEMBLY TYPE –1

Sr.No	Description	Material	Quantity	Spare Qty
13	Hex.M20x2.5P Nut with washer	ASTM SA194 Gr.4/Gr.7	01 set.	01 set
12	Hex. headed Bolt M10x1.5Px18Long with washer	High Tensile Bolt grade 10.9	04 set.	16 set
11	Circular plate –2	MS: IS2062	08 Nos.	
10	2"Weldneck Flange #300	ASTM A105 Gr.B	01 No.	
09	Stud M10x1.5Px160Long	MS	02Nos.	
08	Connector–3	MS	02 Nos.	
07	Connector–2	MS	01 No.	
06	Hex. M10 Nut & washer	ASTM SA194 Gr.4/Gr.7	08 Set.	16 set
05	Stud M10x1.5Px75Long	High Tensile Bolt grade 10.9	02 Nos.	
04	Circular plate –1	MS	01 No.	
03	Filter	MS	01 No.	
02	Connector–1	MS	01 No.	
01	Flange cover	MS	01 No.	

⚠ BILL OF MATERIAL

Notes.:–
1) ALL DIMENSIONS ARE IN mm.
2) REMOVE ALL SHARP EDGES.
*3) To be finalized during manufacturing.

REV. NO.	DESCRIPTION	DRAWN	DATE
02	Revised part2 and 8	DKP	26/10/2021
01	Revised Bill of material	DKV	08/01/2021
00	Issued Drawing	DKV	13/12/2019

GENERAL TOLERANCE UNLESS OTHERWISE SPECIFIED SHOULD CONFIRM TO IS : 2102 VIZ : (MIDIUM CLASS)

LINEAR DIMENSIONS

UP TO –6	± 0.1
6 – 30	± 0.2
30 – 120	± 0.3
120 – 315	± 0.5
315 – 1000	± 0.8
1000 – 2000	± 1.2
2000 – 4000	± 2
4000 & ABOVE	± 3

LENGHT OF SHORTER SIDE OF ANGLE

1 – 6	±1°
6 – 30	±0° – 30'
30 – 120	±0° – 20'
120 – 400	±0° – 10'

SURFACE FINISH IN MICRON 3.15 CLA

CHAMFER 1x45°

NOTE: –
1) IF IN DOUBT ASK.
2) ALL DIMENSIONS ARE IN mm.
3) REMOVE SHARP CORNERS AND BURS.
4) DO NOT SCALE THE DRAWING.

	NAME	SIGNATURE	DATE
DRAWN	DKV		08/01/2021
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL :– MS

SYMBOL :–

WEIGHT :–

TITLE :–
Extension Assembly type –1
Deepalporadhan

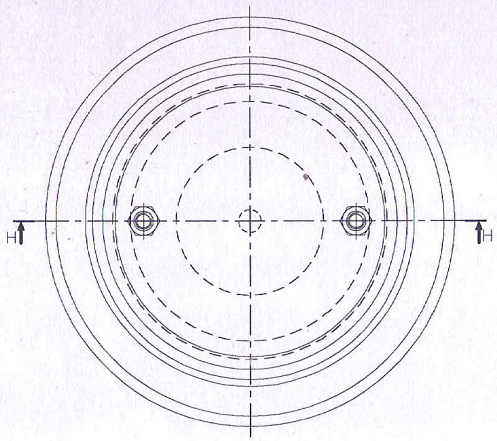
DWG. NO. :– DD–PTR–04

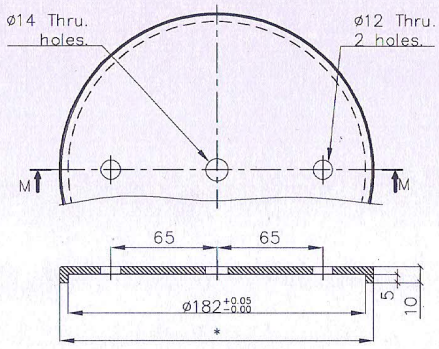
A3

REV. 01

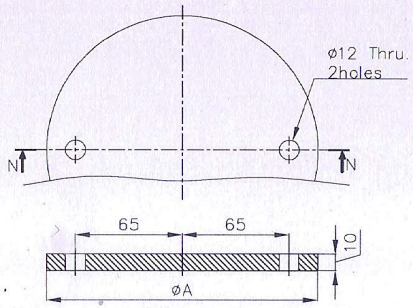
SCALE :– NTS

SHEET 01 OF 01





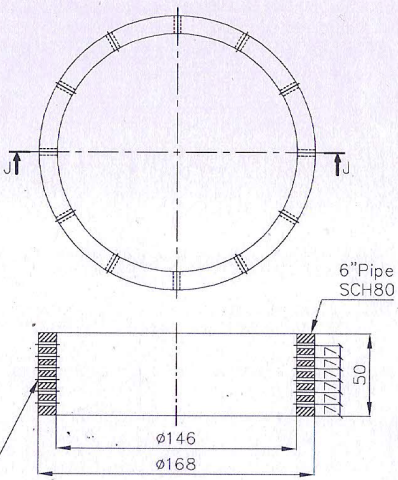
Part No.:-01 Section M-M



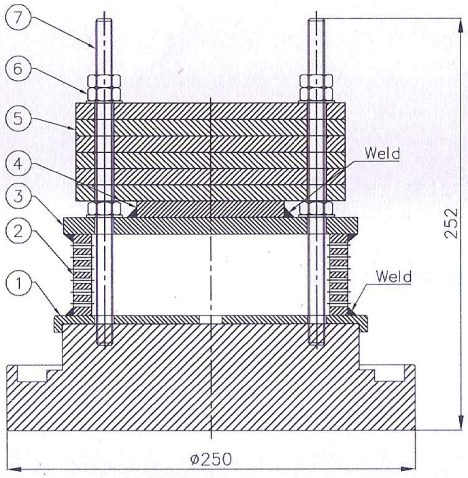
Part No.:- 03 & 05 Section N-N

Part No.	Dimension"øA"mm
03	ø180
05	ø165

ø4 Thru.12 holes on circular diameter (total=12x6rows =72 holes)

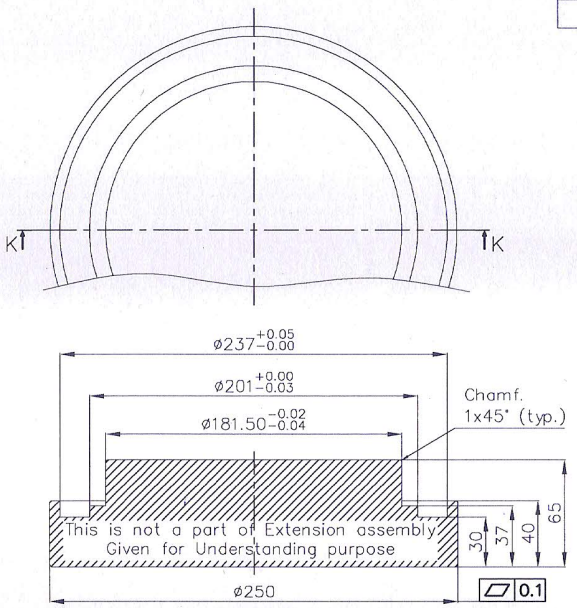


Part No.:-02 Section J-J



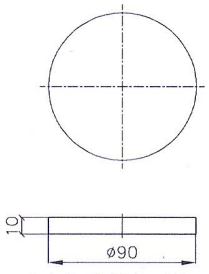
Section H-H

EXTENSION ASSEMBLY TYPE -2



Section K-K

⚠ (Note: Given for understanding purpose)



Part No.:-04

Notes:-
1) ALL DIMENSIONS ARE IN mm.
2) REMOVE ALL SHARP EDGES.
*3) To be finalized during manufacturing.

Sr.No	Description	Material	Quantity	Spare qty
07	Stud M10x1.5Px200Long	High Tensile Bolt grade 10.9	02 Nos.	02 Nos
06	Hex. M10 Nut & washer	ASTM SA194 Gr.4/Gr.7	06 Set.	16 Set
05	Circular plate -3	MS:IS2062	06 Nos.	
04	Circular plate -2	MS	01 No.	
03	Circular plate -1	MS	01 No.	
02	Filter	MS	01 No.	
01	Flange cover	MS	01 No.	

⚠ BILL OF MATERIAL

REV. NO.	DESCRIPTION	DRAWN	DATE
01	Revised drawing	DKV	08/01/2021
00	Issued Drawing	DKV	13/12/2019

GENERAL TOLERANCE UNLESS OTHERWISE SPECIFIED SHOULD CONFIRM TO IS : 2102 VIZ : (MIDIUM CLASS)

LINEAR DIMENSIONS

UP TO -6	± 0.1
6 - 30	± 0.2
30 - 120	± 0.3
120 - 315	± 0.5
315 - 1000	± 0.8
1000 - 2000	± 1.2
2000 - 4000	± 2
4000 & ABOVE	± 3

LENGHT OF SHORTER SIDE OF ANGLE

1 - 6	±1°
6 - 30	±0° - 30'
30 - 120	±0° - 20'
120 - 400	±0° - 10'

SURFACE FINISH IN MICRON 3.15 CLA

CHAMFER 1x45°

NOTE:-
1) IF IN DOUBT ASK.
2) ALL DIMENSIONS ARE IN mm.
3) REMOVE SHARP CORNERS AND BURS.
4) DO NOT SCALE THE DRAWING.

	NAME	SIGNATURE	DATE
DRAWN	DKV		08/01/2021
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL :- MS

SYMBOL :-

WEIGHT :-

TITLE :- Extension Assembly type -2

Deepalyoradhan

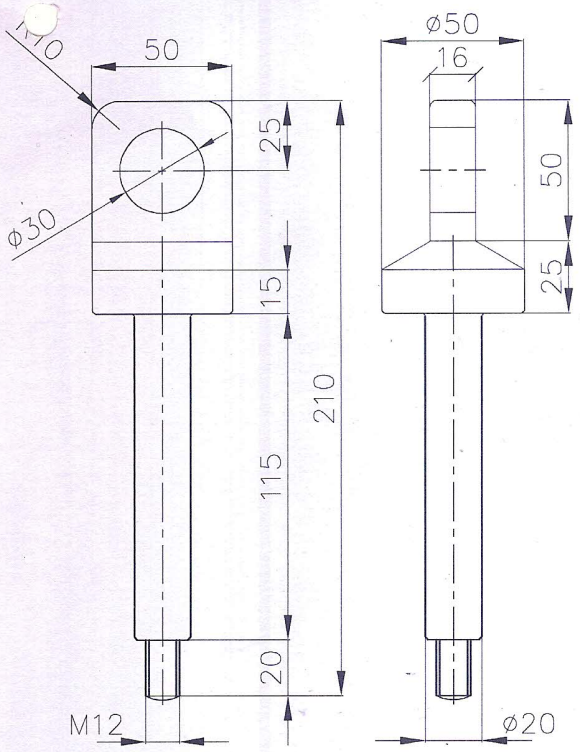
DWG. NO. :- DD-PTR-05

A3

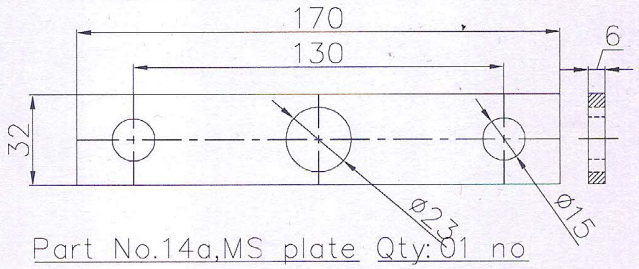
REV. 01

SCALE :- NTS

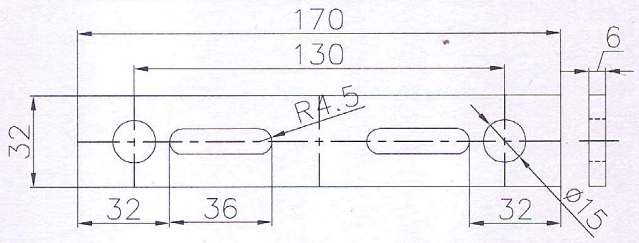
SHEET 01 OF 01



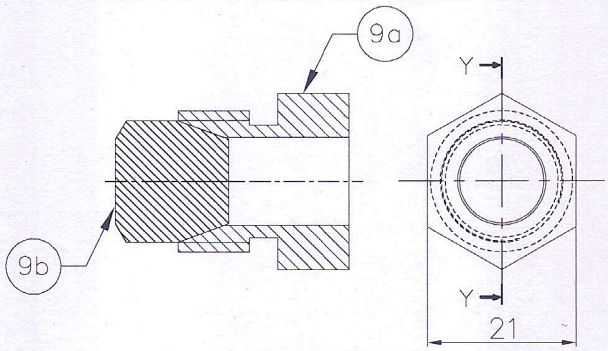
Part No.08 Matl.:– SS304



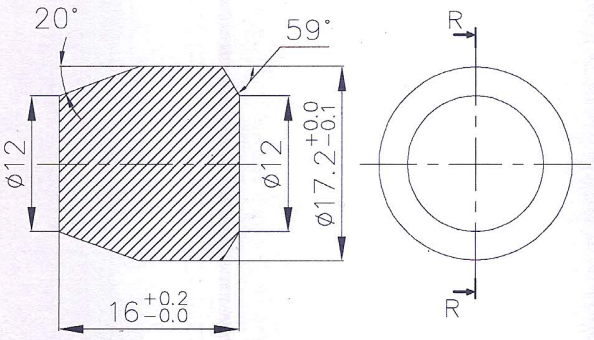
Part No.14a,MS plate Qty: 01 no



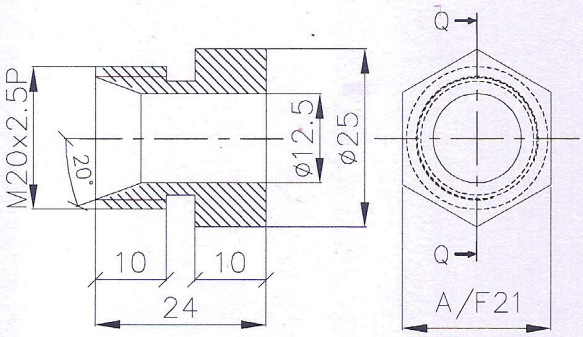
Part No.14b, MS plate Qty: 01 no



Section Y–Y PLUG
Part No.:–09



Section R–R (Scale: 4:1)
Part No.:–09B Matl.:– Delrin



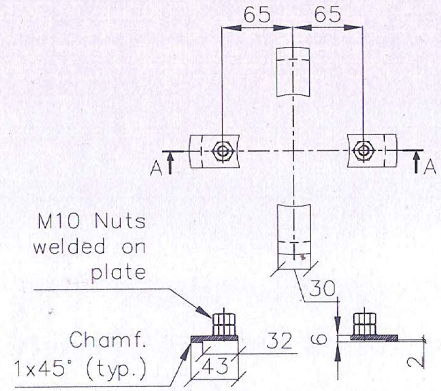
Section Q–Q (Scale: 2.5:1)
Part No.:–09A Matl.:– SS304

Notes.:–
1) ALL DIMENSIONS ARE IN mm.
2) REMOVE ALL SHARP EDGES.

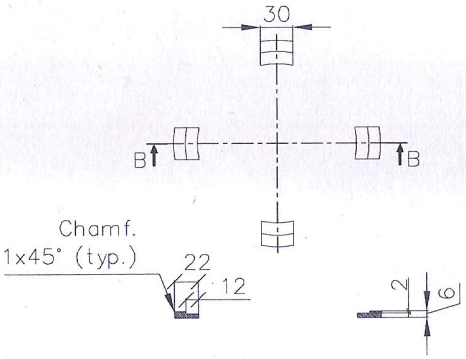
	NAME	SIGNATURE	DATE
DRAWN	DKP	---	26/10/2021
CHK'D	---		
APPV'D	---		
MFG			
Q.A			

TITLE :–
Connector & Plug detail

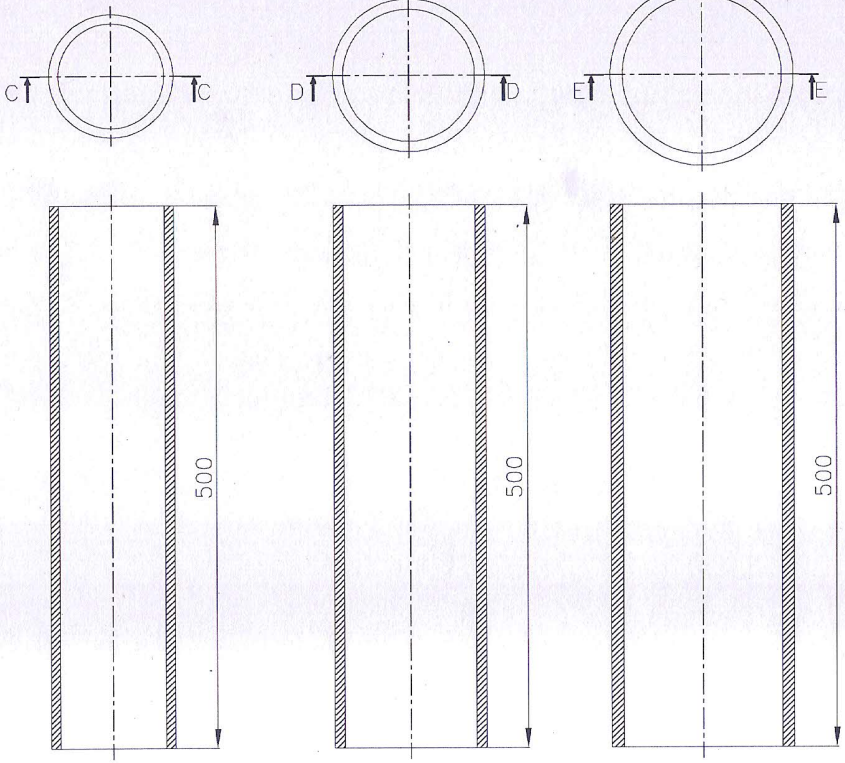
MATERIAL:	SYMBOL:–	DWG NO.:–	A4
---		DD–PTR–06	REV.00
WEIGHT		SHEET 1 OF 1	SCALE



Part No.1 Section A–A
Qty.:– 04 Nos.
Matl.:–MS IS2062



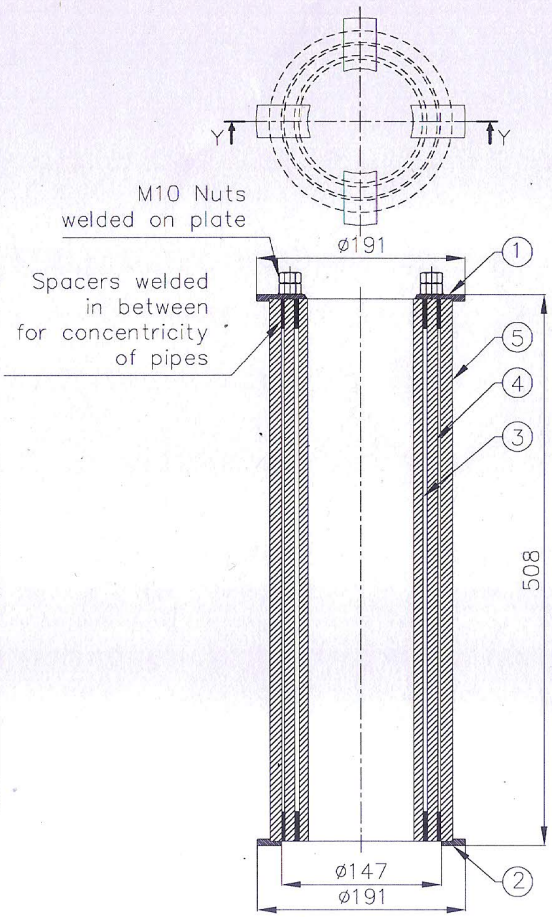
Part No.2 Section B–B
Qty.:– 04Nos.
Matl.:–MS IS2062



Part No.3 Section C–C
4" SCH.80
Qty.:– 1No.
Matl.:–SA106 Gr.B

Part No.4 Section D–D
5" SCH.80
Qty.:– 1No.
Matl.:–SA106 Gr.B

Part No.5 Section E–E
6" SCH.80
Qty.:– 1No.
Matl.:–SA106 Gr.B



Section Y–Y
Pipe Assembly
Part No.10

REV. NO.	DESCRIPTION	DRAWN	DATE
01	Revised Drawing	DKP	26/10/2021
00	Issued Drawing	DKV	13/12/2019

GENERAL TOLERANCE UNLESS OTHERWISE SPECIFIED SHOULD CONFIRM TO IS : 2102 VIZ : (MIDIUM CLASS)

LINEAR DIMENSIONS

UP TO –6	± 0.1
6 – 30	± 0.2
30 – 120	± 0.3
120 – 315	± 0.5
315 – 1000	± 0.8
1000 – 2000	± 1.2
2000 – 4000	± 2
4000 & ABOVE	± 3

LENGHT OF SHORTER SIDE OF ANGLE

1 – 6	±1°
6 – 30	±0° – 30'
30 – 120	±0° – 20'
120 – 400	±0° – 10'

SURFACE FINISH IN MICRON 3.15 CLA

CHAMFER 1x45°

NOTE:–
1) IF IN DOUBT ASK.
2) ALL DIMENSIONS ARE IN mm.
3) REMOVE SHARP CORNERS AND BURS.
4) DO NOT SCALE THE DRAWING.

	NAME	SIGNATURE	DATE
DRAWN	DKV		13/12/2019
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL :– ---

SYMBOL :–

WEIGHT :–

TITLE :– Internal Pipe Assembly

DWG. NO. :– DD–PTR–07

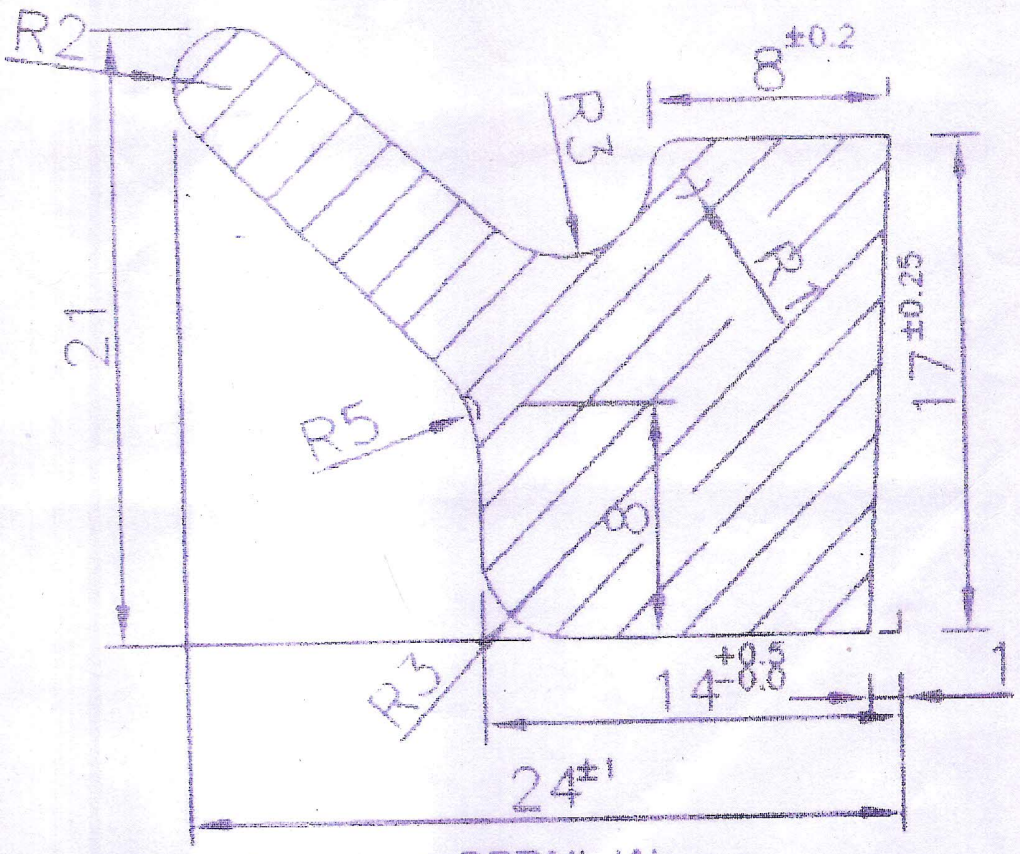
A3

REV. 01

SCALE :– 1:1

SHEET 01 OF 01

SKETCH - 1



DETAIL 'A'

LIP SEAL CROSS SECTION

MOC - EPDM/EPR

HARDNESS - 70 DUROMETER

Deepalyoradha