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सत्यमेव जयते

भारत सरकार

Government of India

भाभा परमाणु अनुसंधान केन्द्र

Bhabha Atomic Research Centre

उच्च तापमान रिएक्टर अनुभाग

High Temperature Reactor Section

हाल - 7,
ट्रोम्बे,
मुंबई - 400 085,
HALL No. 7,
TROMBAY,
MUMBAI - 400 085

Ref. No.: RDDG/HTRS/KKP/MF/ 8404 /2021

Date: 07/12/2021

Dear Sir(s),

Sub: Fabrication, pre-dispatch inspection, supply and guarantee of gas purification facility meeting the technical requirements as mentioned in HTRS/KKP/2021/10.

Sealed quotations are invited by Head, HTRS on behalf of the President of India for the execution of the following job:

Fabrication, pre-dispatch inspection, supply and guarantee of gas purification facility meeting the technical requirements as mentioned in HTRS/KKP/2021/10.

General Notes:

- 1) The bidder shall take all the necessary safety precautions during work and they shall be responsible for any damage or accidents. No compensation in any case will be paid by the Department to the bidder.
- 2) The work shall be subject to inspection by the purchaser or his authorised representative. Work shall be conducted under their supervision and to the full extent of satisfaction.
- 3) The work shall be completed within 60 days from the receipt of work order.
- 4) The quotations must reach Head, HTRS latest by 27 /12/2021. Quotations will be opened on 28 /12/2021. Address for sending quotations: **Shri I.V. Dulera, Head, HTRS, RED Office, Engg Hall-7, Bhabha Atomic Research Centre, Trombay, Mumbai – 400085.**
- 5) The above mentioned **REFERENCE NUMBER** and **DATE OF OPENING OF BIDS MUST BE CLEARLY MENTIONED ON THE SEALED ENVELOPE** containing the quotation. Offers should be sent by **Registered or Speed Post only**.
- 6) Payment will be made as per rules, after the completion of the work to purchaser's satisfaction against submission of original bill in triplicate and advance stamped receipt.
- 7) Income tax @2% and Educational cess as applicable will be deducted from the bill.
- 8) Any delay which is attributable to the contractor is liable for penalty @ ½ % per week (Max 5%).
- 9) Bidder shall mention their PAN and GST Nos. in the quotation.
- 10) The offer shall be kept open for acceptance for a minimum period of 45 days from the date of opening of the quotation.

- 11) Head, HTRS reserves the right to accept/reject any or all the quotations received without assigning any reason whatsoever.
- 12) The bidder shall furnish the detailed information regarding whether an ex-employee of BARC is working in their organisation or whether any of their relative is working in DAE/BARC or whether he/she is an ex-employee of DAE/BARC. In case of absence of such information, or wrong information the quotation or contract is likely to be rejected or cancelled.

CONFIDENTIALITY CLAUSES:

I. Confidentiality:

No party shall disclose any information to any third party concerning the matters under this contract generally. In particular, any information identified as "Proprietary" in nature by the disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party.

This clause shall apply to the sub-bidders, consultants, advisers or the employees engaged by the party with equal force.

II. "Restricted information" categories under Section 18 of the Atomic Energy Act, 1962 and "Official Secrets" under Section 5 of the Official Secrets Act, 1923:-

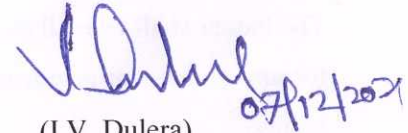
Any contravention of the above-mentioned provisions by any bidder, sub-bidder, consultant, adviser or the employees of a bidder will invite penal consequences under the aforesaid legislation.

III. Prohibition against use of BARC's name without permission for publicity purposes:-

The bidder or sub-bidder, consultant, adviser or the employees engaged by the bidder shall not use BARC's name for any publicity purpose through any public media like Press, Radio, T.V. or Internet without the prior written approval of BARC.

Thanking you,

Yours Sincerely,



(I.V. Dulera)

Head, HTRS, RDDG

For and on behalf of the President of India
(The Purchaser)

Enclosures:

Specification (4 pages)

Drawings (8 pages)

आई. वी. दुलेरा/I. V. DULERA
अध्यक्ष, उच्च ताप रिएक्टर अनुभाग
HEAD, HIGH TEMPERATURE REACTOR SECTION
रिएक्टर अभिकल्पन एवं विकास वर्ग
REACTOR DESIGN & DEVELOPMENT GROUP
बाबा परमहंस अणुसन्धान केंद्र/BHABHA ATOMIC RESEARCH CENTRE

Specification for inert gas purification facility

1.0 SCOPE

Fabrication, pre-dispatch inspection, supply and guarantee of gas purification facility meeting the technical requirements as mentioned herewith.

Sl. No.	Item description	Quantity
1.	Oxygen purification vessel as per drawings A3-4012-M-001-ME	2 Set
2.	Moisture purification vessel as per drawings A3-4012-M-002-ME	2 Set
3.	Stand for oxygen & moisture purification vessel as per drawings A3-4012-M-007-GA	2 no.
4.	Acrylic body rotameter	4 Nos.
5.	Pressure gauge	4 Nos.
6.	1/4" Tube, 0.049" thick (MOC-SS304)	15 meter
7.	Ceramic band heaters (1 kW, 240 V) 102 MM Dx600 MM L	2 Nos.
8.	Ceramic band heaters (1 kW, 240 V) 76 MM Dx200 MM L	2 Nos.

2.0 TECHNICAL REQUIREMENTS

2.1 Bill of Material (BOM) for oxygen purification vessel, moisture purification vessel, stands to be maintained as per bill of materials in drawing no. A3-3012-M-001-ME, A3-3012-M-002-ME and A3-3012-M-007-GA on a PER SET basis and repeated below.

2.2 **Oxygen Purification vessel:** A3-4012-M-001-ME

S.N.	Parts to be fabricated	QTY	MOC
1.	Blind flange (as per A3-4012-M-003-ME)	2	SS304
2.	Slip-on flange(as per A3-4012-M-003-ME)	2	
3.	Hex head M8 X 35 mm bolt, hex nut, washer set	8	
4.	Vessel (80 NB SCH 10 pipe connected to 40 NB SCH 40 pipe at both end with conical section)	1	
5.	Angle support (30x30x3) (as per A3-4012-M-004-ME)	2	
6.	Support plate (as per A3-4012-M-005-ME)	1	
7.	Tube (1/4", 0.019" thk)	2	
8.	O ring (as per A3-4012-M-005-ME)	2	Teflon

2.2.1 All welds should be made such that they don't leave any internal crevices and checked by DPT.

2.2.2 Surface finish must be $\sqrt{M3}$ all over, in every parts except specified.

2.2.3 Concentricity and surface flatness of the flanges should be within the tolerance limit of ± 0.05 mm.

2.2.4 Final assembly will be checked by PMI at a time of PDI.

2.2.5 The oxygen purification vessels are to be pneumatically tested at 13 bar(g).

2.3 **Moisture Purification vessel:** A3-4012-M-002-ME

S.N.	Parts to be fabricated	QTY	MOC
1.	Blind flange (as per A3-4012-M-003-ME)	2	SS304
2.	Slip-on flange(as per A3-4012-M-003-ME)	2	
3.	Hex head M8 X 35 mm bolt, hex nut, washer set	8	
4.	Vessel (100 NB SCH 10 pipe connected to 40 NB SCH 40 pipe at both end with conical section)	1	

5.	Angle support (30x30x3) (as per A3-4012-M-004-ME)	2	Teflon
6.	Support plate (as per A3-4012-M-005-ME)	1	
7.	Tube (1/4", 0.019" thk)	2	
8.	O ring (as per A3-4012-M-005-ME)	2	

2.3.1 All welds should be made such that they don't leave any internal crevices and checked by DPT.

2.3.2 Surface finish must be $\sqrt{M3}$ all over, in every parts except specified.

2.3.3 Concentricity and surface flatness of the flanges should be within the tolerance limit of ± 0.05 mm.

2.3.4 Final assembly will be checked by PMI at a time of PDI.

2.3.5 The moisture purification vessels are to be pneumatically tested at 13 bar(g).

2.4 **Stand:** A3-4012-M-007-GA

S.N.	Bill of material for assembly	QTY	MOC
1.	Aluminum extrusion profile(40x40mm)	As per dimensions	Aluminum
2.	Die cast corner bracket (40x40mm)	100	
3.	T slot nut (m8 thread)	200	
4.	Button screw(m8)	200	

2.4.1 Two stands should be assembled at the supplier location during pre dispatch inspection.

2.5 **Acrylic body rotameter**

S.N.	Description	Value
a)	Meter body MOC	Transparent Acrylic body
b)	End fitting MOC	SS316, 1/4" compression fitting
c)	Float	SS316
d)	Packing	Teflon
e)	Max. temp. & pressure	70 °C, 7 kg/cm ²
f)	Op. temp. & pressure	50 °C, 5 kg/cm ²
g)	Rotameter type 1	Fluid: N2, Range: 0-10 LPM, qty-1 no.
h)	Rotameter type 2	Fluid: N2, Range: 0-5 LPM, qty-2 nos.
i)	Rotameter type 3	Fluid: H2, Range: 0-1500mLPM, qty-1 no.
j)	Inlet: Bottom, Outlet: Top	

2.6 **Pressure gauge**

2.6.1 Pressure range should be 0-20 bar(g)

2.6.2 Line fluid: N₂ gas

2.6.3 End fitting: 1/4" compression fitting SS304

2.7 **1/4" Seamless tube, 0.049" thick**

2.7.1 Minimum length of the tube should be 3000mm

2.7.2 Straightness of the tube should be as per ASTM A269.

2.8 **Ceramic band heaters** (1 kW, 240 V) 102 MM Dx600 MM L

2.8.1 Ceramic band heater for 4" pipe, heater length: 600mm, Power-1 kW

2.8.2 Maximum watt density should be 8 watt /cm².

- 2.8.3 Maximum operating temperature should be 800 °C.
- 2.8.4 Metallic terminal box with AB type clamping and provision for 2 T/c insertion
- 2.9 **Ceramic band heaters** (1 kW, 240 V) 76 MM Dx200 MM L
 - 2.9.1 Ceramic band heater for 3" pipe, heater length: 200mm, Power-1 kW
 - 2.9.2 Maximum watt density should be 8 watt /cm².
 - 2.9.3 Maximum operating temperature should be 800 °C.
 - 2.9.4 Metallic terminal box with AB type clamping and provision for 2 T/c insertion

2.10 **Testing Requirements:**

- a) Positive Material Inspection (PMI) testing of all vessels, flanges should be done by supplier at the time of PDI.
- b) Pneumatically testing at 13 bar(g) of all vessels should be done by supplier at the time of PDI.
- c) Die penetration test (DPT) will be done as per ASME SEC IX, in presence of purchaser.
- d) Bidder has to provide manufacturer certificate for SS-304 flanges, bolt, nuts and ¼" tube.
- e) Bidder has to provide Welding procedure specification, welder qualification certificate, & DPT of all welding.

3.0 DELIVERY REQUIREMENTS

- 3.1 Item should be delivered to BARC North Gate, Trombay, and Mumbai within 60 days of WO.
- 3.2 Bidder should mention PAN No, GST No. in the quotation.
- 3.3 **Packing and forwarding:** Packing, forwarding, freight & Transport charged shall be restricted to 3% or else original proof payment of the entire charges shall be furnished.
- 3.4 At the time of delivery, the following documents must be sent along with the item:
 - a) Warranty Certificate (for one year)
 - b) Delivery challan
 - c) Tax invoice
 - d) Advance Stamped Receipt
 - e) Annexure-II (An undertaking that GST has been promptly deposited)
 - f) Particulars of bank account of supplier for ECS payment
 - g) Cancelled Check
- 3.5 **Payment:** No payment will be made at the time of delivery, and no advance payment will be acceptable. Payment can be arranged at least 45 days after delivery, if the item is as per this specification and all paperwork as per para 3.3 and 3.4 is provided at the time of delivery. Please note that payment cannot proceed if the paperwork is not complete.

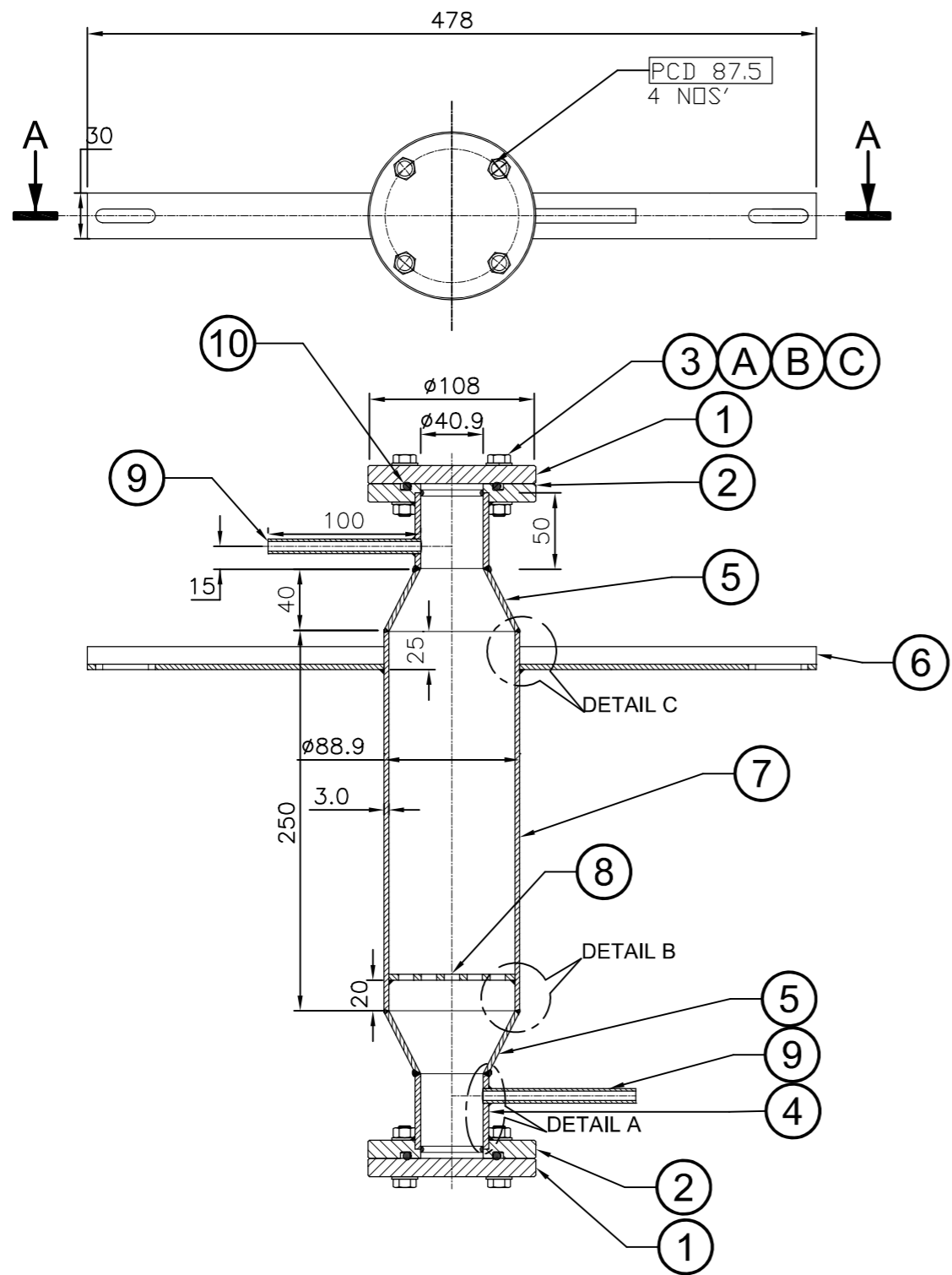
4.0 NOTE TO BIDDER

- 4.1 All offers should be sent by **speed post** only, in a properly **sealed** envelope. The bidder should clearly mention the Inquiry number, Inquiry date, Due date on the envelope.

- 4.2 The bidder shall provide item-wise quotation for the items mentioned in Para 1.0. Prices on a per piece basis should also be included. The bids may be rejected if the quotation does not mention the prices of all the items.
- 4.3 All the taxes, duties and other government levies shall be clearly mentioned in the offer. The testing, inspection, packing-forwarding-freight and delivery charges if any should be mentioned in the offer.
- 4.4 Proof of ability: The bidder shall provide, along with the quotation, adequate proof of show their capability to execute the job such as copies of the previous purchases orders placed on the executed by the party for the reputed firms (Indian and international). Specific mention should be made of previous supplies made to BARC, along with names and contact details of indenting officers and the purchase order numbers.
- 4.5 As a part of the offer, the bidder shall confirm point by point their acceptance of the various requirements and deviations if any from the specification.
- 4.6 Quotations found incomplete in any respect and also deficient in clarity about technical and commercial terms will be summarily rejected.
- 4.7 Bidder may clarify any doubt about the drawing by contacting

Shri. K.K. Panda,
Ph: 022-25596870,
Email: kkpanda@barc.gov.in

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SECTION A-A
(SCALE: 1:4)

BILL OF MATERIAL

PART NO.	DESCRIPTION	MATERIAL	QTY.	REF. DRG. NO.	REMARKS
1	BLIND FLANGE	SS304	2	A3-3012-M-003	NOTE6
2	SLIPON FLANGE	SS304	2	A3-3012-M-003	NOTE6
3	HEX HEAD M8 BOLT(35MM L)	SS304	8		
A,B,C	M8 HEX NUT & WASHER SET	SS304	8		
4	END PIPE (40NB SCH40)	SS304	2		
5	CONICAL SECTION (40NB-80NB)	SS304	2		
6	SUPPORT L ANGLES (30X30X3)	SS304	2	A3-3012-M-004	PART2
7	MAIN PIPE (80NB SCH10)	SS304	1		
8	SUPPORT PLATE	SS304	1	A3-3012-M-005	PART3
9	TUBE (1/4"OD, 049"THK)	SS304	2		NOTE6
10	O RING	TEFLON	2	A3-3012-M-005	

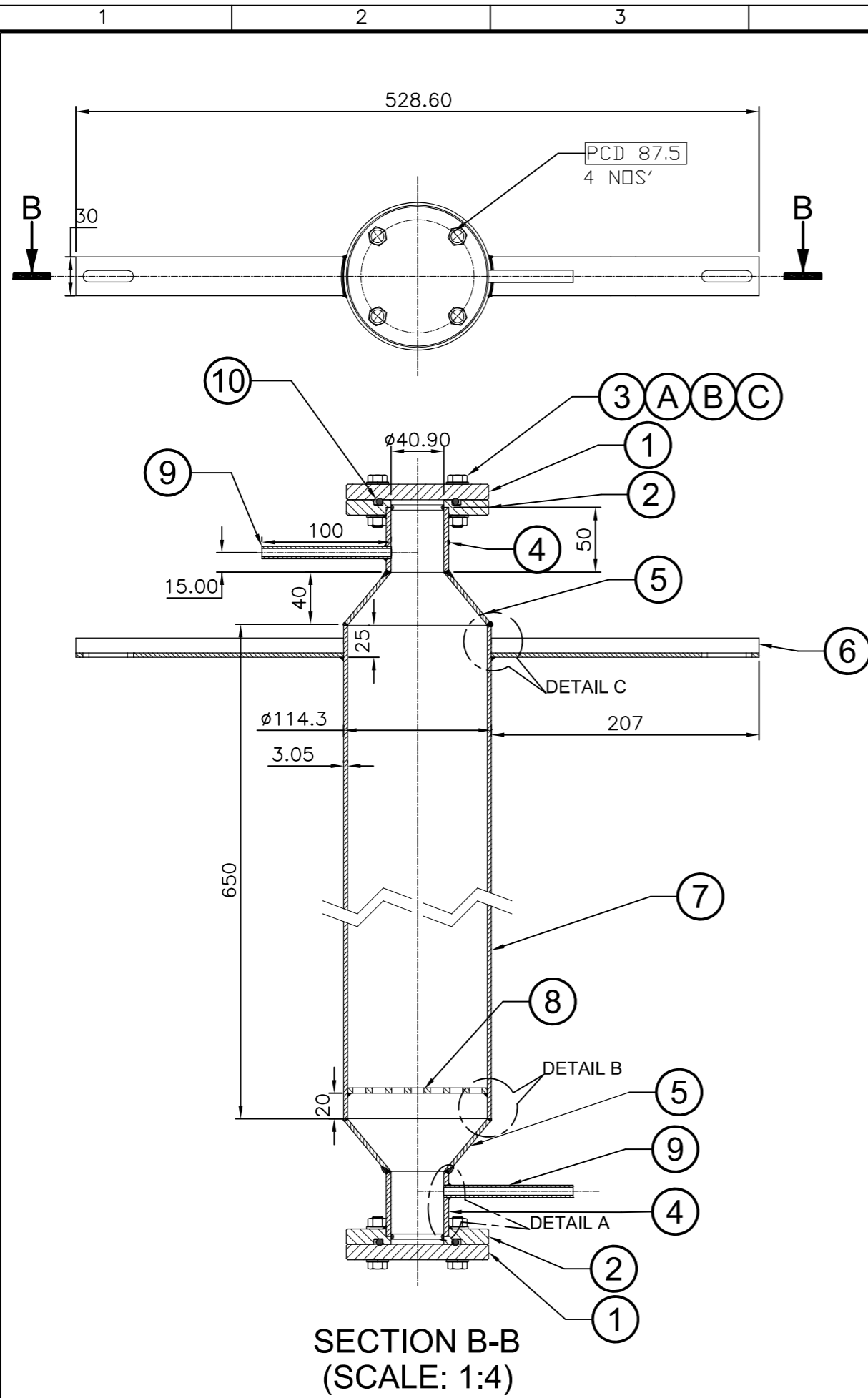
NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. REFER SHEET-6 (M-006) FOR DETAILS A,B,C.
3. ALL WELDS TO BE CHECKED BY DYE PENETRANT TESTING.
4. FINAL ASSEMBLY WILL BE CHECKED BY PMI AT A TIME OF PDI.
5. FINAL ASSEMBLY IS TO BE PNEUMATICALLY TESTED AT 13 BAR (G).
6. THESE ITEMS SHOULD BE MACHINED FROM BAR STOCK ONLY MACHINING FROM PLATE IS NOT PERMITTED.

SCALE- 1:4		PROJECTION	
SHEET	REV. NO.		
10F1	0		

DRG.NO. A3-4012-M-001-ME

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SECTION B-B
(SCALE: 1:4)

BILL OF MATERIAL

PART NO.	DESCRIPTION	MATERIAL	QTY.	REF. DRG. NO.	REMARKS
1	BLIND FLANGE	SS304	2	A3-3012-M-003	NOTE6
2	SLIPON FLANGE	SS304	2	A3-3012-M-003	NOTE6
3	HEX HEAD M8 BOLT(35MM L)	SS304	8		
	M8 HEX NUT & WASHER SET		8		
4	END PIPE (40NB SCH40)	SS304	2		
5	CONICAL SECTION (40NB-100NB)	SS304	2		
6	SUPPORT CHANNEL (35X35X3)	SS304	2	A3-3012-M-004	PART2
7	MAIN PIPE (100NB SCH10)	SS304	2		
8	SUPPORT PLATE	SS304	1	A3-3012-M-005	PART3
9	TUBE (1/4"OD, 049"THK)	SS304	1		NOTE6
10	O RING	TEFLON	2	A3-3012-M-005	

NOTES:-

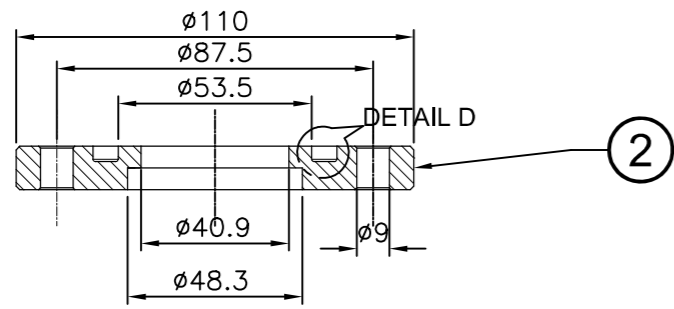
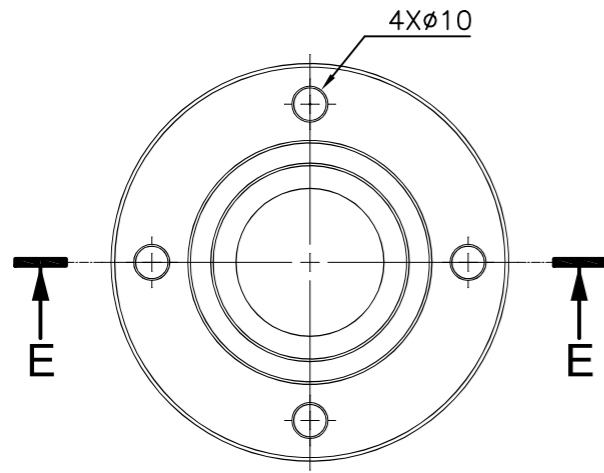
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2. REFER SHEET-6 (M-006) FOR DETAILS A,B,C.
3. ALL WELDS TO BE CHECKED BY DYE PENETRANT TESTING.
4. FINAL ASSEMBLY WILL BE CHECKED BY PMI AT A TIME OF PDI.
5. FINAL ASSEMBLY IS TO BE PNEUMATICALLY TESTED AT 13 BAR(G).
6. THESE ITEMS SHOULD BE MACHINED FROM BAR STOCK ONLY MACHINING FROM PLATE IS NOT PERMITTED.

SCALE- 1:4 PROJECTION

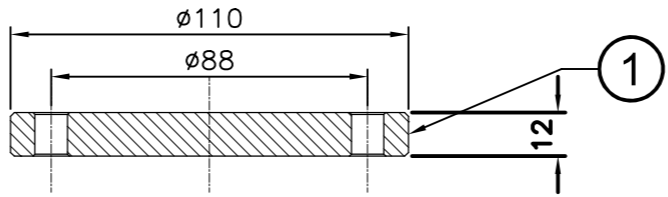
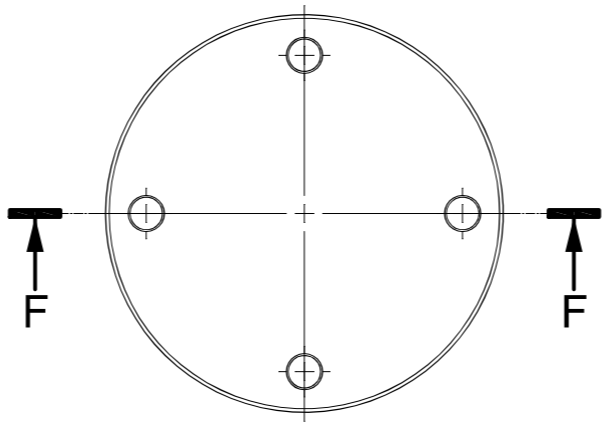
SHEET	REV. NO.
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DRG.NO. A3-4012-M-002-ME

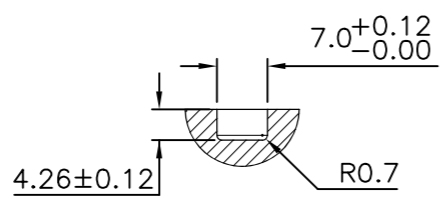
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SECTION E-E
(SCALE: 1:2)



SECTION F-F
(SCALE: 1:2)



DETAIL D
(SCALE: 1:1)

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. REFER SHEET-1 FOR PART NO & BOM.

SCALE- 1:2 PROJECTION

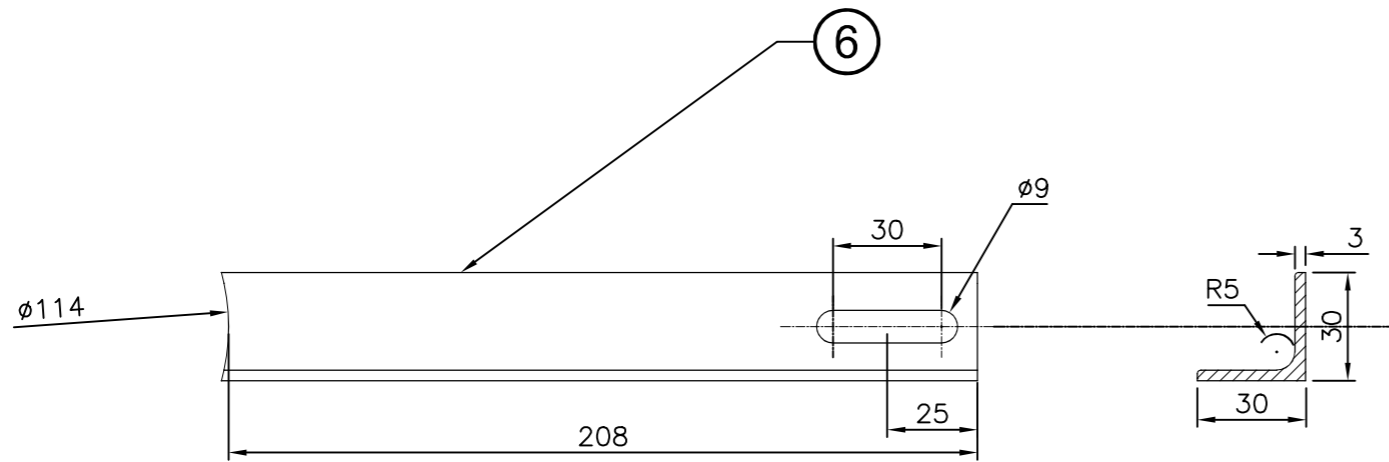
DRG.NO. A3-4012-M-003-ME

SHEET	REV. NO.
1OF1	0

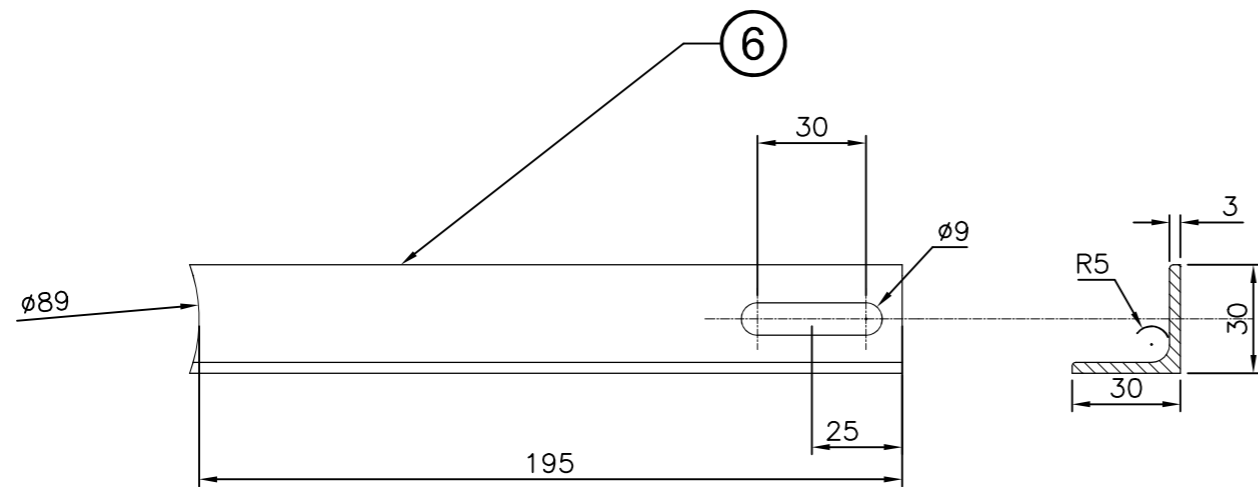
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BILL OF MATERIAL

PART NO.	DESCRIPTION	MATERIAL	QTY.	REF. DRG. NO.	REMARKS
6	SUPPORT 1 FOR ITEM 1	SS304	2	A3-3012-M-001	
6	SUPPORT 2 FOR ITEM 2	SS304	2	A3-3012-M-002	



SUPPORT 1
(SCALE: 1:2)



SUPPORT 2
(SCALE: 1:2)

DRG.NO. A3-4012-M-004-ME

SCALE- 1:2 PROJECTION

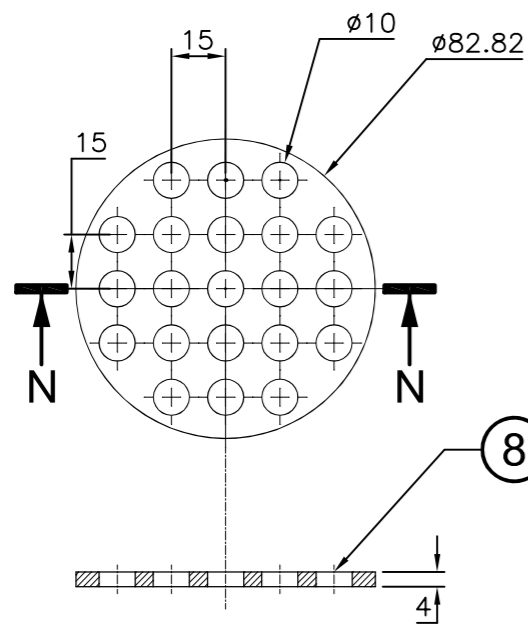
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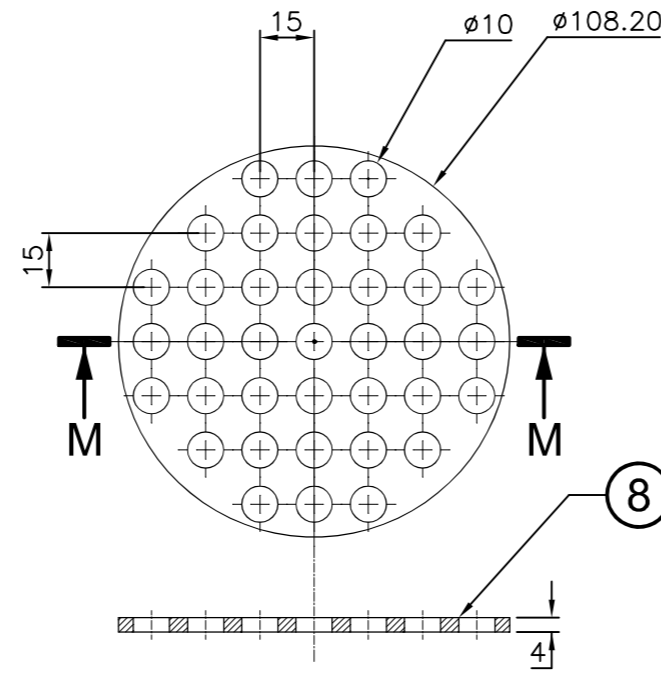
A
B
C
D
E
E
H
F

1 2 3 4 5 6 7 8

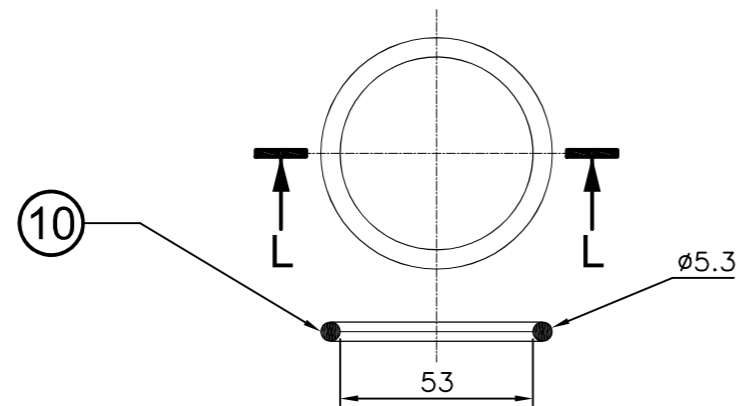
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SUPPORT PLATE 1
SECTION N-N
(SCALE: 1:2)



SUPPORT PLATE 2
SECTION M-M
(SCALE: 1:2)



O-RING
SECTION L-L
(SCALE: 1:1)

BILL OF MATERIAL

PART NO.	DESCRIPTION	MATERIAL	QTY.	REF. DRG. NO.	REMARKS
8	SUPPORT PLATE 1 FOR ITEM 1	SS304	1	A3-3012-M-001	
8	SUPPORT PLATE 2 FOR ITEM 2	SS304	1	A3-3012-M-002	
10	O-RING	TEFLON	4		

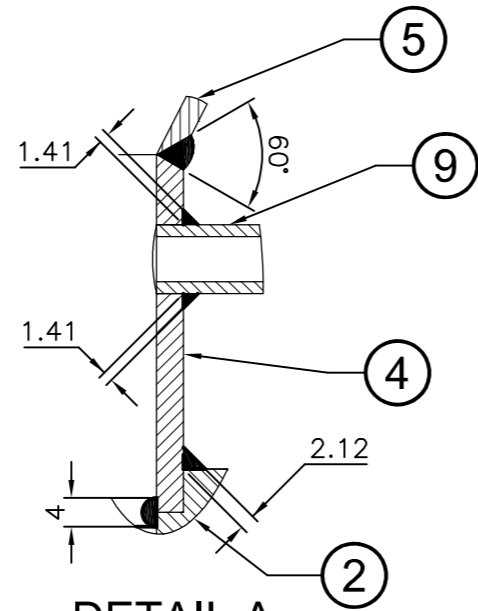
SCALE- 1:2

PROJECTION

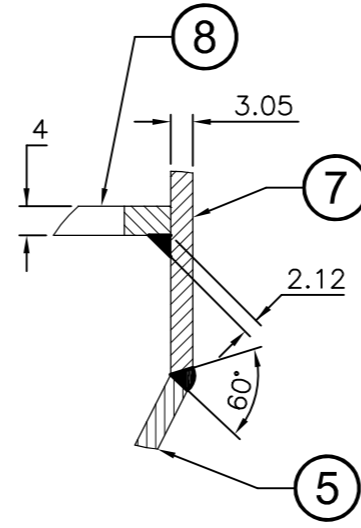
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SHEET	REV. NO.
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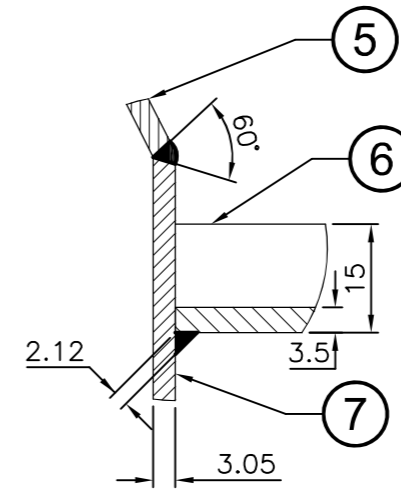
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DETAIL A
(SCALE: 1:1)

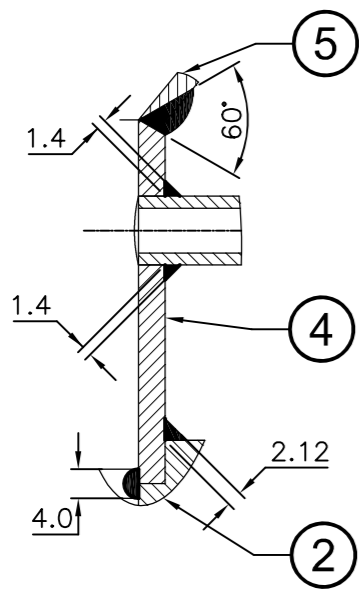


DETAIL B
(SCALE: 1:1)

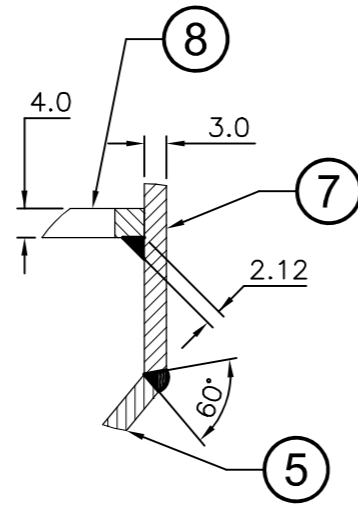


DETAIL C
(SCALE: 1:1)

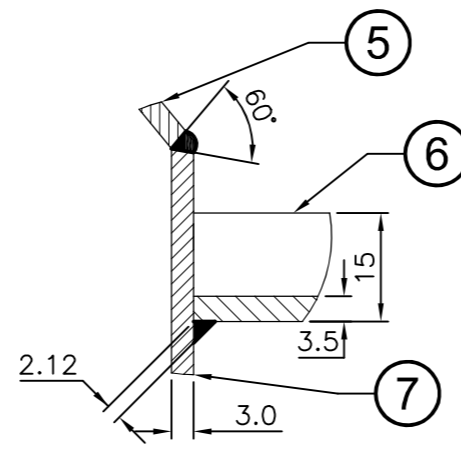
DETAIL A,B,C FOR ITEM 1 (REF.DRG.NO : A3-3012-M-001-ME)



DETAIL A
(SCALE: 1:1)



DETAIL B
(SCALE: 1:1)

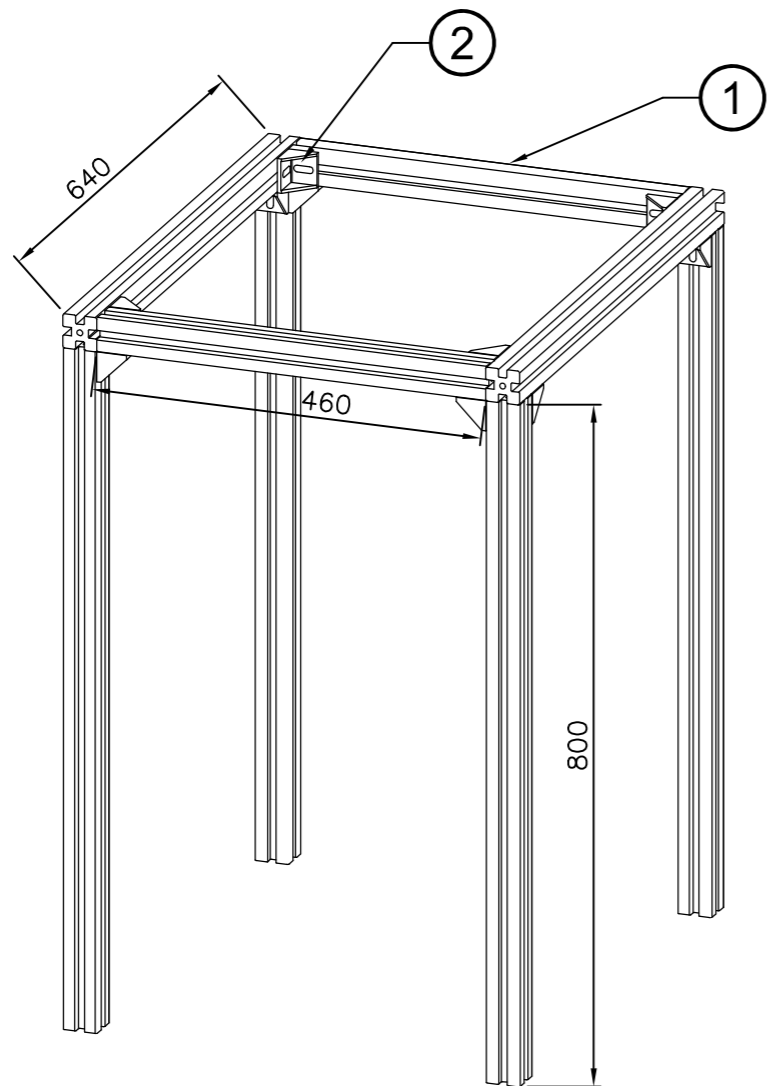


DETAIL C
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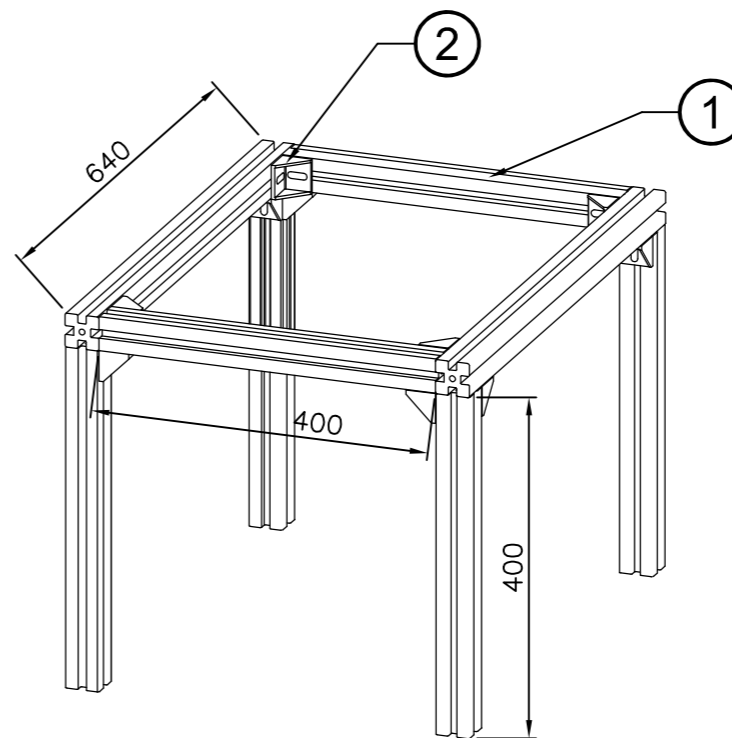
DETAIL A,B,C FOR ITEM 2 (REF.DRG.NO : A3-3012-M-002-ME)

DRG.NO. A3-4012-M-006-ME		SCALE- 1:1	PROJECTION
SHEET	REV. NO.		
10F1	0		

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STAND-1



STAND-2

BILL OF MATERIAL			
PART NO.	DESCRIPTION	MATERIAL	QTY.
1	EXTRUSION PROFILE(40X40mm)	ALUMINUM	AS PER DIM.
2	DIE CAST CORNER BRACKET (40X40mm)	ALUMINUM	100 nos.
3	T SLOT NUT (M8 THREAD)	ALUMINUM	200 nos.
4	BUTTON SCREW(M8)	ALUMINUM	200 nos.

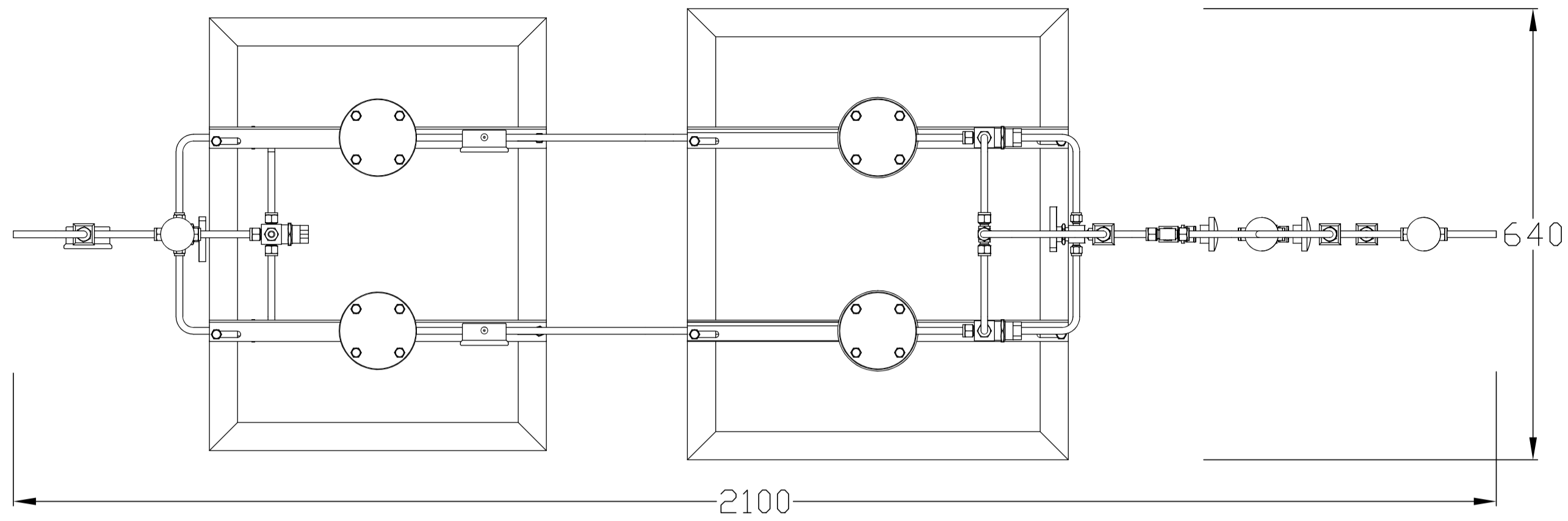
NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. ALUMINUM CHANNEL WILL BE CUT AS PER DIM.

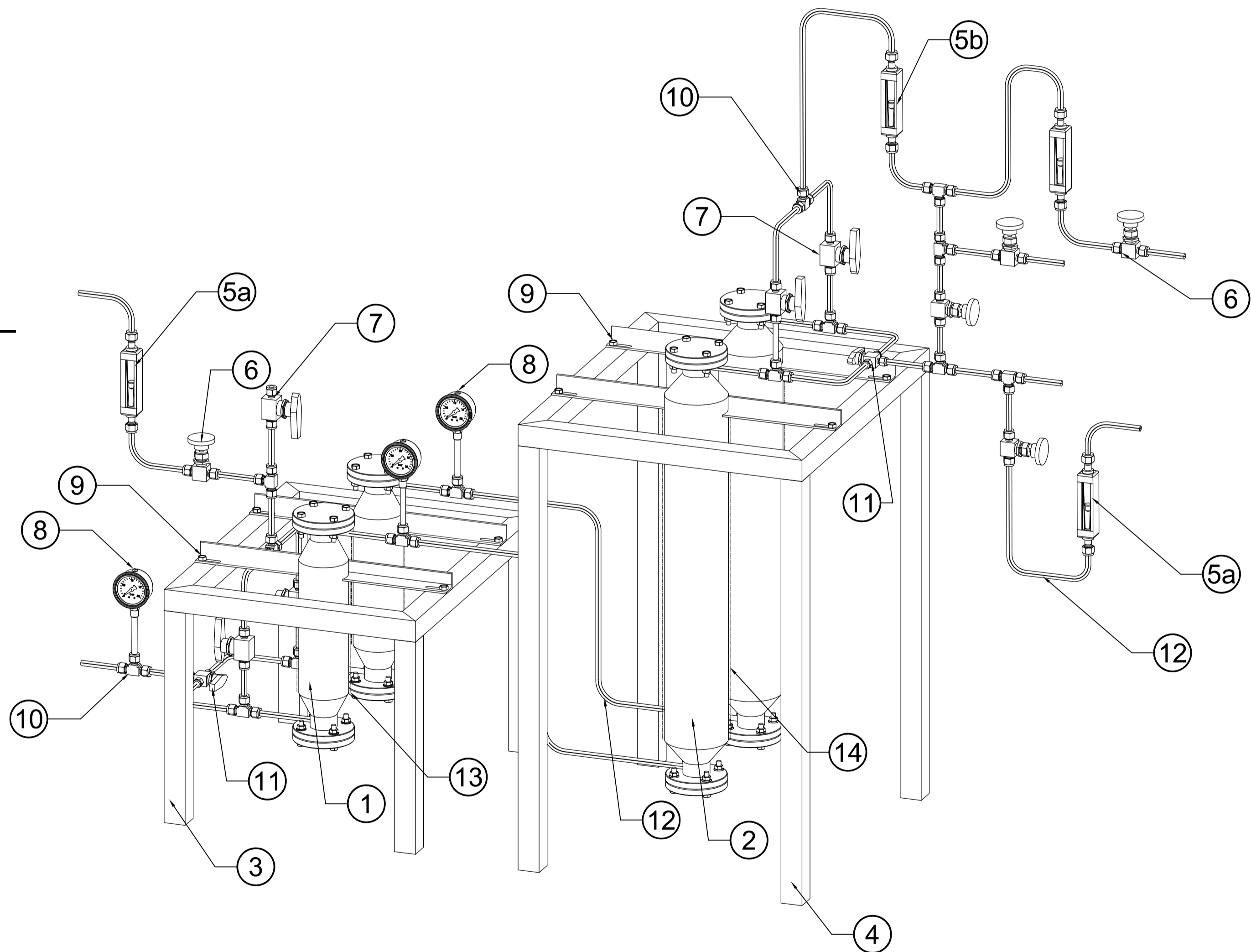
SCALE- 1:4 PROJECTION

DRG.NO. A3-4012-M-007-GA

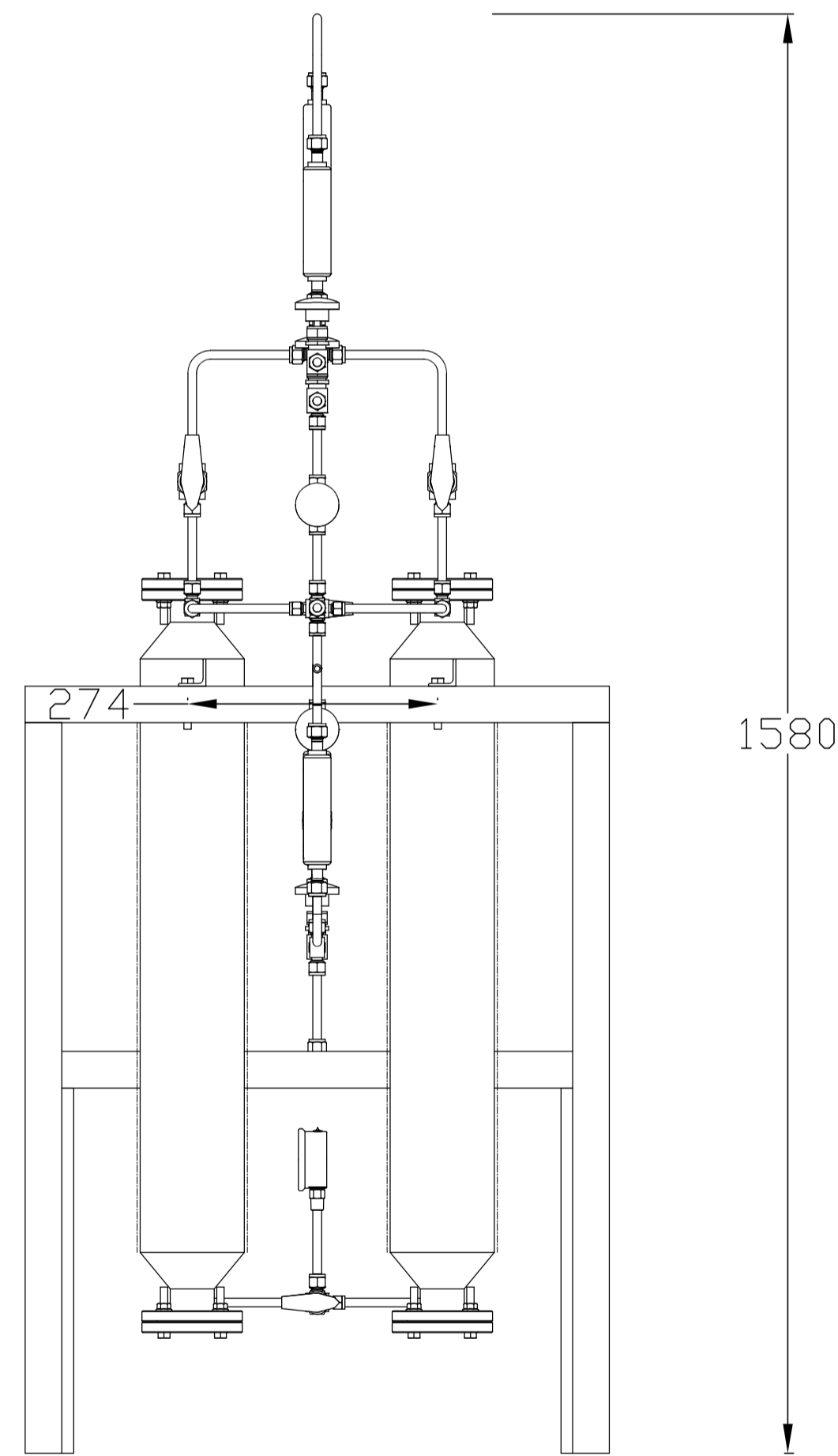
SHEET	REV. NO.
10F1	0



TOP VIEW



ISOMETRIC VIEW



SIDE VIEW

BILL OF MATERIAL

PART NO.	DESCRIPTION	DIMENSION	QTY.	MATERIAL	REFER.
1	OXYGEN PURIFICATION VESSEL	80 NB PIPE & 430 mm HT.	2	SS 304	001-ME
2	MOISTURE PURIFICATION VESSEL	100 NB PIPE & 830 mm HT.	2	SS 304	002-ME
3	STAND-2	400 x 640 x 400	1	ALUMINUM CHANNEL	007-GA
4	STAND-1	460 x 640 x 800	1	ALUMINUM CHANNEL	007-GA
5 a	ACRYLIC BODY ROTAMETER	ø10-10 LPM (N2 EQV.), 1/4" COMP. FITTING.	1	ACRYLIC	
5 b		ø10-5 LPM (N2 EQV.), 1/4" COMP. FITTING.	2	ACRYLIC	
5 c		ø10-15 LPM (H2 EQV.), 3/8" COMP. FITTING.	1	ACRYLIC	
6	NEEDLE VALVE	1/4" COMPRESSION FITTING	5	SS304	BARC SCOPE
7	BALL VALVE	1/4" COMPRESSION FITTING	5	SS304	BARC SCOPE
8	PRESSURE GAUGE	0-20 BAR(G), 1/4" COMP. FIT.	4	SS304 CASING	
9	M8 HEX BOLT, NUT	50 MM LONG	4	SS 304	
10	TEE	1/4" COMPRESSION FITTING	15	SS 304	BARC SCOPE
11	3 WAY BALL VALVE	1/4" COMPRESSION FITTING	2	SS 304	BARC SCOPE
12	TUBE	1/4" OD, 0.049" THK	15MTR.	SS 304	
13	CERAMIC BAND HEATER-1	102 mm D, 600 mm L	2	NICHROME	
14	CERAMIC BAND HEATER-2	76 mm D, 200 mm L	2	NICHROME	

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE SPECIFIED.
2. FABRICATION, EXAMINATION AND TESTING AS PER ASME SEC. VIII. WELDING PROCEDURES AND WELDER QUALIFICATIONS AS PER ASME SEC. IX.
3. ALL WELDS TO BE CHEKED BY DYE PENETRANT TESTING

A3-3012-M-008-GA

THIS DESIGN AND DRAWING IS THE PROPERTY OF BHABHA ATOMIC RESEARCH CENTRE AND SHALL BE RETURNED WITH QUOTATION OR UPON DELIVERY OF MATERIAL AND EQUIPMENT AND MUST NOT BE USED EXCEPT BY PERMISSION OF THE OWNER

GROUP	COMMENTS	SIGN DATE	REFERENCE DRAWINGS	DRAWING NO.	REFERENCE DRAWINGS	DRAWING NO.	NO.	LOC.	DESCRIPTION	DES'D.	CHK'D.	DRG. DATE	APP'D.	DATE

TOLERANCES ON LINEAR DIMENSIONS (IS 2102)

DIMENSIONS	TOL.	DIMENSIONS	TOL.
UP TO 3	± 0.1	120-315	± 0.1
3 - 6	± 0.1	315-1000	± 0.15
6 - 30	± 0.2	1000-2000	± 0.2
30-120	± 0.3	2000-4000	± 0.3
RADI AND CHAMFERS	0.5-3	3-6	6-30
TOLERANCE	+/-0.2	+/-0.5	+/-1.0

SURFACE FINISH TO BE 3.2 MICRONS OR BETTER UNLESS OTHERWISE SPECIFIED. REMOVE ALL BURRS. ROUND SHARP CORNERS & EDGES TO R=0.3 MAX.

SCALE: 1:4

PROJECTION

DRG.NO. A1-4012-M-008-GA

SHEET 10/1 REV. NO. 0