BHABHA ATOMIC RESEARCH CENTRE
WASTE MANAGEMENT DIVISION
WASTE MANAGEMENT FACILITY - TROMBAY

Ref No.: WMD/WIP/Equip./RT/18/Quotation/ Date: 25/07/2018

Tender Enquiry for Minor Fabrication Works

Sub: Fabrication and supply of Inconel690 Process pot (02nos.) and Susceptor (01no.) based on ASME Sec III Division I Sub Section NC as per attached drawings and annexure.

Dear Sir,

Quotations are invited for Fabrication and supply of Inconel690 Process pot (02nos.) and Susceptor (01no.) based on ASME Sec III Division I Sub Section NC as per existing departmental drawings and annexure.

Interested parties are requested to contact on Telephone no. 2559-1091 foe issuance of tender enquiry and detailed scope of work.

Enquires shall be issued to eligible contractors from 30.07.2018 to 08.08.2018 between 10:00 hrs to 17:00 hrs on all working days.

The quotation shall be received on or before **08/08/2018 upto 13.00 hrs** at following address. The Sealed quotations will be opened on the same day at 1400 hrs in the divisional Office. Quotations shall be received by speed post only. You may contact following address for further details of the work.

Address: Shri Rahul Tripathi, SO/C
WMD,WIP, BARC, Trombay,
Mumbai-400085.
Ph-022-25591091 Email: rtripathi@barc.gov.in

Note :

1. Quotation shall be on printed letter head with GST no. etc.
2. Your offer shall be valid for minimum 60 days from the date of opening and quoted price shall remain same during the period of execution of the order.
3. Taxes etc., if any, shall be clearly mentioned.
4. Work shall be completed within 75 days from the date of issue of work order.
5. Payment shall be made after successful completion of work.
6. You should give 12 month guarantee certificate for workmanship from the date of delivery.
7. Chief Superintendent, WMD, reserves right to accept/reject any or all quotations without assigning any reason.

Thanking You.

Yours faithfully,

Rahul Tripathi
SO/C, WMD

ANNEXURE - WMD/WIP/Equip./RT/18

TECHNICAL SPECIFICATION FOR FABRICATION, INSPECTION,TESTING AND SUPPLY OF INCONEL 690 PROCESS POT (02no.) AND SUSCEPTOR (01no.)

1) SCOPE OF THE WORK AND SPECIAL REQUIREMENTS

Scope of work covers fabrication and supply of approximately 130Kg Inconel 690 process pot (02nos.) with two no. of pneumatic cylinders & four no. of gaskets and susceptor 01(no.) based on ASME Sec III Division I Sub Section NC as per attached drawings. Major points of scope of work have been described as following:

1. The work includes collection of free issue materials (FIM) (as mentioned in Appendix-I) from WIP stores at Trombay, Mumbai, preparation of fabrication drawings, shop fabrication of process pot & susceptor and its assembly as per ASME section III Division-I (NC), procurement of two no. of pneumatic cylinders, four no. of gasket (size and material as mentioned in the drawing of process pot and it should be approved by purchaser), stage wise & final QA and inspection of all equipments, Non Destructive Testing (NDT), packing & safe delivery of equipments to WMZ store, WIP, BARC, Trombay, Mumbai.
2. Preparation/submission/approval of fabrication drawing according to codes/standards mentioned in Technical Specifications for all equipment components.
3. Fabrication shall be started only after approval of fabrication drawings, WPS, PQR & WPQ, plate cutting layout, steps of fabrication and Quality Assurance plan (QAP) from department.
4. Process Pots shall be manufactured as per drawing no. **A1-3643-M-1039** and susceptors shall be manufactured as per drawing no. **A1-3643-M-1038**. These drawings are design drawing (or scope drawings) which are just given for reference purpose only and as such shall not be referred for obtaining fabrication details. The fabricator shall prepare fabrication/shop floor drawings & QAP and submit them for Purchaser's approval. The fabrication drawings given by supplier shall indicate all welding/ machining details and also the details of sheet forming and sheet rolling. After obtaining Purchaser's approval for fabrication drawings and the QAP for fabrication of the equipments, supplier shall proceed with the fabrication of the items.
5. Notes given in drawing should be strictly followed. Minor modifications suggested by the Purchaser for improving the functional effectiveness of the assemblies shall be carried out by the supplier without any extra cost to Purchaser; after obtaining prior approval from the Purchaser.
6. Drawings shall be prepared on computer using AutoCAD Software of latest version and stored on compact disk.
7. All dimensions have been mentioned in drawings. Supplier should also take final confirmation of all these dimensions prior to the fabrication of equipments and supplier

should discuss all points in a detailed way with Purchaser. If necessary, any changes required, shall be approved by Purchaser.

8. Off gas nozzle, mechanical plug assembly and thermocouple dimension and sizes are very critical and the sizing & fabrication of these things are also under the scope of supplier.
9. Collection of FIM from stores shall be carried out in stipulated time and shall be visually inspected by the fabricator immediately on receipt. In case of any defective materials being received by the fabricator as FIM, it shall be the responsibility of the fabricator to return the same to the purchaser, and obtain proper replacement immediately at the time of receipt of material.
10. In the case of any damage to FIM during fabrication, supplier will be fully responsible for that damage and he will pay amount equivalent to current price of that time (including all charges of QA and other testing) of that material.
11. Any alternative material used for fabrication shall be strictly prohibited and fabricator shall obtain approval of the purchaser for any deviation in mentioned standard procedure used for fabrication of equipments.
12. Inspection at the appropriate stages during fabrication shall be carried out and Preparation of inspection reports at these stages and submission of these reports to the purchaser as and when required during the execution of the contract for verification and records.
13. All fabrication including heat treatment such as annealing etc and machining etc. used during fabrication shall be confirm to relevant standard procedure and shall be approved by purchaser prior to the fabrication.
14. The Purchaser reserves the right to make, wherever found necessary, minor changes such as deletion or addition of any components, weld descriptions, testing methods, inspection procedure etc including changes in the fabrication drawings and such changes shall be considered as within the scope of the specified work.
15. Necessary modifications or improvements until satisfactory fabrication has not been found, shall be carried out by the contractor at the free of cost.
16. All NDT such as Liquid Penetrant Testing (LPT), Radiographic Testing (RT), Ultrasonic Testing (UT), Visual Testing (VT), Helium leak testing etc of all equipments shall be carried out at supplier's workshop and supplier should arrange all necessary things required for testing.
17. Packing and safe crating of storage tanks so as to avoid any damage during handling, transportation and storage before installation.
18. After approval of the drawings, fabricator shall submit 4 (four) prints of all the drawings to the Purchaser for reference and records.
19. All NDT shall be carried out as per relevant ASME code to the satisfaction of Quality surveyor.

20. Supplier shall submit a bill of material (after calculation) with offer in which supplier shall include each individual equipment weight, dimensions, fabrication method, cost (in Rs per Kg.) etc.
21. Collection of free issue material (FIM) is clearly defined in under fabricator's scope of work and fabricator shall collect FIM at his own expenses including labour and transport etc., from WMZ stores, WIP, BARC Trombay.

2) DRAWING, CODES AND STANDARDS:

i. The work shall be carried out strictly in accordance with the tender drawings and the documents/codes/standards of issue in effect on the date of the pertinent works documents. These documents shall constitute a part of this specification and apply as specified herein. **In the event of any conflict between any requirement as given in this specification and that of the applicable codes and standards, the governing requirement shall be the more stringent of the two at the discretion of the Purchaser.**

ii. Fabricator shall prepare shop floor drawings complete with all details for fabrication and QA correlation. The same shall be submitted for review/approval of Purchaser before taking up fabrication The Purchaser reserves the right to make, wherever found necessary, minor changes in the fabrication drawings prior to their approval.

2.1 ASME BOILER & PRESSURE VESSEL CODES :

Section III NC - Rules for construction of nuclear components
Section II—Materials and Specifications
Section V - Non Destructive Examination
Section IX - Welding and Brazing Qualifications

2.2 ASTM STANDARDS :

ASTM –E –165 - Recommended Practice for Liquid Penetrant Inspection.
ASTM E-270 - Definitions of terms relating to liquid penetration inspection
ASTM –E –94 - Recommended Practice for Radiographic Testing
ASTM –E –142 - Std. Methods for Controlling Quality of Radiographic Testing.
ASTM –E –1003 - Hydrostatic Testing

3) MATERIALS :

1) The material of construction for both the equipment is Inconel 690; which will be supplied as FIM (Free Issue Materials) and will be issued from our stores at WIP, Trombay. In the event of non-availability of plates or pipes of particular size/thickness, nearest available suitable higher size plates/pipe will be issued. Welding filler wire will also be issued as FIM for this work.

2) The fabricator shall be required to submit an insurance policy at his own cost for the full value of the cost of FIM issued to him and the validity of the insurance policy shall be up to the completion of the work. It should be submitted within one week from issue of the work order. The insurance policy shall cover any loss or damage to the Purchaser’s materials due to fire, theft, burglary, riot, civil commotion, strike etc. The insurance

policy shall also cover any damage arising out of external sources such as damages due to other materials falling on purchaser's materials and earthquake. The insurance policy shall be valid till the delivery period of all the items covered by this tender. The validity of the insurance policy shall be extended in case the completion date of the order gets extended. The insurance policy shall include beneficiary as "President of India, acting through Chief Superintendent, WMD." Total cost of FIM for the equipments is **Rs. 4,00,000/-(Rs. Four Lacs only).**

3) The fabricator shall be responsible for the safety of FIM after it is received by them and all through the period during which the material will remain in their possession. They shall take all necessary precautions against any loss, deterioration or destruction of the free issue material from whatever cause arising whilst the said material remains in their possession and/or custody or control.
4) The fabricator shall also not mix-up the material in question with any of their materials and shall render true and proper account of the materials actually used and return the balance remaining on hand unused along with the scrap materials, if any, within a period of 15 days from the date of delivery of materials covered by the purchase order. Accordingly, a FIM statement shall be prepared and submitted.

5) Material consumption statement should be submitted to departmental stores (WIP stores) after completion of work and scrap will be returned with finished job to departmental stores (WIP stores).

The cutting of the plate should be started only after approval of plate cutting diagram submitted by you for the approval. Burning, cutting, grinding and machining losses/allowance up to 3% weight loss of consumed material is acceptable, which is non recoverable.

4) FABRICATION AND MACHINING :

1) Since the assemblies are meant for use in hazardous radioactive environment, their integrity is of utmost concern and calls for highest standards of engineering and workmanship in the manufacturing. **Fabrication of the Process Pots and Susceptors shall be as per ASME Section – III NC and shall be carried out in Dust free enclosure room in the shop floor with clean environment to avoid foreign particle contamination. Separate enclosure for fabrication and storing of equipment and FIM of these equipments shall also be made available. All the materials shall be pre-cleaned prior to taking for fabrication as per the approved procedure** and passivated before delivery.
2) During fabrication, it shall be ensured that Centricity of the process pots & susceptors shall be maintained to be within ± 1.00 mm from centreline. With regard to final dimensions of both the Process Pots & Susceptors, achievement of centricity as indicated in the drawing shall be of topmost priority with the flatness of top flanges maintained within 20 microns and the edges maintained to be perpendicular to the shell axis within 0.25 mm.

5) WELDING :

1) Welding details shown in the tender drawings are only indicative and the supplier shall ensure strength of all the welded joints against the intended load.
2) WPS,WPQ and PQR shall be submitted for approval of Department before starting fabrication.
3) Complete details of all the welded joints shall be given in the fabrication drawings which will be submitted by the fabricator for approval.
4) Welding shall be carried out using GTAW process by qualified welders as per ASME Section-IX.
5) The purity of the argon gas used for the welding shall be minimum 99.995%.
6) All butt welds as well as the weld joint between bottom dish end and drain nozzle of the Process Pots shall be radiographed after passing DP test.
7) Other welds shall be DP tested as per relevant ASME/IS standards.
8) All welds from inside of pots to be ground flush wherever accessible.
9) All flush nozzle shall be full penetrated welded.

6) QUALITY SERVEILLANCE AND INSPECTION :-

The Purchaser after scrutiny of fabrication drawings and fabrication / assembly schedule, will finalize the stages for periodic inspection programme. Accordingly, the supplier shall submit quality assurance plan (QAP) for Purchaser's approval before taking up fabrication. All manufacturing procedures including machining, rolling welding, assembly and testing shall also be submitted by supplier for Purchaser's approval. The purchaser's representative shall have free access to the works of supplier or his sub-contractor for carrying out the inspection. He shall be provided with all the necessary instruments, gauges, drawings etc. required for carrying out inspection. Supplier shall maintain record of all the tests and inspections carried out during various stages of manufacture. The supplier shall proceed with the fabrication from one stage to another (as per QAP) only after inspection and clearance by the purchaser / inspector for the previously completed stage.

Deviations from the dimensions and tolerance indicated in the drawings, if any, found during the dimensional check shall be rectified at the supplier's works before shipment.

7) ACCEPTANCE STANDARDS :

7.1 VISUAL EXAMINATION:

There shall be no objectionable visual defect such as dent, scratches, weld spatters, undercuts, unnecessary weld strike marks etc.

7.2 RADIOGRAPHIC EXAMINATION:

Indications shown on the radiographs of weld and characterized as imperfections are unacceptable under the following conditions:

i) Any indication characterized as a crack or zone of incomplete fusion or penetration.
ii) Linear indications are not acceptable.
iii) Any cluster or aligned porosity.
iv) Isolated single rounded indication of size greater than 0.8 mm dia.
V) Any foreign material inclusion is not acceptable.

Acceptance standard for defects/discontinuities as shown in radiograph shall be in accordance with requirement of ASME Sec III and satisfaction of purchaser.

All welding portion shall be radiographed and further it should be verified and approved by WIP departmental QA person.

7.3 LIQUID PENETRATE (LP) EXAMINATION:

Following indications are unacceptable:

i) Any cracks or linear indications.

ii) Inside surfaces: No indications are acceptable.

ii) Outside: Rounded indications with dimensions greater than 0.8 mm. All rounded indications in a line or cluster shall not be acceptable.

Acceptance standard for defects/discontinuities as shown in radiograph shall be in accordance with requirement of ASME Sec III and satisfaction of purchaser.

All welding portion shall be LP tested and further it should be approved by WIP departmental QA person.

7.4 Helium Leak Test:

a. Leak testing of thermo-well, shall be carried out by Helium Mass Spectrometer testing as per requirements of Article 10 ASME Sec. V under vacuum mode. The helium tracer gas concentration shall not be less than 25% by volume at the test pressure. The component shall not be tested at a pressure exceeding 25% of the design pressure but not lesser than 15 psig.

b. Testing shall be carried out using an approved leak detector capable of detecting leaks of 1 x 10-8 std. cc/sec or better. The leakage shall not exceed 1×10^{-8} std. cc/ sec. A proposed detailed procedure for Helium leak testing for the component shall be submitted by the fabricator for the Purchaser's scrutiny and approval. Testing of this test shall also be witnessed by purchaser.

7.5 Hydrostatic Test:

Pressure testing of the Process Pots should be done at 4.00 kg/cm² and water fill test for Susceptors. Hydrostatic test procedure should be verified from Department.

To check seal proof seating of mechanical plug inside the process pot leakage test should be carried out using water or any other liquid and procedure of this testing should be verified and approved by purchaser. Testing of this test shall be witnessed by purchaser.

8. Welding Quality Control Records :

8.1 Welding quality control records shall comprises the following:

a) Mill test certificates for base materials.
b) Manufacturer's certificates for consumable supplies (filler metals, argon, LPT, materials etc.) attesting compliance of the product with the specification issued by the Engineer.
c) Welding procedure specifications and records.
d) Welder's qualification tests.
e) Procedures for manufacturing and non-destructive examinations.
f) Qualification certificates of the personnel performing non-destructive examination.
g) Radiography reports and films.

h) Calibration certificates of testing gauges.
i) Record charts for heat treatment, if any.

8.2 The results of radiographic examination shall be recorded on a standard reporting form which shall be countersigned by the Quality Surveyor on completion of his examination.

8.3 For each weld joint there shall be a record attesting that work was completed, examined and found to comply with all the requirements of this specification. The above records shall be submitted in quadruplicate in the contract documents. Where only a single copy exists such as radiographs and heat treatment record charts, these shall become the property of Department of Atomic Energy on completion of contract or earlier if so directed by Engineer.

9. Pneumatic Cylinder specification :

Supply of two no. of Pneumatic cylinder is also in the scope of supplier
specification of pneumatic cylinder is listed as following:

1) Operating medium: Compressed Air
2) Operating pressure range-.6-10Bar
3) Ambient temperature -20-120^{0}C
4) Piston diameter- 32mm
5) Stroke length - 25mm
6) For advance stroke force at 6 Bar should be in the range of approx 483 N
7) For return stroke force at 6 Bar should be in the range of approx 415 N
8) pneumatic connection G 1/8
9) cushioning length :19mm
10) Mode of operation - Double acting
11) Design structure - Piston, Piston rod
12) Mounting type - optional with internal (female) Thread with accessories.

Pneumatic cylinder of international reputed brands (Such as FESTO etc.) shall be preferred and supplier shall have proper company authorization certificate. These pneumatic cylinder shall be properly tested from quality point of view at extreme working conditions/ in the range of above mentioned specifications. QA testing of pneumatic cylinder should be verified by Department.

10. SUBCONTRACTING :

The supplier shall not subcontract the whole assembly. However, subcontracting to some extent is allowed. In the case of subcontracting, the supplier shall furnish all the details about the subcontractor at the time of submission of the offer. The Purchaser shall have right of access to the subcontractor's work for inspection of the components. However the supplier shall be fully responsible for the item manufactured by the subcontractor.

11. PACKING AND DELIVERY :

Each of the Process Pots and Susceptors shall be enveloped in PVC bags and then packed in wooden crates individually. Required cushion in the crates shall be provided to avoid damage to the process pots during transportation and handling. Delivery period of these equipment is **75 days from the date of issue of the work order.**

12. GUARANTEE : The supplier shall give 12 (Twelve) months guarantee from the date of delivery for satisfactory performance of the items against failure caused by defective workmanship, materials and components.

13. GENERAL NOTES :

1. It may be noted that fabrication of both the equipment may be awarded together to one fabricator or separately to different fabricators; as per the quoted offers by the bidders. The bidder shall be ready to accept the part order. Purchaser has the right to evaluate the shop floor facility of the manufacturer before award of contract to assess the infrastructure availability and capability to complete the order. Non compliance with the requirement of technical specification shall be a cause for rejection of award of contract.

2. All weld joints of both the equipments should be Liquid penetrant tested for each weld pass. In-house LPT reports for each joint shall be prepared and furnished. These reports shall be made available to the departmental representative during subsequent stage inspection visits.

3. All butt weld joints should be 100% radiographed, quality conforming to ASME SEC.III NC.

4. Repaired joints should be re-radiographed. Reports of all the acceptable joints shall be compiled in single sheet; showing all the joints with accepted report no.

5. Welding shall be carried out by GTAW process and by a qualified welder as per ASME Sec. IX and only qualified welder shall be used for carrying out the job. Welder qualification taken up afresh shall be witnessed by BARC representative. **The fabricator should essentially have clean room facility for fabrication of subject equipment.**

6. Inspection will be done at site by departmental representative for Fit-up, DPT of all weld pass, RT etc. as per the stages mentioned in the QAP. Also, dimensional stage inspection will be carried out while assembly of bottom and top dish end fabrication.

7. Welding of all nozzles/pipes shall be carried out only with Argon back purging to avoid any oxidation.

8. All surfaces including weld area shall be thoroughly clean off the scales, oils, grease & finally passivated.

9. All the surfaces shall be checked for carbon, halides and iron before final assembly.

10. Fabrication including cleaning and packaging, inspection and testing shall be carried out as per duly approved fabrication procedure supported by NDT procedures and QAP. The fabricator should give all procedures for approvals prior to fabrication.

11. Extreme care should be taken in handling the material and fabricated components at all stages of manufacture so as not to cause any damage or surface contamination.

12. Dished ends shall be DP tested on its surface, bevel edges etc. after forming operation.
13. All components shall be adequately supported during fabrication/testing to avoid any distortion, deflection etc.

14. INFORMATION TO BE FURNISHED WITH THE OFFER :

1. Fabrication, machining, testing and inspection facilities available with the supplier
2. Details of similar works with reference to purchase orders executed for BARC and other
3. DAE units.
4. Availability of **Dust free enclosure room in the shop floor** for fabrication.
5. Availability of Clean room for storage of FIM.
6. Manufacturing and delivery schedule.
7. The supplier shall also indicate in his offer the time required in weeks for the following in the event of an order.
   a) Quality Assurance Plan.
   b) Submission of fabrication drawings and plate cutting diagram.
   c) Submission of fabrication / assembly procedure.
   d) Commencement of work after approval of the above.
   e) Completion of the job.
   f) Deviations, if any, from the specifications.
   g) Proposal for sub contracting, if any, along with their addresses.

15. Vendor Evaluation Criteria

The offer of participating firms will be evaluated on the basis of following technical criteria:

a) Experience in fabrication of Inconel and exotic material to requisite quality specifications.
b) Financial Capability to mobilize raw materials within scheduled time, material receipt & storage system.
c) Availability of fully enclosed and separated area exclusively for Inconel and exotic material fabrication.
d) Adequate arrangement for handling of materials during processing.
e) System for pickling, passivation, in-process contamination checks, helium leak test, etc.
f) Implementation and application of relevant codes as per the technical specification. Availability of requisite jigs & fixtures, manufacturing capabilities including GTAW welding sets, HF units, machining, drilling, shell rolling, pipe coiling facility, etc.
g) Existence of established quality control systems along with qualified NDT personnel; stage inspection & testing facilities and documentation.
h) Organizational structure w.r.t. detailed engineering, drafting, planning, production & quality assurance.
i) Review of previously executed works of similar nature. (Similar may be inconel or exotic material)
j) Understanding of the fabrication work requirements with respect to Inconel, heat treatment etc.

Appendix -I: Free Issue Material (FIM)

Following material will be issued as FIM.

a. For Process Pots (02 nos.):

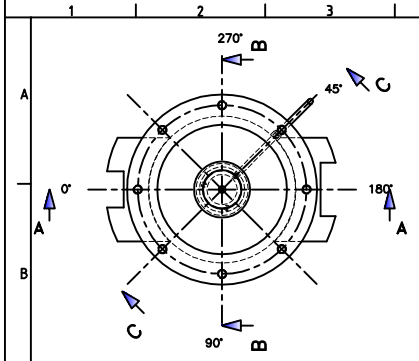
a) Inconel 690 Plate 10 mm thick - 80 Kg approx.
b) Inconel 690 Plate 15 mm thick - 400*400 mm^2
c) Inconel 690 Rod 25 mm ϕ - 1 m
d) Inconel 690 Rod 43/50 mm ϕ - 100 mm
e) Inconel 690 Rod 65 mm ϕ - 120 mm
(nearest diameter rod shall be given for fabrication)
f) Cooling jacket Inconel 690 50 NB, Schedule 40 -500mm
(nearest diameter shall be given for fabrication)
g) Inconel 690 tube 6NB- 2m
h) Inconel 690 Pipe 50 NB X Sch. 40 - 500mm
i) Inconel 690 Filler wire Gr. 52 , 1.6 mm ϕ - 02 kg.
j) Inconel 690 Filler wire Gr. 52 , 2.4 mm ϕ - 7 kg.
k) Inconel 690 Filler wire Gr. 52 , 3.15 mm ϕ - 5 kg.

b. For Susceptors (01 no.):

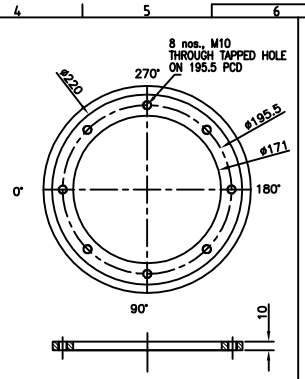
a) Inconel 690 Plate 10 mm thick - 30Kg approx.
b) SS304L rod 8 mm ϕ - 1m
c) Inconel 690 Filler wire Gr. 52 , 1.6 mm ϕ - 01 kg
d) Inconel 690 Filler wire Gr. 52 , 2.4 mm ϕ - 3 kg.
e) Inconel 690 Filler wire Gr. 52 , 3.15 mm ϕ - 3 kg.

Note:

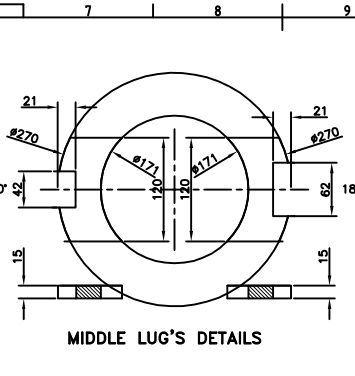
1. Supplier shall maintain fair record of the FIM issued to him by purchaser.
2. In the case of unavailability, FIM can also be given in the form of nearest dimension rod/plate shall be given for fabrication. further for requiring exact size just light machining shall be required. This machining shall be in the scope of supplier.
3. FIM as mentioned above shall be given to supplier/ fabricator for fabrication and if any material other than above mentioned list, shall be in the scope of supplier.



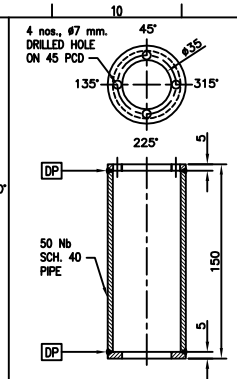
PLAN



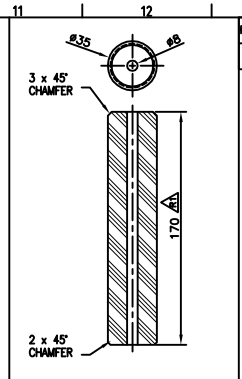
TOP FLANGE DETAILS



MIDDLE LUG'S DETAILS

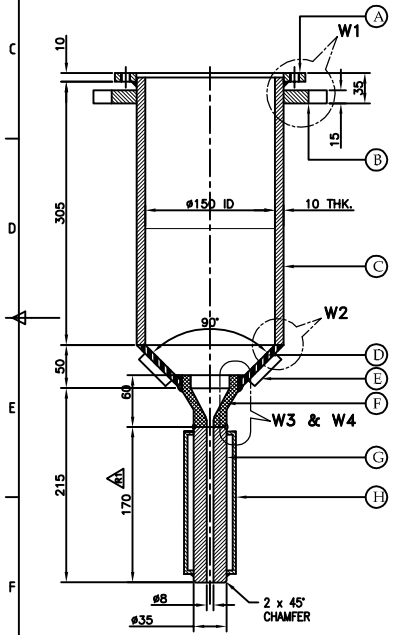


COOLING JACKET'S DTL.

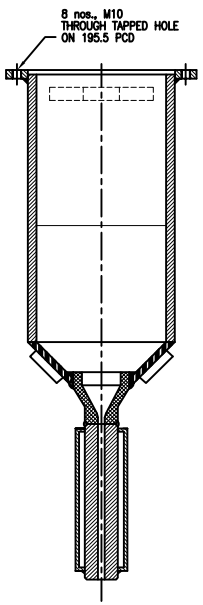


DRAIN PART DTL.

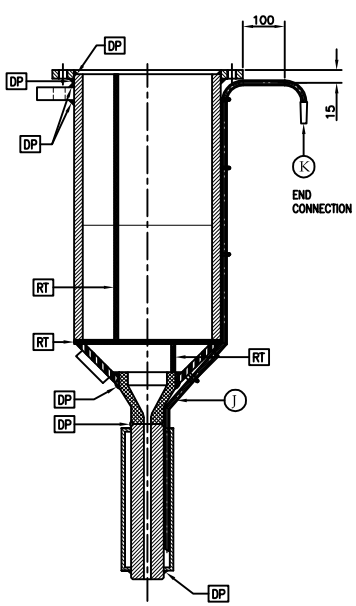
REV.NO.	DESCRIPTION	DATE	DRAWN	CHKD. BY	APPROVED



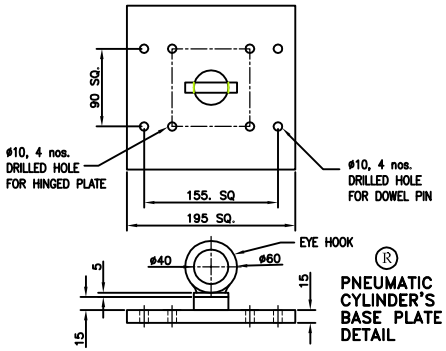
SECTIONAL VIEW
SECTION ON A–A



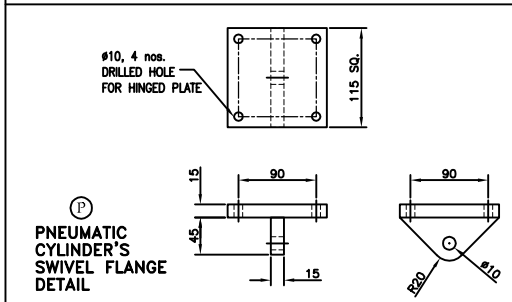
SECTIONAL VIEW
SECTION ON B–B



SECTIONAL VIEW
SECTION ON C–C



PNEUMATIC
CYLINDER'S
BASE PLATE
DETAIL



PNEUMATIC
CYLINDER'S
SWIVEL FLANGE
DETAIL

NOTES–

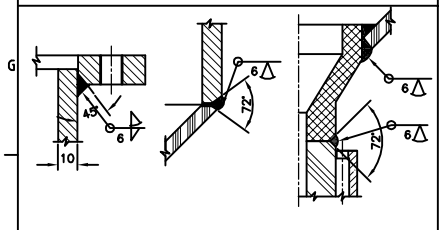
1. ALL DIMENSION ARE IN mm. UNLESS OTHERWISE SPECIFIED.
2. ALL PLATES USED SHALL BE FREE FROM LAMINATION, DENTS, HAMMER WARKS ETC. ONLY PRIME QUALITY PLATES SHALL BE USED.
3. DISTORTION OF THE PROCESS POT SHELL BE CONTROLLED DURING FABRICATION WITH THE HELP OF SUITABLE FIXTURES ETC. SURFACE WAVINESS OF THE PLATE SHALL BE WITHEN 1 MM/METER

TOTOAL WEIGHT – 40 Kg Approx./ ONE UNIT

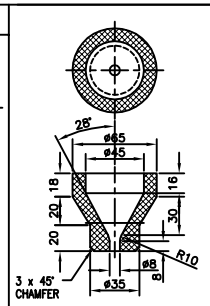
PART NO.	DESCRIPTION	FINISH SIZE	MATERIAL	QTY.	REMARKS
R	PN. CYLINDER'S BASE PLATE	AS PER DRAWING	SS 304 L	2	
P	PN. CYLINDER'S SWIVEL FLG.	AS PER DRAWING	SS 304 L	2	
N	GRAFOIED GASKET	5 Thk. x 171 I.D.x 205 O.D./05 PER INSTRUCTION	GRAFIDE	2	
M	PLUG	ø43 mm. ROD x AS PER DRAWING	INCONEL 690	2	
L	PLUG'S ROD	ø25 mm. ROD x 365 mm. Lg.	INCONEL 690	2	
K	END CONNECTION	AS PER INSTRUCTION	SS 304 L	2	
J	AIR COOLING TUBE	6 Nb x 1 mtr. Lg. AS PER STD.	INCONEL 690	2	
H	AIR COOLING JACKET	50 NB SCH. 40 x AS PER DRAWING	INCONEL 690	2	
G	PROCESS POT'S DRAIN PART	8 I.D. x 35 O.D. X 170 Ht.	INCONEL 690	2	
F	PLUG SEAT	AS PER DRAWING	INCONEL 690	2	
E	PROCESS POT'S PAD	45L x 10W x 10 Thk.	INCONEL 690	4+4	
D	PROCESS POT'S SMALLE CONE	10 Thk. x AS PER DRAWING	INCONEL 690	2	
C	PROCESS POT'S SHELL	10 Thk. x 150 I.D. x 305 Ht.	INCONEL 690	2	
B	PROCESS POT'S MID. LUG	15 Thk. x AS PER DRAWING	INCONEL 690	2+2	
A	PROCESS POT'S TOP FLANGE	10Thk. x 220 O.D.x AS PER DRAWING	INCONEL 690	2	

BILL OF MATERIAL

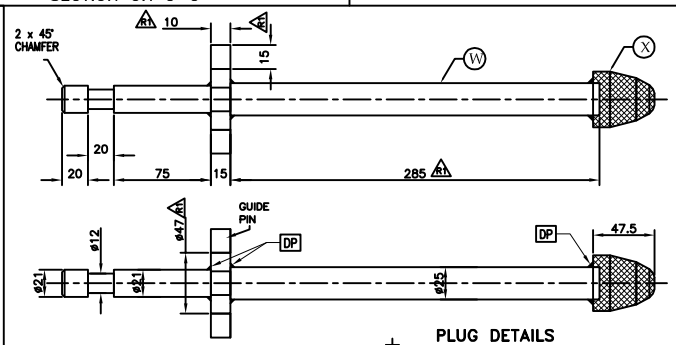
WELDING DETAILS



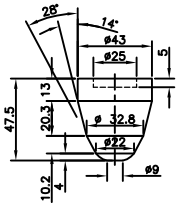
W1 W2 W3 & W4



PLUG'S SEAT DETAILS



PLUG DETAILS



GENERAL TOLERANCES							
DIMENSION	0 – 10	11 – 50	51 – 100	101 – 500	501 – 1000	1001–3000	ABOVE 3000
FABRICATION	± 0.5		± 1.5	± 2.0	± 3.0	± 4.0	± 6.0
MACHINING	+ 0.1	+ 0.2	+ 0.3	+ 0.5	+ 0.8	+ 1.2	+ 2.0

PROCESS POT (QTY. 02 nos.)

PROJECT Cs 137

DRAWN	S. S. MOHITE	GOVERNMENT OF INDIA
DRG. CHD.	S. B. PATIL	BHABHA ATOMIC RESEARCH CENTRE
DESIGNED	S. B. PATIL, PUNEET SRIVASTAVA	TECHNOLOGY DEVELOPMENT DIVISION
DESIGN CHD.		PROJ'N 3 RD ANGLE; SCALE 1 : 4; DATE 24/03/2014
PASS'D		FILE NAME–
APP'D		DRG. NO. A1–3643–M–1039; R1 REV.

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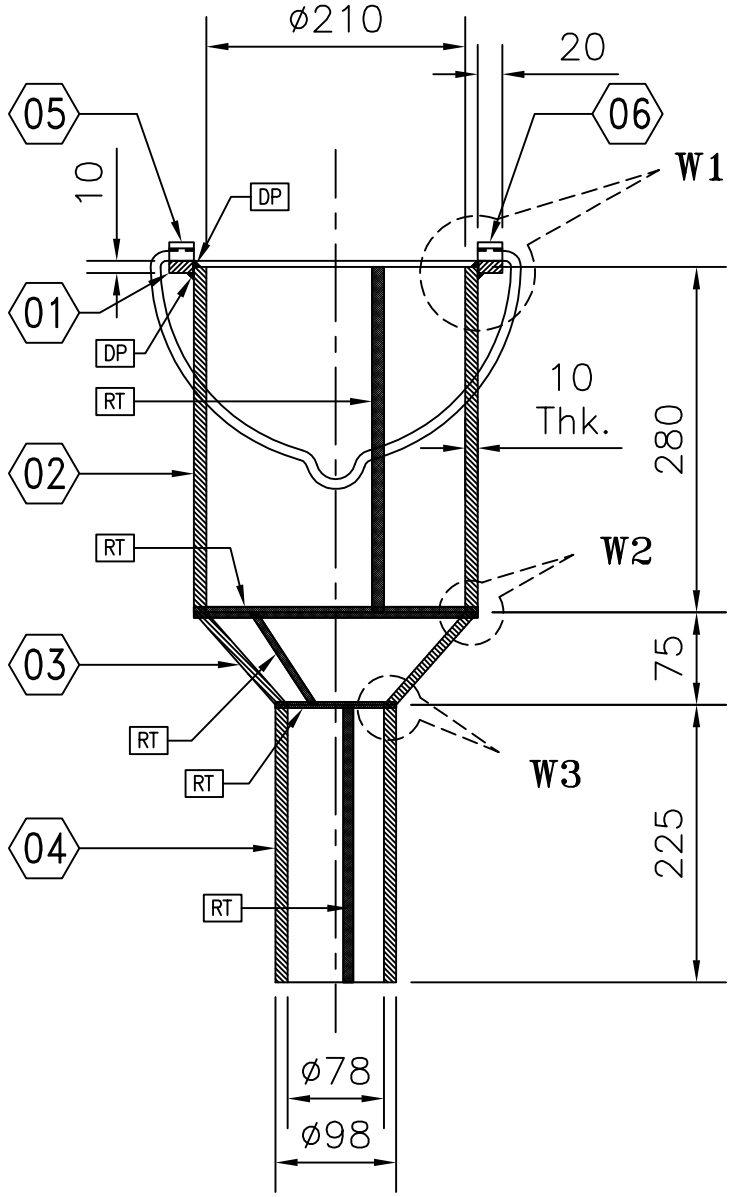
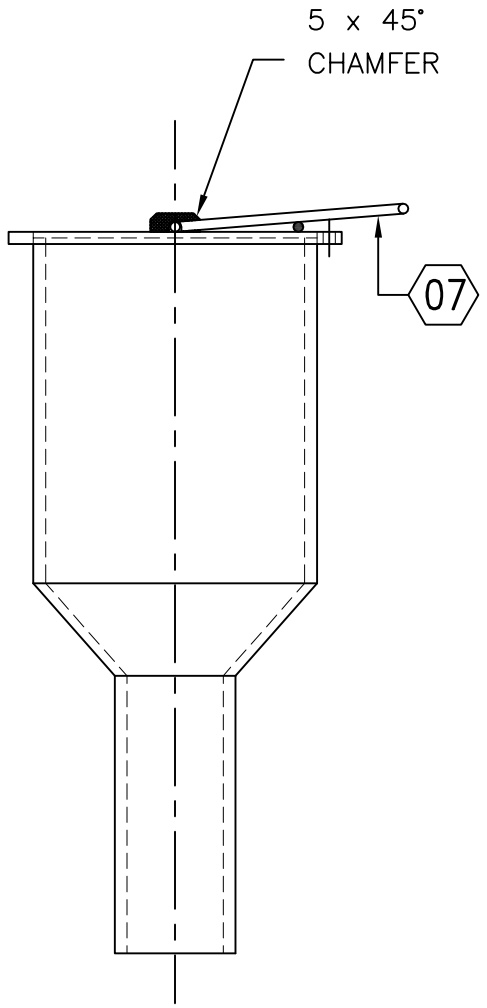
A1

FILE PATH – D:\SANDESH\OFFICIAL DRAWING\...

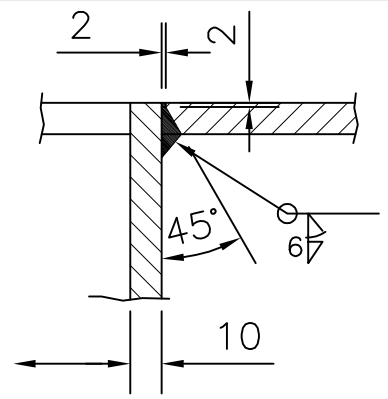


ELEVATION

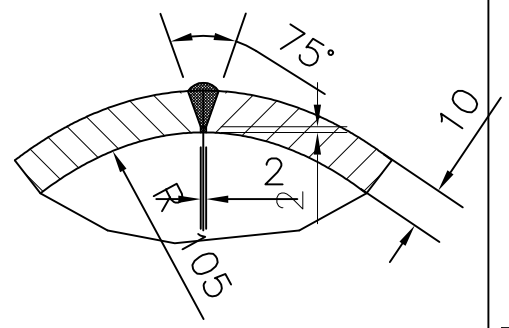


QTY. : 01 no.

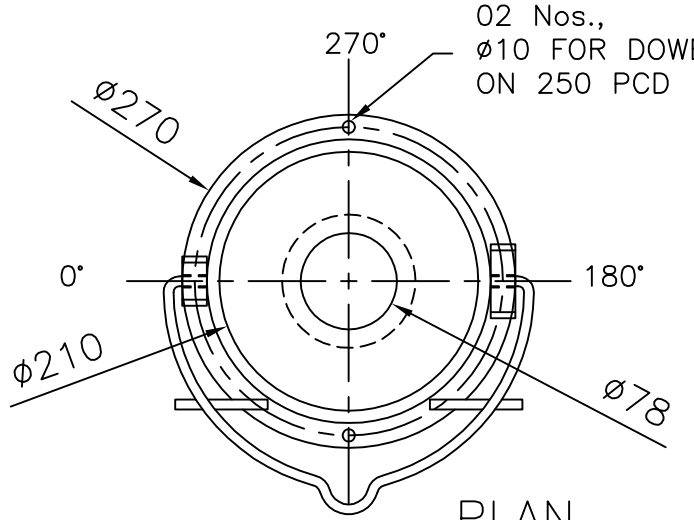
WELDING DETAILS



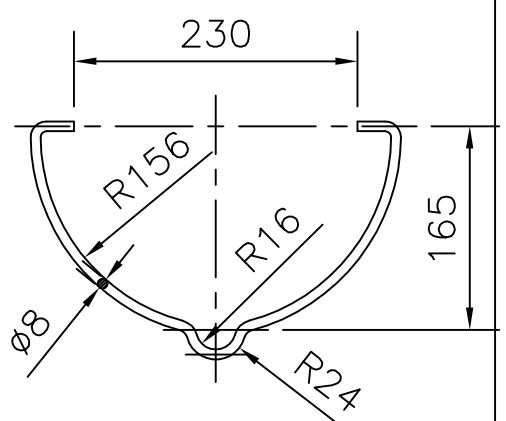
DETAIL AT W1



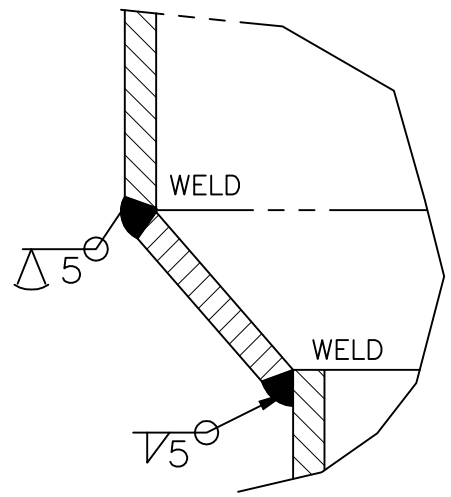
SEAM WELD DETAIL



PLAN



DTL. OF LIFTING HANDLE



DETAIL AT W2 & W3

NOTES–

1. ALL DIMENSION ARE IN mm. UNLESS OTHERWISE SPECIFIED.
2. ALL PLATES USED SHALL BE FREE FROM LAMINATION, DENTS, HAMMER WARKS ETC. ONLY PRIME QUALITY PLATES SHALL BE USED.
3. DISTORTION OF THE SUCCEPTOR SHELL BE CONTROLLED DURING FABRICATION WITH THE HELP OF SUITABLE FIXTURES ETC. SURFACE WAVINESS OF THE PLATE SHALL BE WITHEN 1 MM/METER

NDT– NON DESTRUCTIVE TEST.
RT– RADIOGRAPHY TEST
DP– DYE PENETRANT TEST

TOTAL WEIGHT – 25 Kg Approx.

PART NO.	DESCRIPTION	FINISH SIZE	MATERIAL	QTY.	
07	LIFTING HANDLE	ø8 AS PER DREAWING	SS 304 L	1	
06	BLOCK NO.1	60 x 20 x 20 Ht.	INCONEL 690	1	
05	BLOCK NO.1	40 x 20 x 20 Ht.	INCONEL 690	1	1
04	SUSCEPTOR'S DRAIN PART	78 I.D. x 98 O.D. x 225 Ht.	INCONEL 690	1	2
03	SUSCEPTOR'S CONE	10 Thk. x AS PER DRAWING	INCONEL 690	1	2
02	SUSCEPTOR'S SHELL	10 Thk. x 210 I.D. x 280 Ht.	INCONEL 690	1	14
01	TOP FLANGE	10 Thk. x 230 I.D. x 270 O.D.	INCONEL 690	1	2

BILL OF MATERIAL

GENERAL TOLERANCES

DIMENSION	0 – 10	11 – 50	51 – 100	101 – 500	501 – 1000	1001–3000	ABOVE 3000
FABRICATION	± 0.5		± 1.5	± 2.0	± 3.0	± 4.0	± 6.0
MACHINING	+ 0.1	+ 0.2	+ 0.3	+ 0.5	+ 0.8	+ 1.2	+ 2.0

REV.NO.	DESCRIPTION	DATE	DRAWN	CHKD. BY	APPROVED

SUSCEPTOR POT DETAIL
FOR Cs–137 SOURSE PENCIL PRODUCTION FACILITY

PROJECT: Cs 137

DRAWN	S. S. MOHITE	GOVERNMENT OF INDIA
DRG. CHD.	S. B. PATIL	BHABHA ATOMIC RESEARCH CENTRE
DESIGNED	S. B. PATIL	TECHNOLOGY DEVELOPMENT DIVISION
DESIGN CHD.		PROJ'N 1 ST ANGLE · SCALE NTS · DATE 24/03/2014
PASS'D		FILE NAME–
APP'D		DRG. NO. A1–3643–M–1038 · R1 REV.

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