Government of India
Bhabha Atomic Research Centre
Multidisciplinary Research Group
Engineering Design and Development Division

Ref: MRG/ED&DD/CUS/2018/OPA-147601 **DATE: 30.07.2018**

To,

SUB: Invitation of Quotations for fabrication and supply of "Overpack Container"

DUE DATE: 08.08.2018

Dear Sir,

1. Quotations are invited for the minor fabrication job as per the enclosed specifications
2. Bidder shall quote for fabrication of the setup as per specifications.
3. Taxes shall be quoted separately.
4. The quotations must reach **Head, Engineering Design and Development Division on/ before 08.08.2018** and **must be sent in a sealed envelope** super scribed with above **reference number and due date** as mentioned **above by speed post**:
5. The address on the envelope should read:

   To,
   Head, Engineering Design and Development Division,
   Multidisciplinary Research Group, G-12, RLG Trombay
   Bhabha Atomic Research Centre
   Mumbai 400085
   (Kind attention: Dr. C. UmaShankar)
6. The bidder should have to take an insurance policy against any material issued by the purchaser.
7. The fabrication work shall be subjected to inspection by our engineer. The finished components shall not be dispatched prior to approval by our engineer at bidder's works. Necessary inspection facilities should be provided to our engineers during fabrication at bidder's premises.
8. The bidder shall deliver the finished components after approval by our engineer within 12 weeks from the date of issue of the purchase order to the bidder.
9. **Head, Engineering Design and Development Division**, **BARC** reserves the right to accept or reject any or all quotations without assigning any reason.
10. For any further clarification Dr. C. Uma Shankar, ED&DD (Ph: (O) 022-255924178) may be contacted.

Yours faithfully

C. UmaShankar

Dr. C. Uma Shankar
SO/G, ED&DD

JOB SPECIFICATION

1. SCOPE

Fabrication and Supply of Overpack Container as listed in Para. 2 & 3.

2. GENERAL

S. No	ITEM	Specification	Quantity
1	**Overpack Container as per the attached details shown in drawing no: Overpack Container/2018/08**	**As listed in Para: 3**	**Four**

3. SPECIFICATION

Fabrication and supply of "Overpack Container" as per the attached details shown in drawing no: Overpack Container/2018/08. The detailed specification for "Overpack Container" is as under:

The department reserves the right to revise without materially altering the design prior to bulk fabrication. Such changes shall be considered within the scope of the specified work and shall not be considered extra.

Important stages of execution

- **Purchase of raw material & its testing as per approved/applicable codes. (No free issue material shall be provided by the purchaser.)**
- **Manufacturing and assembly.**
- **Inspection and testing at manufacturers works.**
- **Supply of assemblies at purchasers site including packaging, safe transport, unloading and unpacking.**
- **Warranty of the units and its accessories for 12 months**

4. MATERIAL OF CONSTRUCTION & APPLICABLE CODES

All the material used shall be STRICTLY as per specifications. The Overpack container is a combination of different materials as indicated in the drawing. The standards of the materials shall be as per the code.

Overpack container to be made by Stainless Steel (SS304L) and seasoned teak wood (SP33 wood and Engineering hand book)

- **ASME SEC II PART A (for Stainless Steel raw material SS 304L, UNS Number: S30403)**

- **ASTM (A240) shall be used for property evaluations.**

- **Seasoned teak wood (As per SP33 Wood handbook)**

The wood shall be dry seasoned teak wood. **The wood shall possess the following properties:**

a) ash content: <5%
b) moisture content: <10%
c) density: 0.5 to0.7g/cc
The testing for the wood for the above properties shall be within the scope of supply.

- The sealing material for sealing in the Overpack container is Neoprene O-ring.

- The bolts used for tightening the Overpack shall be HIGH TENSILE BOLTS of LPS Bossard / Unbrako /TVS make. The bolts used shall be high tension bolts of property class ISO 12.9 grade (LPS Bossard / Unbrako / TVS). The certificates of all the bolts material, yield strength & Tensile strength shall be submitted by the supplier. **In case, it it is not available from supplier of bolts, the party shall arrange for testing of bolts. The sample size shall not be less than 5% randomly selected of the total content required.**

- In general for assembly and testing:
  - All the bolts used is in the scope of supply
  - Eye bolts of the size M-12 capacity: 5tons for each assembly is also in the scope of supply.

Note: <u>Material used shall comply with the requirement of code.</u>

4. 1 FABRICATION

4.1.1 General

This fabrication demands the highest standard of workmanship, particularly from machinist and the welder. The desired finish and the leak- tightness as specified shall be of primary concern to the fabricator. Any lowering of standards of workmanship, finish and the flatness in gasketting area will be evident in the final leak tests and thus it is in the contractor's interest to ensure a high standard of workmanship and supervision.
All gasket surfaces shall be checked for flatness and finish upto M3. In case of doubt, suitable means shall be chosen to verify the surface finish.

4.1.2 Machining

In general, M2 finish with buffing shall be as accepted. Care shall be taken to ensure that chatter marks, scratches and burns are removed from the machined surfaces. All sharp corners are to be removed. All tolerances, sizes and finishes shall be as per drawings. All the surfaces where "O" ring / gasket sits, shall have M 3 finish.

4.1.3 Welding

Welding procedure to be followed shall be recorded in detail and qualified as per ASME Section IX. All the welders assigned to welding shall be qualified as per ASME section IX. All the welding involving stainless steel shall be conducted by Gas Tungsten Arc Welding (GTAW) process. Filler wire used for welding shall be of type E-308 and shall be subjected to the purchaser's approval. The details are given the quality assurance programme.

After the full welding of all the joints the welds shall be ground flush where ever required, cleaned and tested for through and through leaks, cracks, pinholes etc., with DYE –PENETRANT. In case of any doubt, Take the corrective action and test the weld again as mentioned above. Once welds are checked, the supplier can proceed with other fabrication works. Procedure for Dye-Penetrant examination shall confirm to ASTM E-165 – T or ASME – Section III ND 5350.

When welding the main members of S.S.304L proper care shall be taken to align the various parts and clamp them with suitable fixtures prior welding to eliminate distortion. All the welds shall have full penetration.

4.1.4 Carpentry

The choice of wood should be done carefully by the fabricator. **As such, seasoned teak wood is to be choosen.** The wood should be free from insects, termite, fungi etc. Thus, it is in the contractor's interest to ensure a high standard for the choice of wood. Any lowering of the wood quality shall be visible during the testing and simultaneously shall be subject to disapproval.

The teak wood planks have to be arranged in criss-cross fashion. The size shall be decided as per wood availability, but not less than 100 x 100 x 50mm thick. These teakwood planks shall be sticked together by choosing a suitable bonding (Adhesive) agent and screwed with 6" wood screws. Thus, the whole planks shall behave as a single structure. The wood assembly shall be finally machined to required shape. After machining inside and outside of the wood assembly, the surfaces of the wood shall be painted with suitable fire resistant paint to provide protecting layer before inserting it into the Overpack Container. The final welding of the top/bottom portion shall be done thereafter. SS304L lining and inside gap between teakwood is not permitted beyond1.5mm diametrically. In case of any problem, it shall be corrected accordingly.

Note:

1. **The adhesive used shall NOT be water based.**
2. **Prior to bulk production, the Supplier shall be in constant touch with the purchaser get his queries/doubts cleared and provide the status of fabrication with approval of the accepted Quality assurance plan during the fabrication.**

4.1.5 Material Identification and Testing

All the material used during the fabrication shall be suitably tested for its chemical properties (composition). The accepted composition of the material shall be sent for mechanical properties evaluation. **The material coupons stamped by BARC representative shall be tested. The testing of coupons is in the scope of supply.**

Apart from the above the supplier shall take special care for the following:

4.2 OVERPACK CONTAINER

4.2.1 W**OOD**: **The wood choosen shall be strictly seasoned teak wood, with termite resistant quality.**The wood to be choosen for the outer container shall be tested fully. It shall be a seasoned wood, with minimum moisture absorption. **Wood shall be dry and the moisture content of the wood shall be evaluated and it shall be less than 10%.**

4.2.2 The teak wood choosen shall have the following properties ash content (<5%), calorific value (~5000 cals/gm) and density (~0.5 to 0.7g/cc) in this range. **However, in case of any problem it shall be corrected accordingly. For this the supplier has to test the wood as per BIS standards for the above properties. This test is within the scope of supply.**

4.2.3 The teak wood planks have to be arranged in criss-cross fashion. The size shall be decided as per wood availability, but not less than 100 x 100 x 50mm thick. These teakwood planks shall be sticked together by choosing a suitable bonding (Adhesive) agent and screwed with 6" wood screws. Thus, the whole planks shall behave as a single structure. The wood assembly shall be finally machined to required shape. After machining inside and outside of the wood assembly, the surfaces of the wood shall be painted with suitable fire resistant paint to provide protecting layer before inserting it into the Overpack container. The final welding of the top/bottom portion shall be done thereafter. SS304L lining and inside gap between teakwood is not permitted beyond 1.5mm diametrically. Hence, proper care shall be taken during machining of wooden components.

4.2.4 **OUTER and INSIDE S.S.304L LINING:** The outer lining of the Overpack Container shall be fabricated with 5mm thick SS304L plate and the inside lining covering the wood shall be

of 2mm thick sheet. **Please note that, the proposed welding zone in the design drawings, ensure enough gap in wooden assembly to avoid burning of wood during welding.**

5.0 ASSEMBLY

5.1 The final assembly shall be fitted with a top neoprene O-ring for preventing any water leakage from outside to inside of the Overpack container.

5.2 Interchange ability of parts: All parts fabricated shall be such that interchangeability of parts shall be possible. For this if required the supplier can fabricate templates/gauges for checking interchange ability of parts.

6.0 ACCEPTANCE CRITERIA (REFER ANNEXURE-III)

All the assemblies shall be subjected to through inspection and testing. Apart from the general inspection the assemblies shall be inspected in detail for the following:

6.1 Raw Material testing (Check for QA plan as per Annexure-II with supporting Documents as per all applicable standards)

i) The material test report for all the material used shall be submitted to BARC for approval.
ii) The bolts test report shall be submitted to BARC for approval.
iii) The wood testing reports for its composition and mechanical properties.
iv) Gasket test reports
v) Radiography reports
vi) Ultrasonic test reports

6.2 Inspection of Overpack containers: The container shall be checked thoroughly as per the specifications. Apart from the above the following shall be checked thoroughly.

i) Visual inspection for cracks, scratches and finish
ii) Dimensional inspection.
iii) DP test on welded joints
iv Radiography and ultrasonic test shall be witnessed by purchaser. (RT and UT shall be done as per ASME Section V).

Fully finished assemblies will be considered acceptable if it passes through the inspection tests specified in this documents.

7.0 Warranty

All supplied items should be free from manufacturing defects and warranted for 12 months from date of installation wherever applicable.

8.0 Packaging

All the accepted materials/items shall be suitably packed to ensure safe delivery at purchaser site to avoid any damage during shipment /transportation.

All the Accepted items shall be suitably packed to avoid any damage before final dispatch.

9.0 Delivery

The material/items shall be shipped only after issue of shipping release from the purchaser. The inspected and accepted assemblies shall be safely delivered to the following address within the scheduled weeks after receipt of purchase order.

The inspected and accepted Assemblies shall be delivered to:

Stores Officer
Radiological Zonal Stores.
Bhabha Atomic Research Centre
Mumbai- 400 085

The supplier shall ensure that it shall meet all the security requirements of the persons entering the BARC premises during delivery especially Police Verification Certificate.

The delivery period shall not exceed the quoted period in the quotation. Accepted Items shall be dispatched only after **pre dispatch inspection** at supplier's site.

Note: Any conflict with the requirement, the discretion and acceptance is with the purchaser. Any modification/changes without affecting the basic design is under the scope of fabrication.

General terms and conditions

i. All work covered by the specification shall be subject to quality surveillance by the purchaser or his authorized representative.
ii. The purchaser reserves the right to inspect any material used by supplier under the contract and to reject any, which is found defective.
iii. No Free Issue of Material
iv. Exemption certificates and taxes (as applicable) shall be clearly mentioned in the quotations.
v. The quotation should be on a printed company letter head which shall consist PAN No., GST No. of the firm and other details pertaining to government purchase procedures. In case of non availability of the same, the quotation shall not be under the zone of consideration.
vi. Quotation shall be signed by proprietor or authorized person and affix company seal.
vii. All taxes, other charges should be mentioned clearly.
viii. No advance is payable.

ix. Delivery period: Within 12 weeks from release of work order.
x. Warranty period: One year from date of delivery.

10.0 PAYMENT TERMS

Full payment will be made only after the satisfactory completion of Work order and delivery of Full payment will be made only after the satisfactory completion of Work order and delivery of "Overpack Container"

Taxes as applicable will be deducted from your bill. No part payment or advance payment will be made. For this mode of payment, you are required to draw your invoice in the name of Director, Multidisciplinary Research Group, Bhabha Atomic Research Centre, Mumbai 400085, in triplicate along with Advance Stamp receipt and to be submitted along with "Overpack Container" or Supplier can choose the option for payment through ECS/RTGS with pre-stamped receipt at the time of payment.

Note:

1. It is to clarify that, BARC being an R& D organization, GST @5% is application. GST exemption certificate shall be issued to the supplier.
2. GST invoice shall indicate following details:
   a) GSTN
   b) PAN &
   c) Location of Supply
3. Annexure-II (GST undertaking) duly filled, signed and stamped shall be sent along with the invoice. ECS option form shall also be duly filled and submitted with the bills
4. Any delay in supply of material crossing the scheduled delivery period by the contractor is liable for penalty@ ½ % per week(max.5%)

11.0 CONFIDENTIALITY CLAUSE:

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.

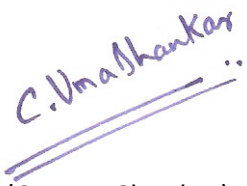
This clause shall apply to the sub-contractors, consultants, advisers or the employees engaged by a party with equal force.

"Restricted information" categories under section 18 of the Atomic Energy Act, 1962 and " official Secrets" under section 5 of the official secrets act, 1923;-

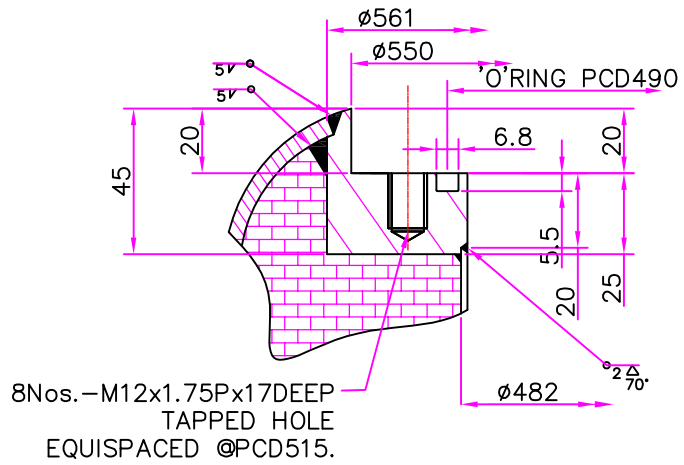
Any contravention of the above-mentioned provisions by any contractor, sub-contractor, consultant, adviser or the employees of a contractor will invite penal consequences under the aforesaid legislation.

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

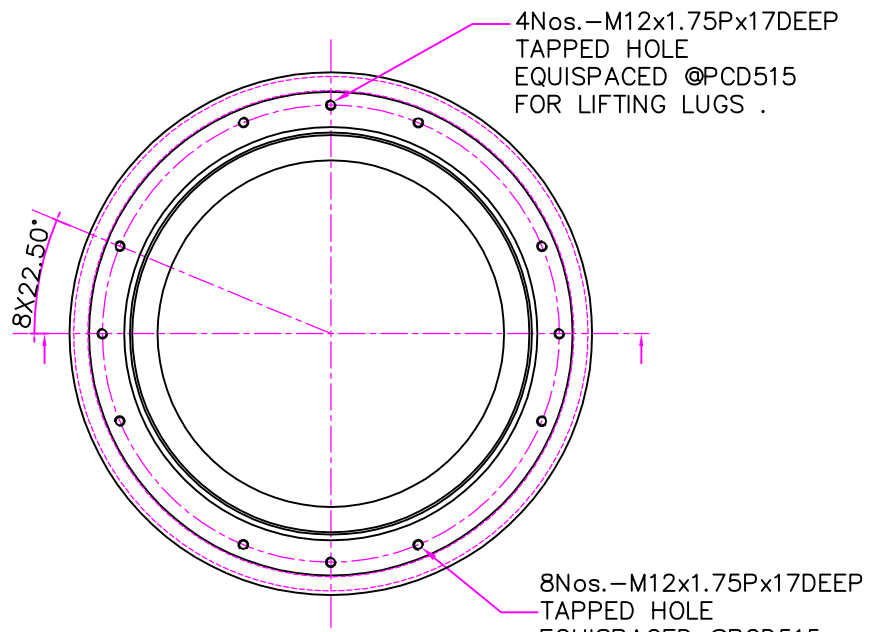
The contractor or sub-contractor, consultant, adviser or the employees engaged by the contractor shall not use BARC's name for any publicity purpose through any public media like press, radio, T.V. or Internet without the prior written approval of BARC.



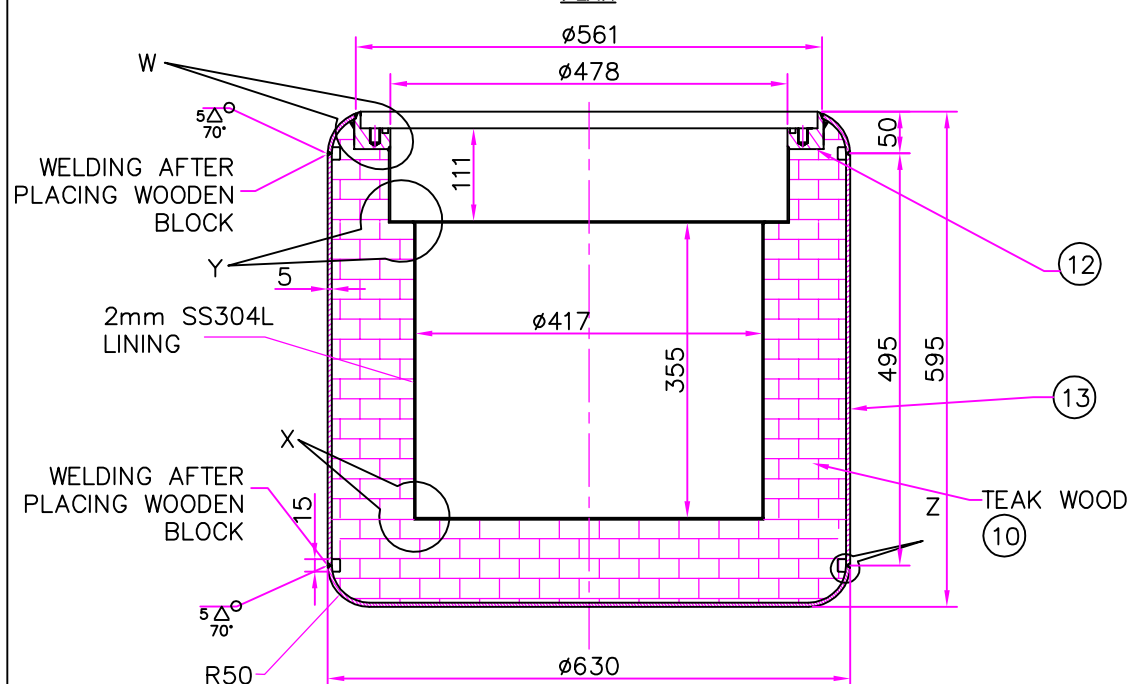
(C. Uma Shankar)
SO/G, ED & DD



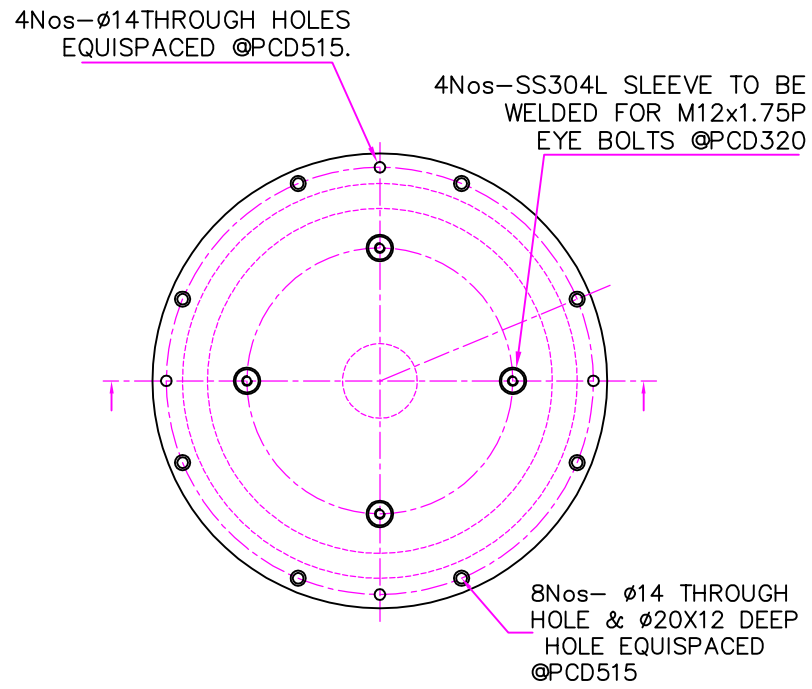
DETAIL–W

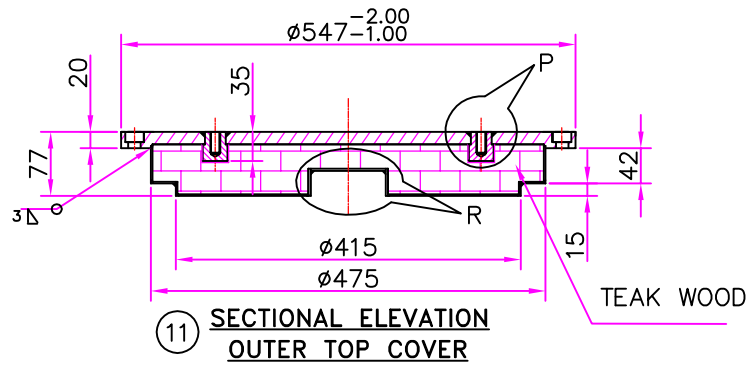


PLAN

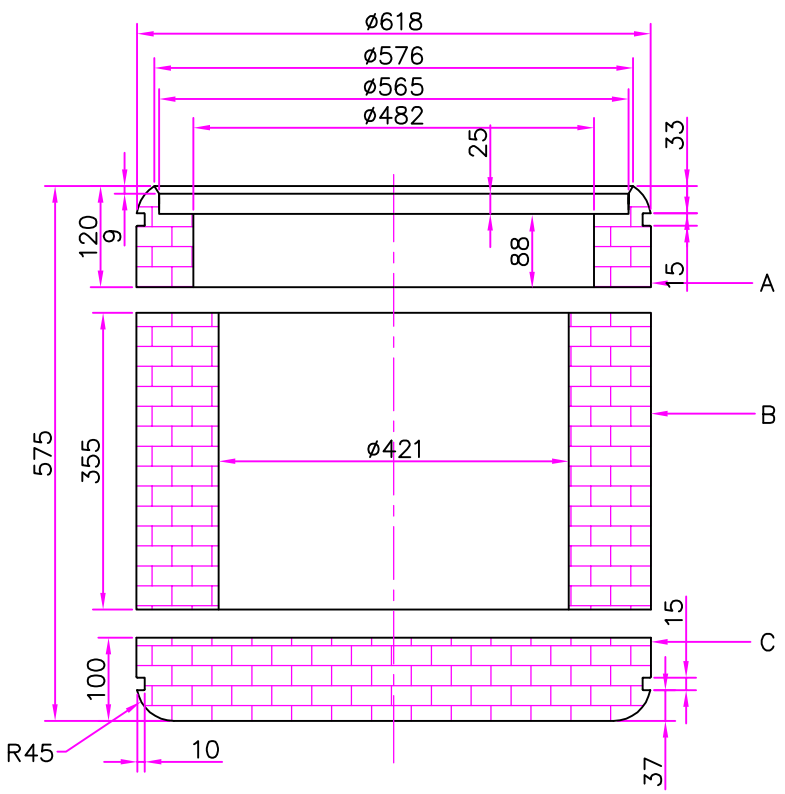


SECTIONAL ELEVATION





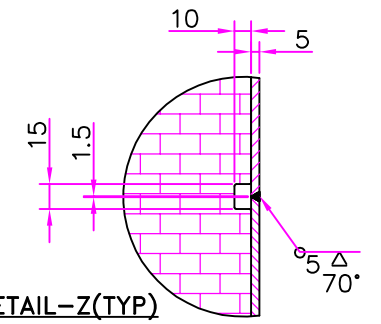
(11) SECTIONAL ELEVATION
OUTER TOP COVER



SECTIONAL ELEVATION

(10) TEAKWOOD FOR OUTER CANISTER

a. MAXIMUM SIZE OF WOOD PLANK SHALL BE 100X100X50 MM THICK.
b. THE PLANK SHALL BE BONDED TOGETHER WITH NON WATER BASED RESIN.
c. IN ADDITION FROM THREE PLANK SHALL BE SCREWED TOGETHER WITH WOODEN SCREW OF 6INCH LENGTH(~150MM LENGTH)
d. THE WOODEN STRUCTURE SHALL BE PAINTED ALL AROUND BEFORE/ AFTER MAKING ASSEMBLY WITH FIRE RETARDANT PAINT.



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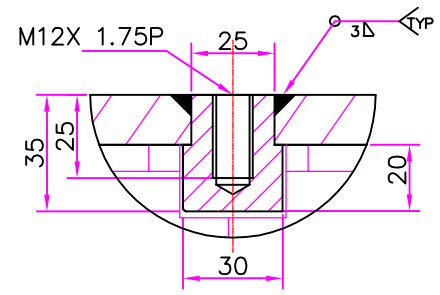
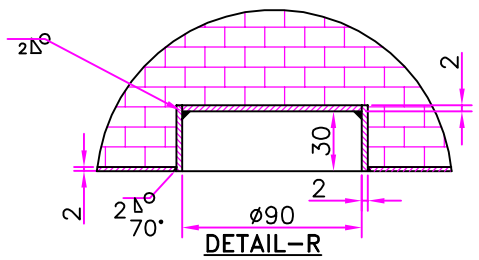


DETAIL–P



DETAIL–R

SR.NO	DESCRIPTION	MOC	QTY
10	TEAK WOOD FOR OUTER CANISTER	SEASONED TEAK WOOD(0.5 TO 0.7g/cc)	1
11	OUTER TOP COVER	SA 240 GR 304L	1
12	OUTER COVER MOUNTING FLANGE	SA 240 GR 304L	1
13	OUTER SHELL	SA 240 GR 304L	1

NOTES:–

1. ALL DIMENSIONS ARE IN MM UNLESS OTHER WISE SPECIFIED.
2. REMOVE ALL SHARP CORNERS, BURRS etc.
3. SURFACE FINISH REQUIREMENT–
   General Machines surface(Ra =3.2or better)
   Sealing Locations for gaskets/O–Ring(Ra=1.6 or better).
4. BOLTS SHALL BE OF HIGH TENSION QUALITY OF GRADE 12.9.
5. COMPONENTS SHALL BE HANDLED WITH UTMOST CARE DURING FABRICATION. ANY SCRATCHES etc. GENERATED DURING HANDLING SHALL BE SUBJECT TO REJECTION ON FINISHED PART.
6. MOC : SS 304L.
7. WELD JOINT NUMBER & DETAILS TO BE APPROVED BY THE PURCHASER PRIOR TO FABRICATION WORK.
8. COMPONENT SUBJECTED TO HYDROSTATIC TEST AT 20kg/cm2 PRESSURE FOR 30MIN.
9. FINAL MACHINING SHALL BE DONE ONLY AFTER WELDING.
10. UT 100% ON ALL FORGE COMPONENTS.
11. RT 100% ON ALL FORGE COMPONENTS.
12. IN CASE OF DOUBT KINDLY ASK.

OUTER OVERPACK (RTP)

Drawing No: Overpack Container/2018/08