NATIONAL CENTER FOR COMBUSTION RESEARCH AND DEVELOPMENT (NCCRD)
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI – 600036, INDIA

Ref. No. ICS/11-12/013/DSTX/TSUN **Date: 24 Aug. 2016**

Due date: 14 Sep. 2016

Item name: FABRICATION AND INSTALLATION OF STAINLESS STEEL CONTAINER AND PLATFORMS FOR MIROGRAVITY DROP TOWER FACILITY (1 no.)

1. Quotations are invited in a **two bid system** for the items shown overleaf (in Annexure I). The offers / bids should be submitted as Technical bid and Financial bid. The Technical bid should consist of all technical details / specifications only. The Financial bid should indicate item-wise price for each item and it should contain all Commercial Terms and Conditions including Taxes, transportation, packing & forwarding, installation, guarantee, payment terms, pricing terms etc. The Technical bid and Financial bid should be put in separate covers and sealed. Both the sealed covers should be put in a bigger cover. The Tender for supply of "_____" should be written on the left side of the Outer bigger cover and sealed.
2. The quotations should be valid for sixty days from the due date and the period of delivery required should also be clearly indicated.
3. The total cost of the equipment in terms of CIP Chennai should be clearly mentioned.
4. Terms of warranty and guarantee should be explicitly mentioned.
5. Packing and delivery charges, customs and clearance duty should be clearly stated.
6. Goods shall not be supplied without an official supply order.
7. Local firms : Quotations should be for free delivery to this institute. If quotations for ex-godown delivery charges should be indicated separately.
8. Firms outside Chennai: Quotations should be for F.O.R. Chennai. If F.O.R. consignor station, freight charges by passenger train / lorry transport must be indicated. If ex-godown, packing, forwarding and freight charges must be indicated.
9. The rate of sales / general taxes and the percentage of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Where this is not done, no claim for sales / general taxes will be admitted at any stage and on any ground whatsoever. The taxes leviable should take into consideration that we are entitled to have Concessional Sales Tax (CST) applicable to non-government educational institutions run with no profit motive for which a concession sales tax certificate will be issued at the time of final settlement of the bill.
10. Payment : Specify the mode of payment and if advanced payment has to be made. Every attempt will be made to make payment within 30 days from the date of receipt of bill / acceptance of goods, whichever is later.
11. IIT Madras is exempt from payment of excise duty and is eligible for concessional rate of customs duty. Necessary certificate will be issued on demand.
12. IIT Madras has the right to accept the whole or any part of the tender or portion of the quantity offered or reject it in full without assigning any reason.
13. The sealed quotation may be sent to

    Prof. S. R. Chakravarthy
    NCCRD Office
    No. 201, Rarefied Gas Dynamics Lab (Behind Aerospace Engineering Dept.)
    Chennai – 600036, Ph. (O) +91-44-22575025

FABRICATION AND INSTALLATION OF STAINLESS STEEL CONTAINER AND PLATFORMS FOR MIROGRAVITY DROP TOWER FACILITY

SUPPLY QTY: 1NO.

Project ref: ICS/11-12/013/DSTX/TSUN.

For the fabrication of one unit of stainless steel container, and related accessories, quotations are invited from vendors. The container and the platforms are to be installed in a drop shaft of dimensions 2400 mm x 2400 mm and height 5600 mm.

Eligibility Criteria

1) Vendors must have at least 5 years of experience in design, installation and commissioning of SS containers, platforms etc. They must produce job completion certificates of having successfully commissioned similar project works.

2) Vendors should provide contact information of previous customers along with technical details of the commissioned project. The feedback from the clients will be considered.

3) Vendors have to furnish the details of technical capability. (of that of equipment and operating personnel)

4) Vendors have to provide copies of test certification documents of the materials used. Wherever the material is not specified vendors shall choose the proper IS code for material selection.

5) Vendors shall be sufficiently equipped with tools, consumables and manpower required for the implementation of the work

6) The successful bidder shall take all precautions to ensure the safety of all their employees and the people in the neighborhood.

7) 12 months guaranteed trouble free operation has to be given by the vendor.

8) The manufacturability, workability, maintenance feasibility shall be well checked before committing the project. No complaints at a later stage will be considered.

9) The bidder should attend the pre-bid meeting and also make a site visit to qualify for submitting the tender. Date and time of meeting: 02,September 2016 ; 10:30 AM, Conference Hall, Aerospace Department, IIT Madras

10) Modifications in the proposed design for the ease of fabrication are acceptable, but the same has to withstand the desired load capacities and safety concerns.

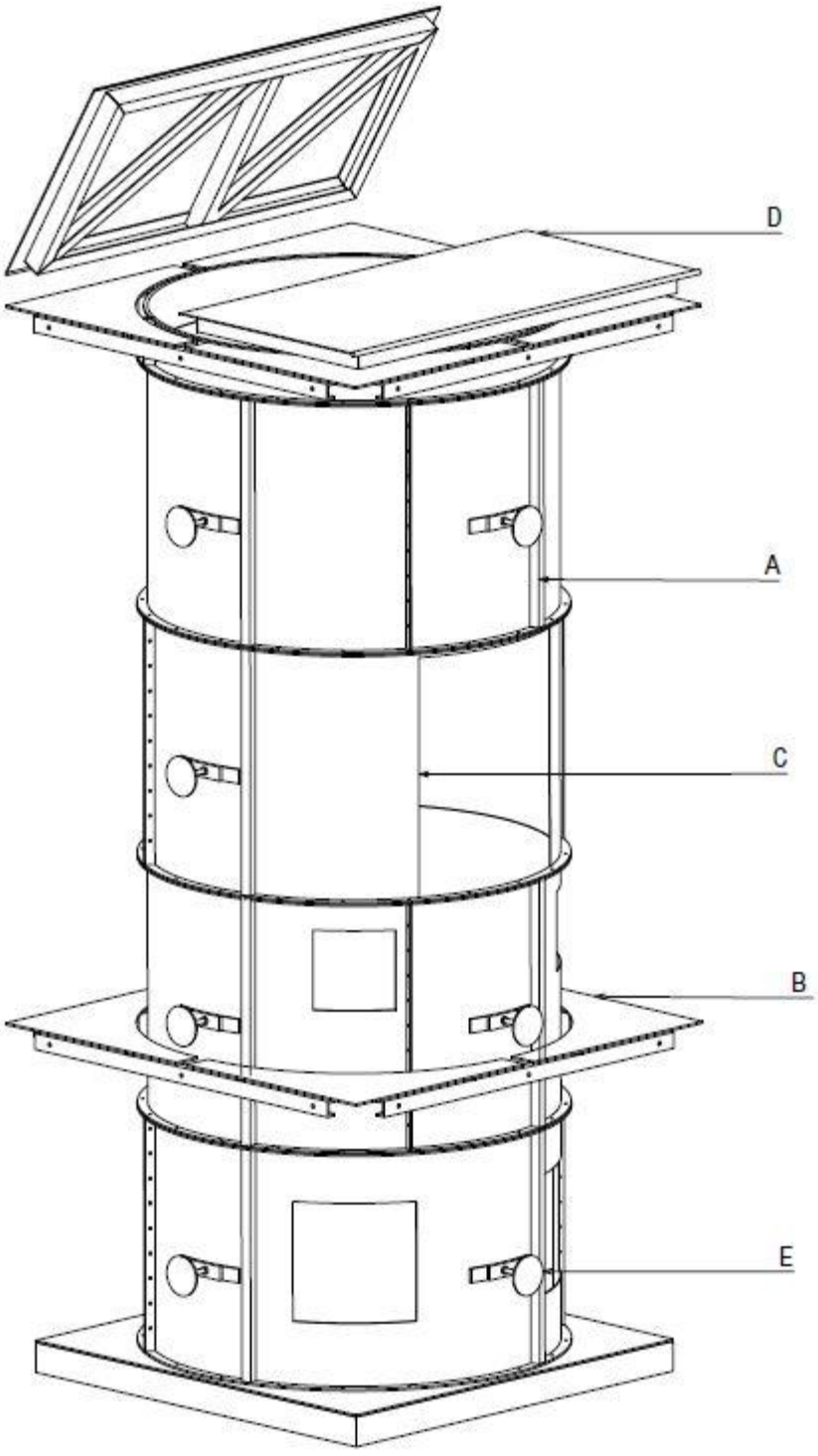

Figure 1: Catcher Container with support platforms

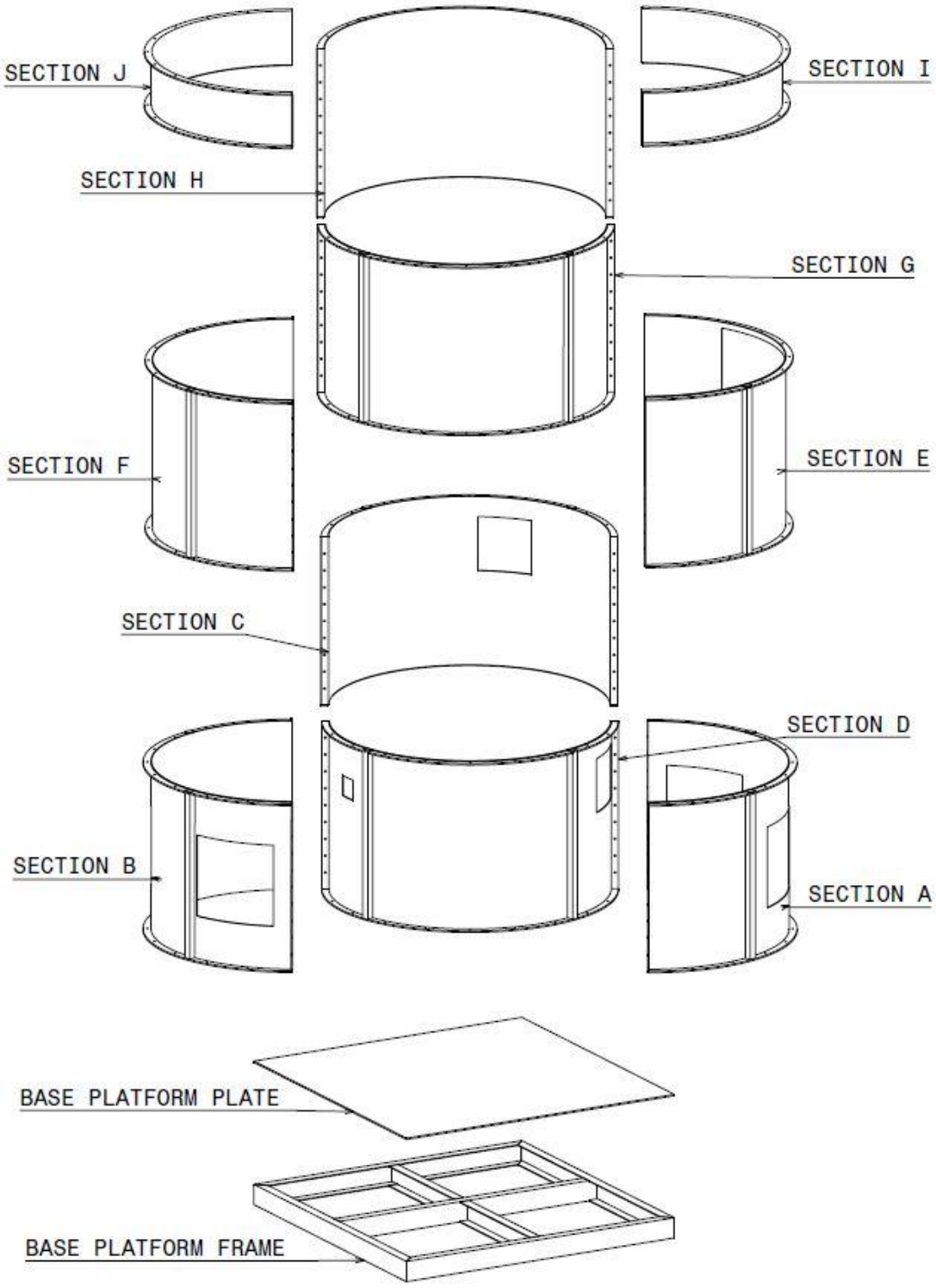

Figure 2: Exploded View of Container

LIST OF MAIN PARTS

A	Stainless Steel Container
B	Support Platforms
C	Inspection Door
D	Pneumatic Operated Hinged Platform
F	Vibration Isolators

1) Stainless Steel Container

Stainless Steel container is for housing an airbag and foam sheets. The airbag will be inflated and deflated within the container. The maximum pressure will not exceed 5 bar. Refer to figure no: 2 for the exploded view showing arrangement of sections and figure no: 3 for standard views of the container assembly.

The container is to be made to satisfy the following requirements.

- The container has to be an assembled unit. Semicircular sections are assembled to form circular sections which are stacked to form the container. The design drawings for each semicircular section are given in detail.
- The inner surface of the container should be as smooth as possible without any protrusions.
- For proper alignment of the circular sections, alignment dowel pins should be provided on the flanges.
- Suitable provisions are to be made for inlet and outlet openings for the airbag. The sections C and D hold the inlet and outlet openings.
- Semicircular section E holds an inspection door of 90 cm x 120 cm.
- Semicircular sections A and B have two inspection doors 60 x 60 cm each.
- The sections A, B, C and D should be given corrosion resistant epoxy coating. All other components should be given two coats of zinc chromate primer.
- Appropriate vertical stiffeners in adequate numbers are to be provided to the sections so as to withstand both the force due to pressure and weight of the top sections.
- The container has to be connected to the four walls of the tower, through vibration isolators.

Container Dimensions and material

- Inner diameter: 2000 mm
- Height : 5300 mm
- 8 semi-circular sections of 1250 mm height and 2 sections of 300 mm height.
- Thickness – 5 mm
- Stainless Steel grade – 304

Table 1: Specifications for Stainless Steel Container

PART	DIMENSION		DETAILS WITH REFERENCE FIGURE NUMBER	
SECTION – A	Inner Diameter	2000 mm	Front View	Figure No: 4
	Height	1250 mm	Top View	Figure No: 5
	Thickness	5 mm		
	Inspection window	600 x 600 mm	Inspection windows should have a door openable from inside.	
SECTION - B	Inner Diameter	2000 mm	Front View	Figure No: 4
	Height	1250 mm	Sectioned Top View	Figure No: 5
	Thickness	5 mm	Inspection windows should have a door openable from inside.	
	Inspection window	600 x 600 mm		
SECTION – C	Inner Diameter	2000 mm	Front View	Figure No: 6
	Height	1250 mm	Sectioned Top View	Figure No: 7
	Thickness	5 mm	This section holds one square outlet opening for airbag piping.	
	Outlet Opening	400 x 400 mm		
SECTION – D	Inner Diameter	2000 mm	Front View	Figure No: 8
	Height	1250 mm	Sectioned Top View	Figure No: 9
	Thickness	5 mm	This section holds square openings for outlet hole and an inlet hole for airbag piping	
	Outlet Opening	600 x 600 mm		
	Inlet Opening	150 x 150 mm		

SECTION – E	Inner Diameter	2000 mm	Front View	Figure No: 10
	Height	1250 mm	Sectioned Top View	Figure No : 11
	Thickness	5 mm	The section holds the main inspection sliding door.	
	Inspection Door	1200 x 1200 mm		
SECTION – F	Inner Diameter	2000 mm	Front View	Figure No: 12
	Height	1250 mm	Top View	Figure No: 13
	Thickness	5 mm		
SECTION – G	Inner Diameter	2000 mm	Front View	Figure No: 14
	Height	1250 mm	Top View	Figure No: 15
	Thickness	5 mm		
SECTION – H	Inner Diameter	2000 mm	Front View	Figure No: 14
	Height	1250 mm	Top View	Figure No: 15
	Thickness	5 mm		
SECTION – I	Inner Diameter	2000 mm	Front View	Figure No: 16
	Height	300 mm	Top View	Figure No: 17
	Thickness	5 mm		
SECTION – J	Inner Diameter	2000 mm	Front View	Figure No: 16
	Height	300 mm	Top View	Figure No: 17
	Thickness	5 mm		

2) Platforms

Platforms are required for the operating personnel to safely operate with container-airbag assembly during maintenance, inspection and daily operation. Three platforms, one each are required at the underground level, beneath ground level and first floor level. The details of the individual platforms are given in the following sections. The platforms should have a minimum of 2 ton loading capacity, excluding the self-weight of the platforms itself.

Refer to figure no: 18 for the arrangement of platforms.

Specifications

- Loading Capacity – 2 ton or above
- Material – GI/MS powder coated platforms with MS powder coated checkered plate – 10 mm for bottom platform and 6 mm for top platforms.
- C channels and L angles of the following specifications shall be used:
  ISMC 150 x 75, ISMC 100 x 50, ISA 40 x 40

Table 2: Specifications for platforms

PART	Dimensions	DETAILS
Platform –I (Base platform)	Available Spacing: 2190 x 2190 x 160 Refer figure no: 19, 21	This platform forms the base level above which is assembled the stainless steel container. Platform is supported on C channel sections and L angle brackets which are anchor bolted to the RCC below the Drop Shaft.
Platform – II (Mezzanine Platform)	Available Spacing: 2390 x 2390 x 160 Refer figure no: 20, 22	This work platform serves for accessing the air outlet of airbag and related accessories. The platform is 75 cm below the Ground Floor Level.
Platform – III (First Floor Platform)	Available spacing: 2390 x 2390 x 160 Refer figure no: 20, 21	The heavy duty platform will be frequently accessed for movement of the experiment capsule.

3) Inspection Door at Ground Floor Entrance

An impact resistant, cylindrical inspection door is required in the container at the ground floor entrance level. A sturdy and rugged construction is required, but the inner surface needs to be free off any sharp corners/edges. Refer to the figure no: 10 and figure no: 11 for door position and clear-opening dimensions.

- Door Type – Double door hinged
- Door dimensions: Height – 1200 mm, Arc Length – 933.3 mm
- Door material : SS grade 304

- Thickness – 5 mm
- Each door leaf has to be duly strengthened with stiffeners.

4) Pneumatic/Electrical control hinged platform

The first floor level has an additional heavy duty swing platform which operates pneumatically. Refer figure no: 23 and figure no: 24 for the framework.

Specifications:

- Double-Leaf, quick-acting hinged platform.
- Pneumatic/Electrical control
- The platform should be made of 10 mm SS 304 grade plate supported on a C channel frame assembly as shown in figure no: 23.
- Load capacity – 2 ton.
- Individual leaf control needed.
- Switch cabinet with controls, push button, pull button, air unit should be placed outside the drop shaft.
- Mechanical override control needed in case of failure of pneumatic/electrical mechanism

5) Anti-vibration mountings

Anti-vibration mountings/ Rubber Suspension mounts has to be placed in adequate numbers in each circular section to take up any shock loads. The container is connected the drop tower walls through the anti-vibration mountings.

Maximum shock load – 250 kgf (compression)

DIAGRAMS

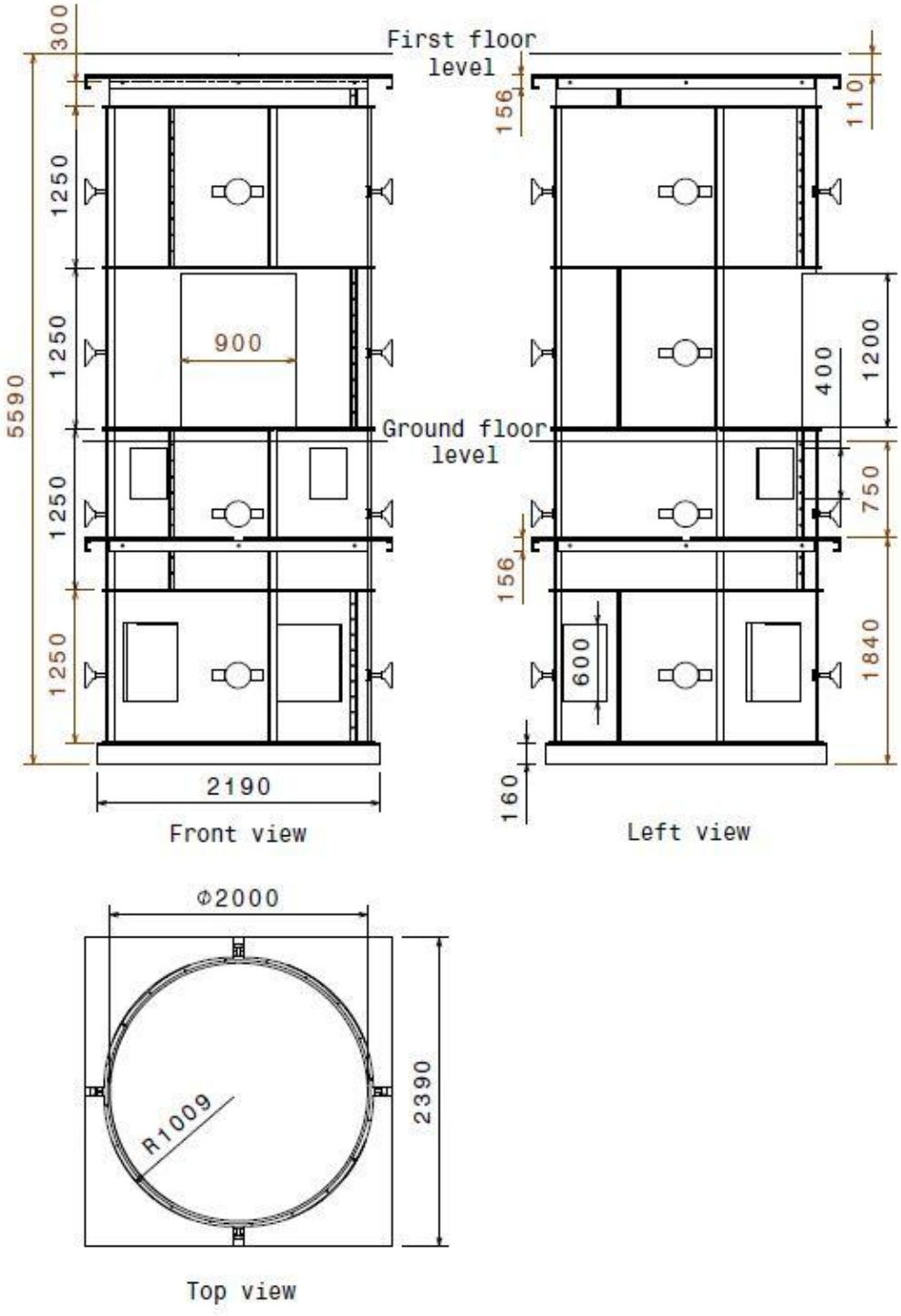

Figure 3: Standard Views of Container Assembly

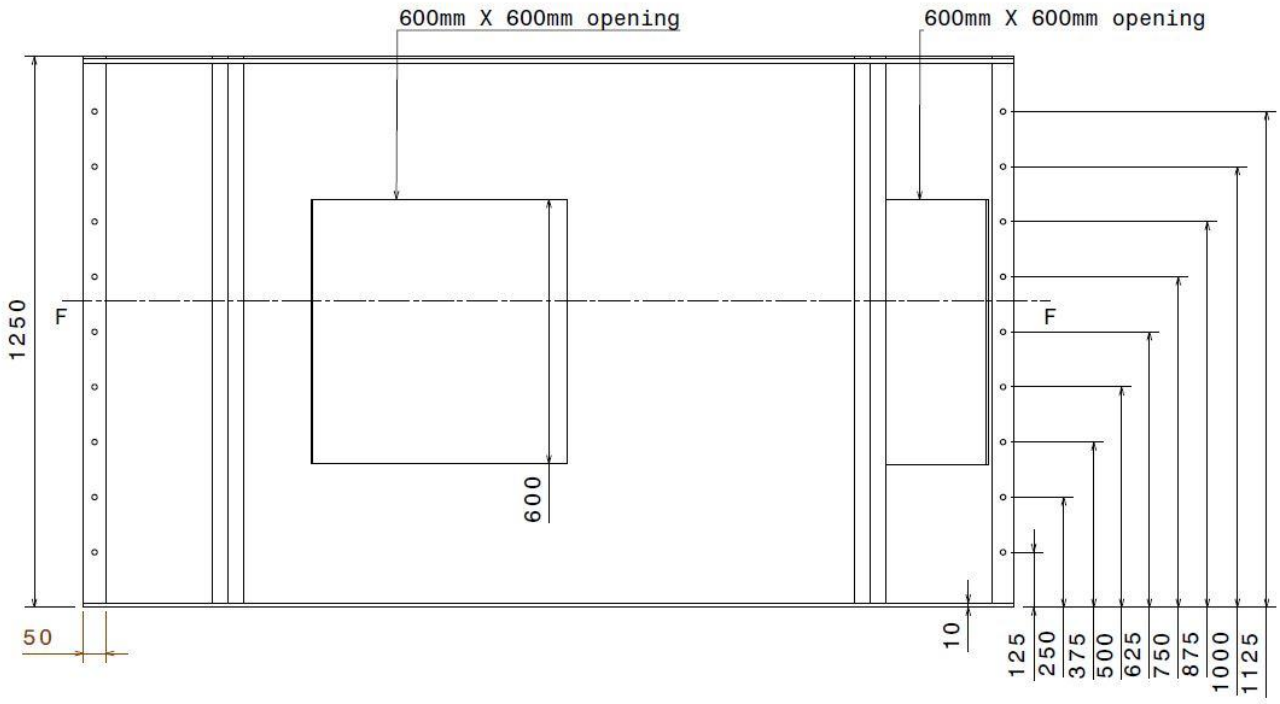

Figure 4: Part A, B Front View

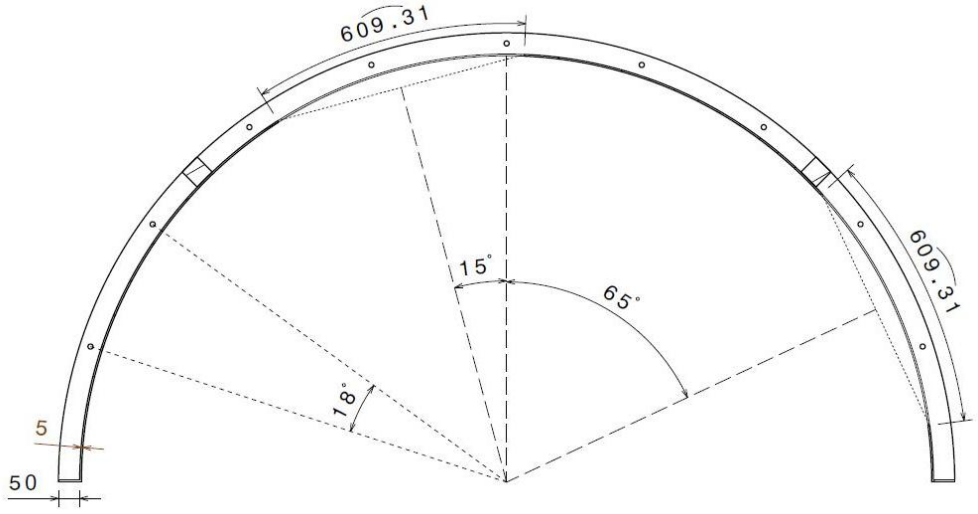

Figure 5: Part A, B sectioned Top View F-F axis

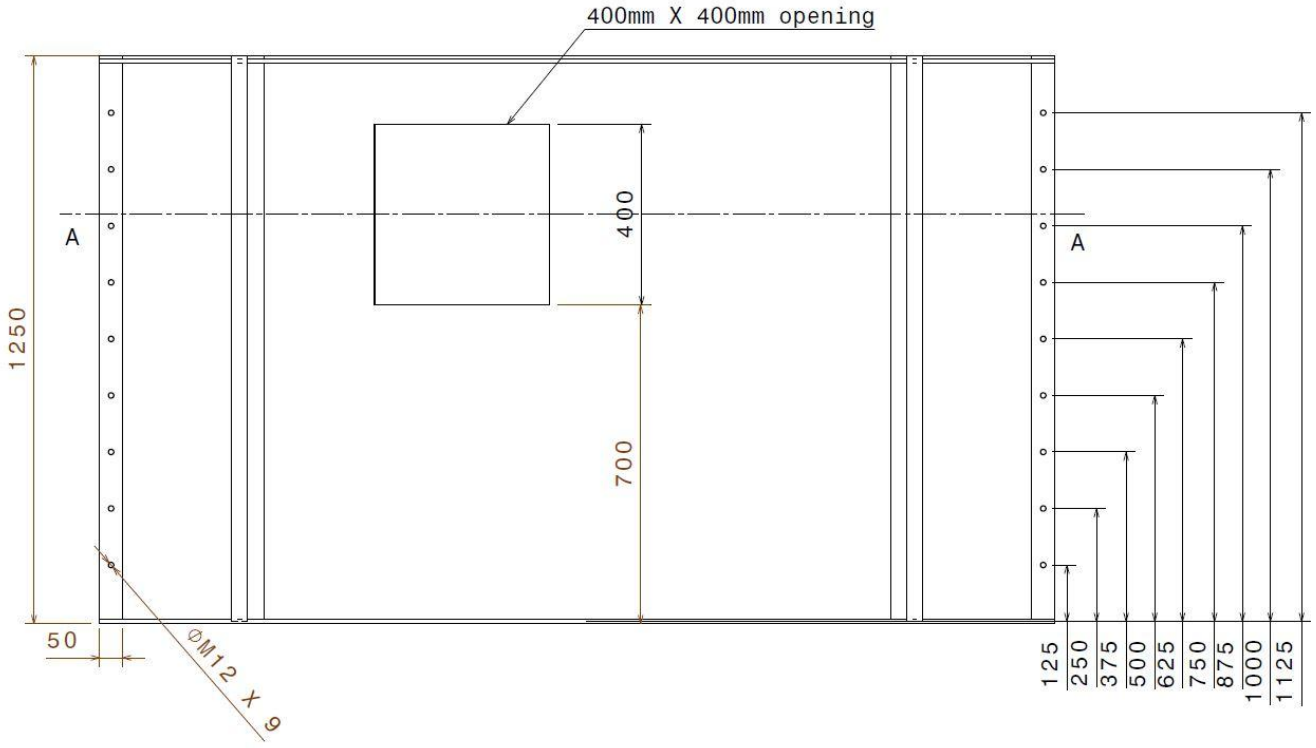

Figure 6: Part C Front View

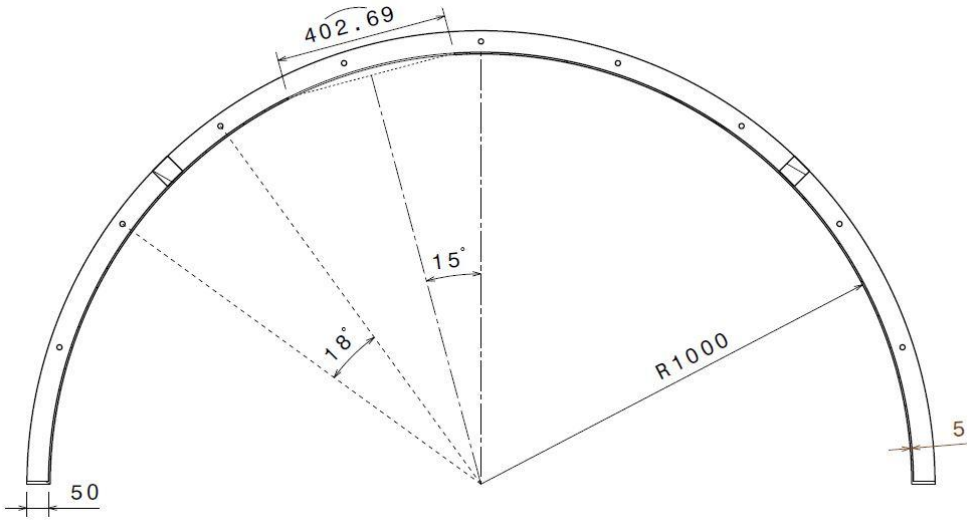

Figure 7: Part C sectioned Top View A-A axis

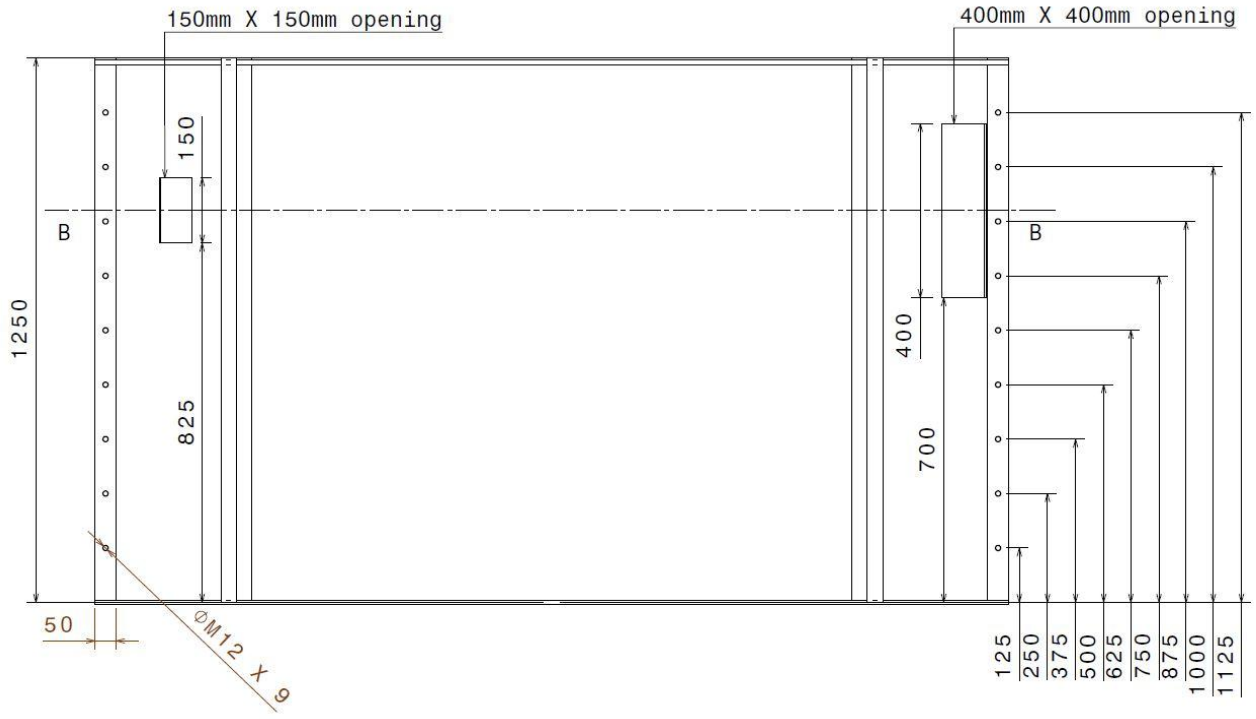

Figure 8: Part D Front View

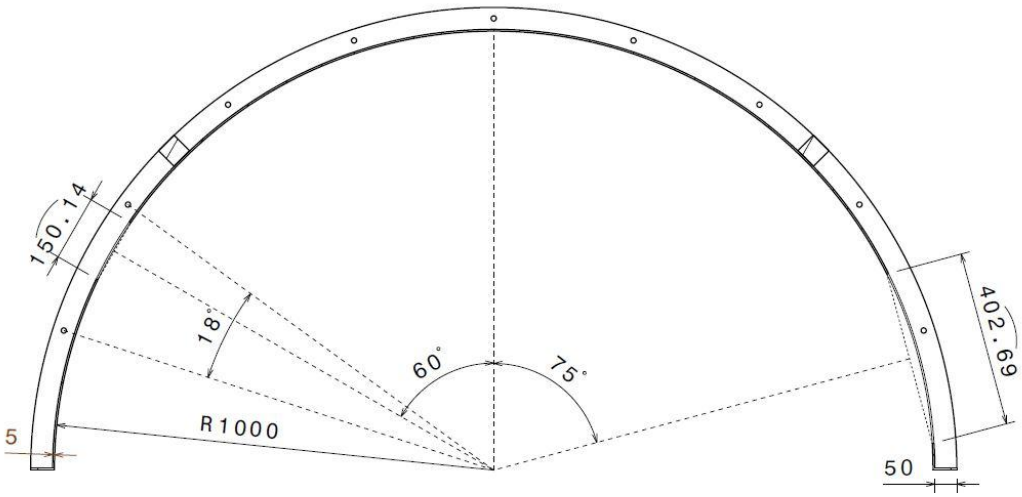

Figure 9: Part D sectioned Top View B-B axis

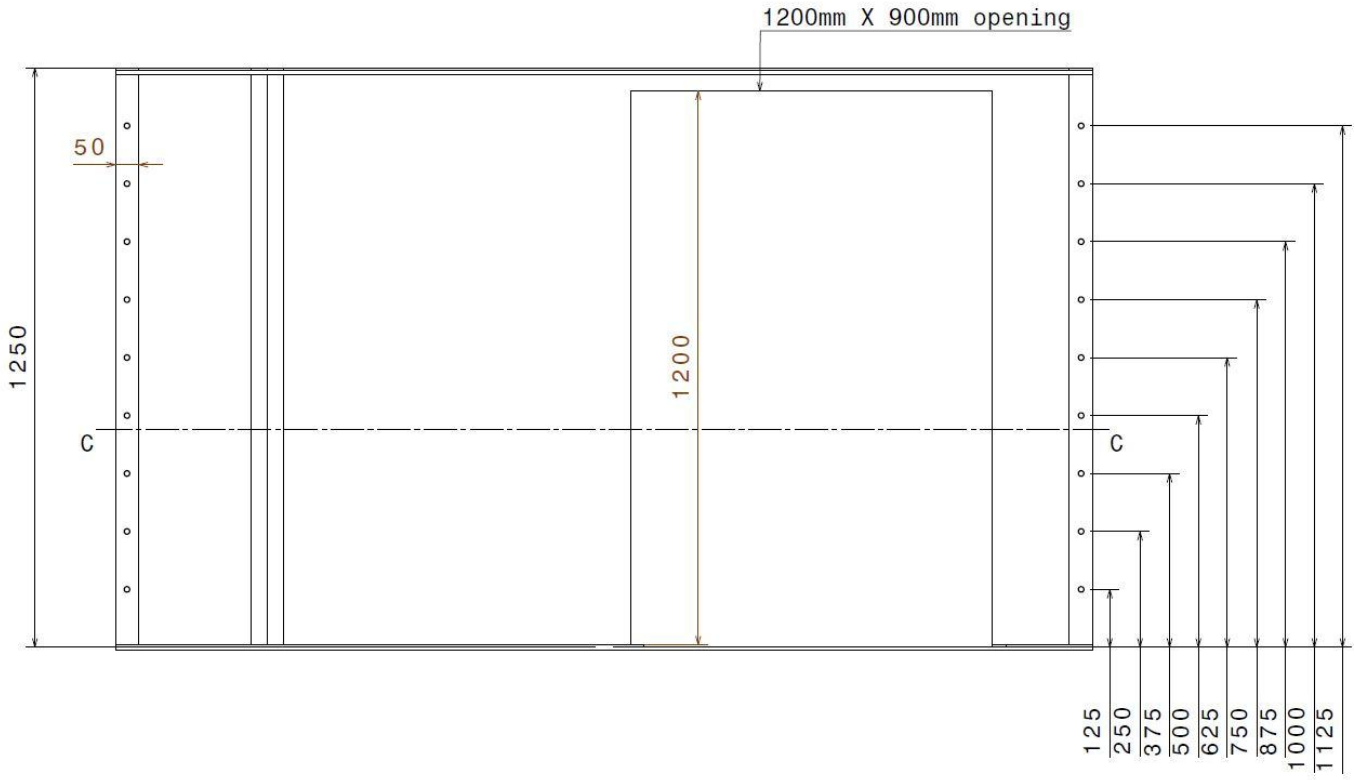

Figure 10: Part E Front View

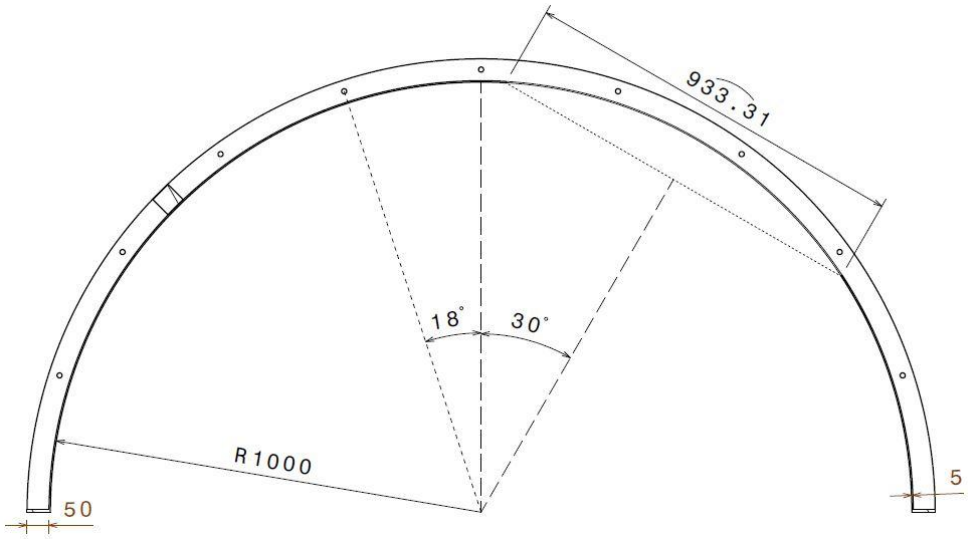

Figure 11: Part E sectioned Top View C-C axis

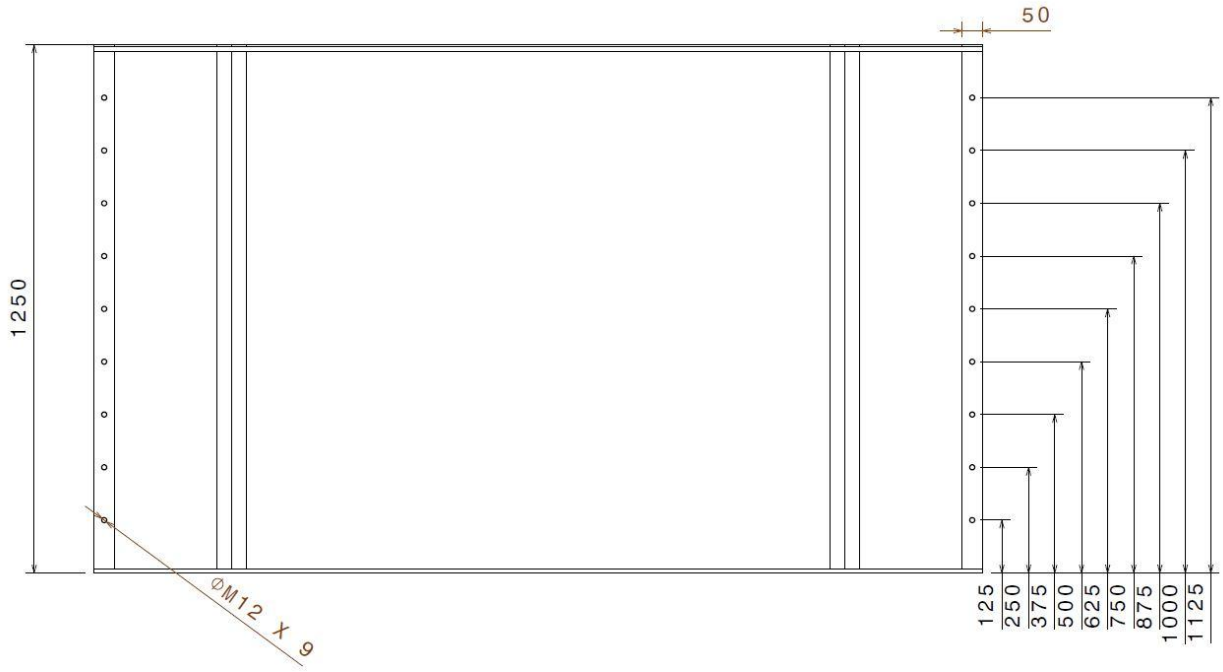

Figure 12: Part F Front view

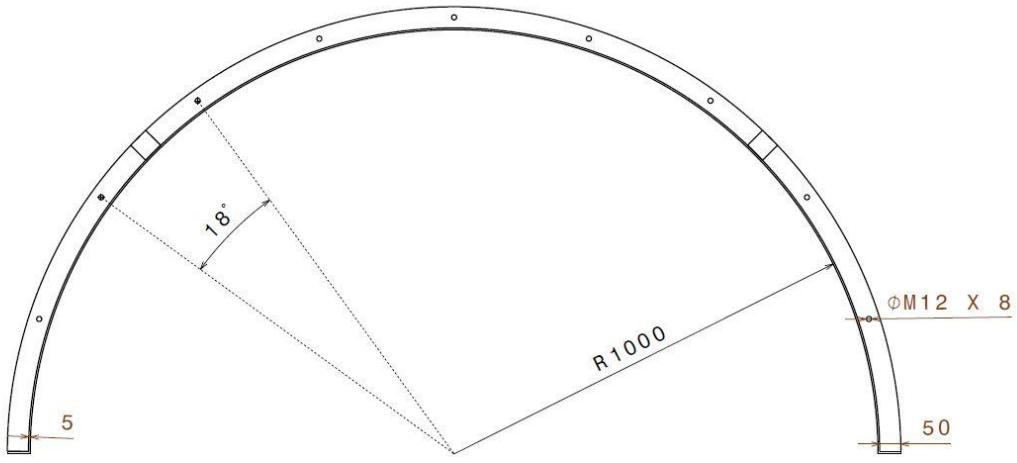

Figure 13: Part F Top View

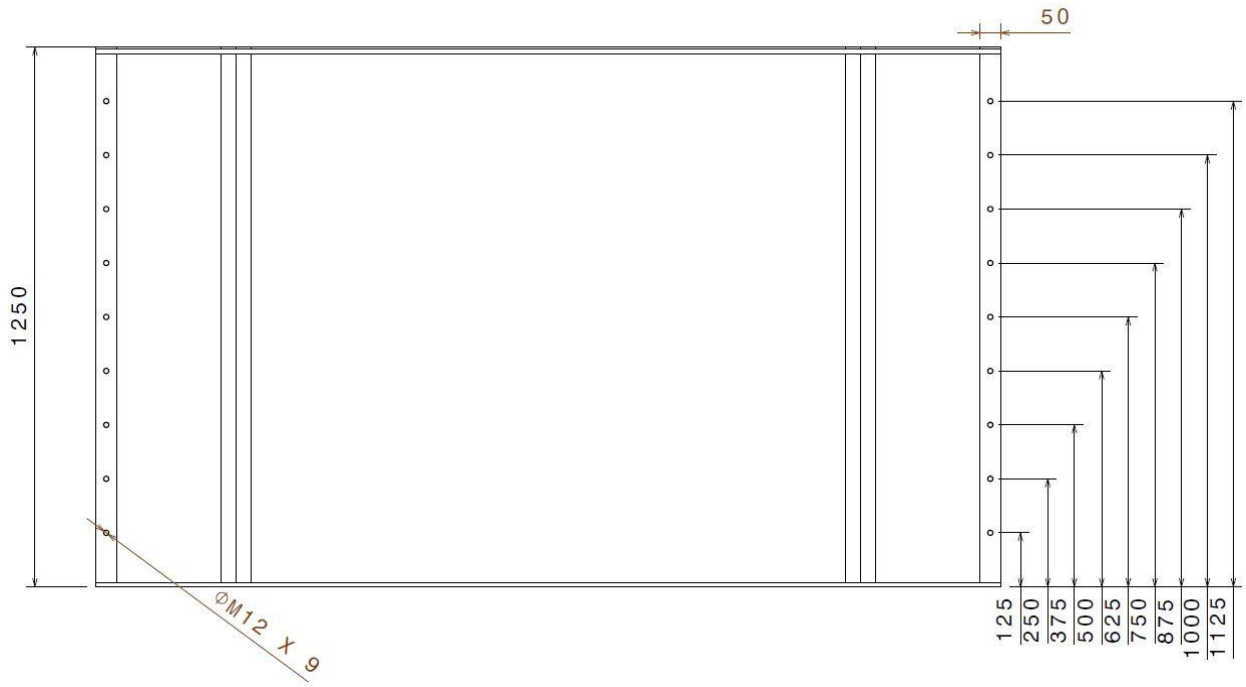

Figure 14: Part G, H Front View

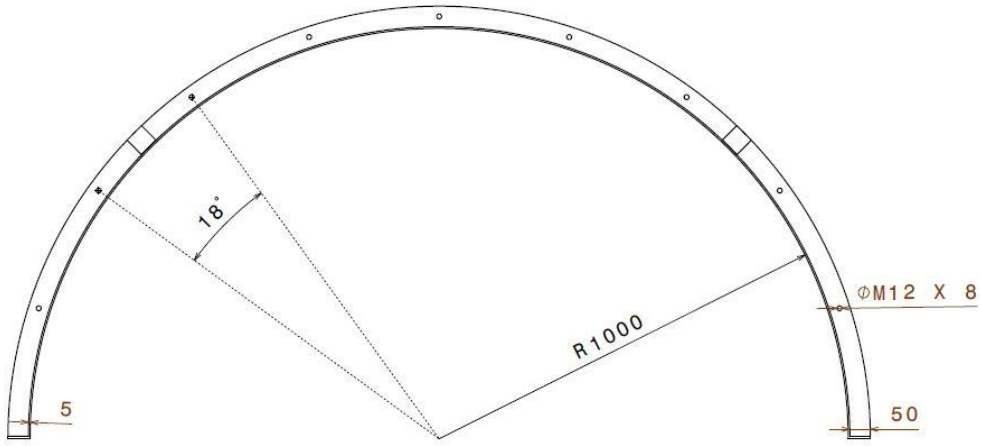

Figure 15: Part G, H Top View

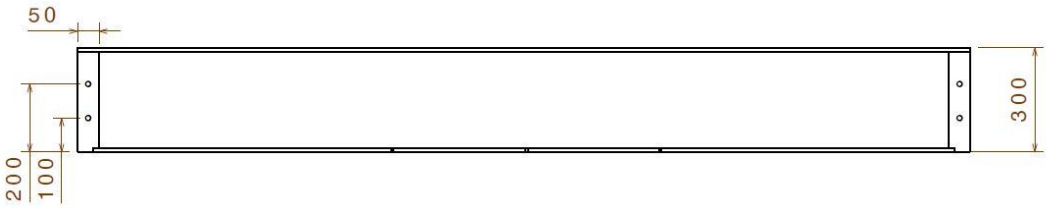

Figure 16: Part I, J Front View

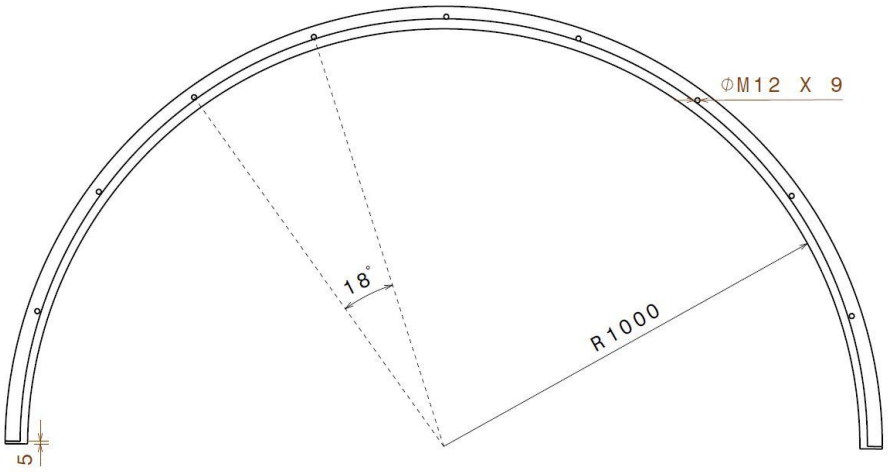

Figure 17: Part I, J Top View

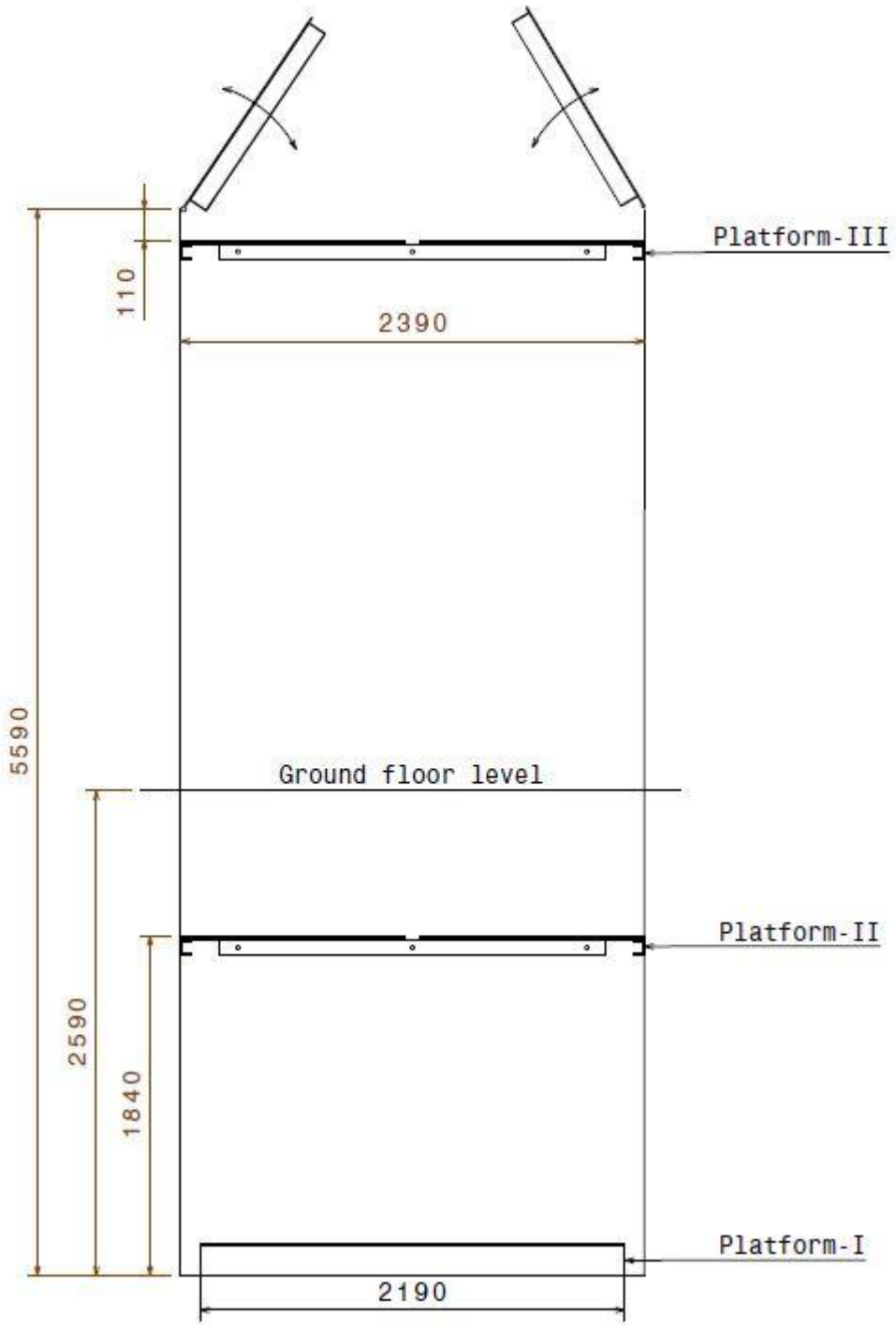

Figure 18: Platform arrangement

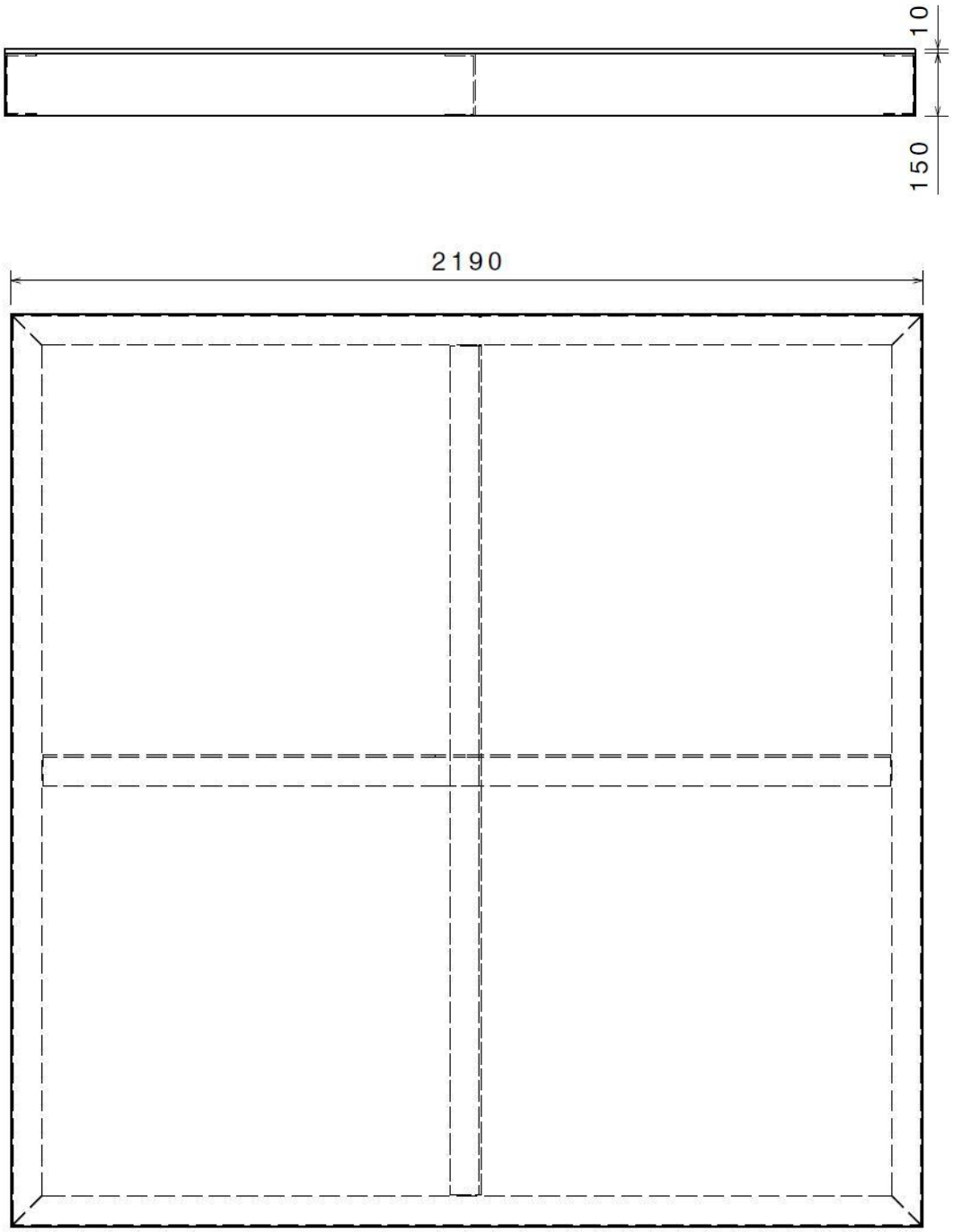

Figure 19: Platform I

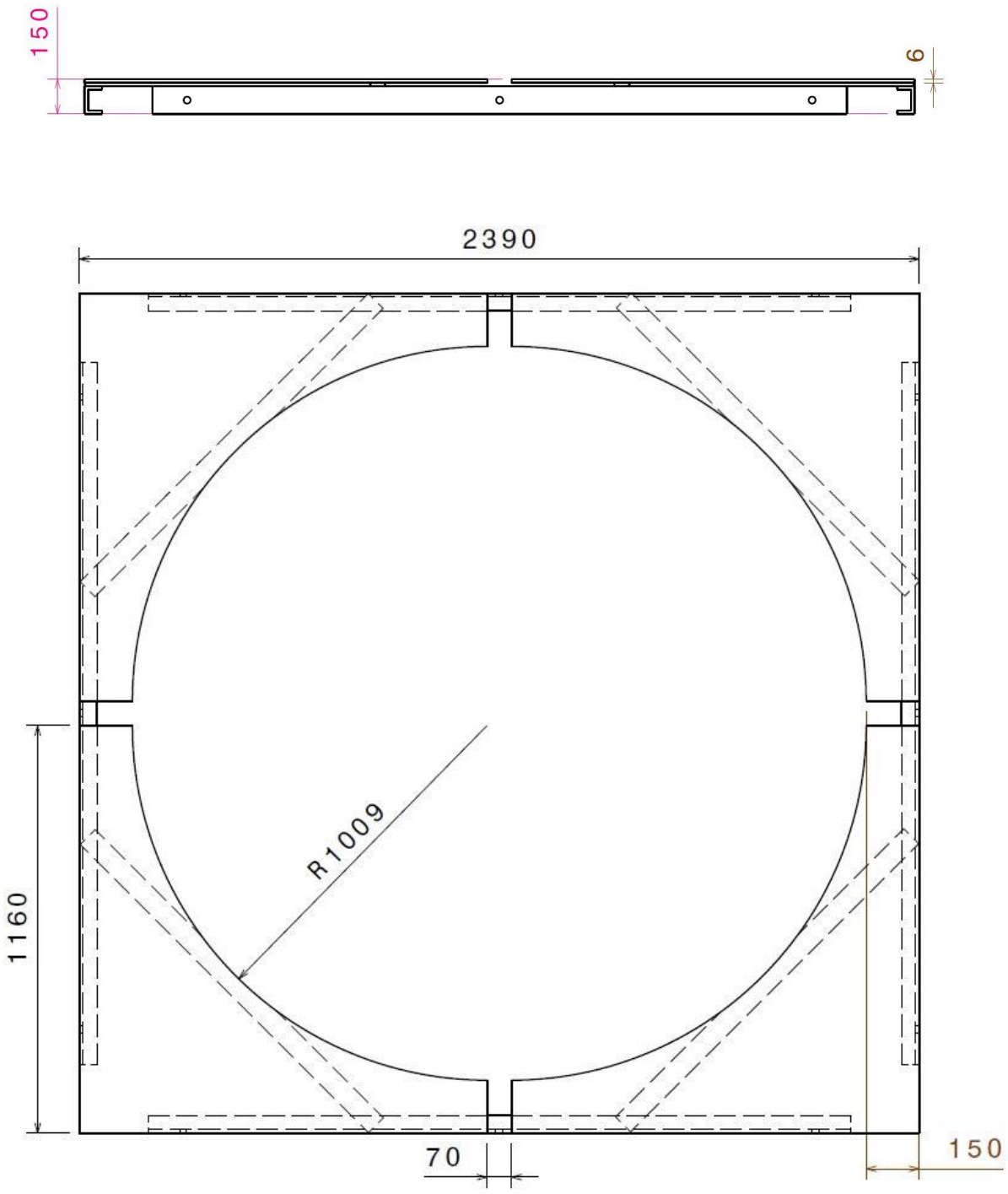

Figure 20: Platform II, III

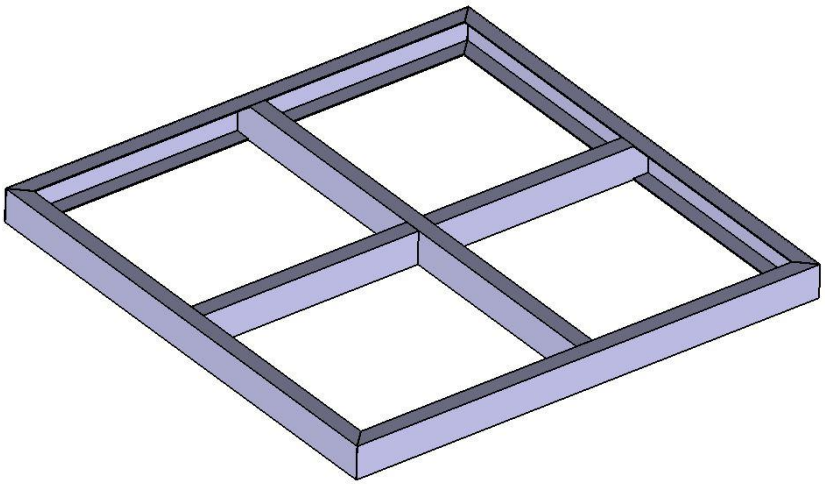

Figure 21: Framework for base platform

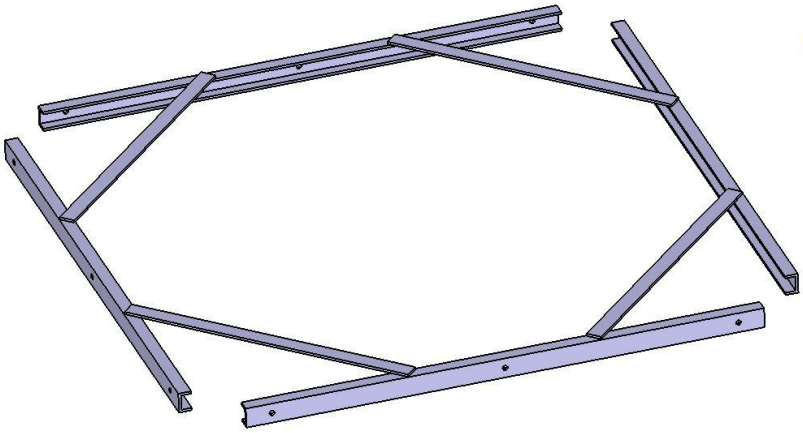

Figure 22: Framework for the platforms

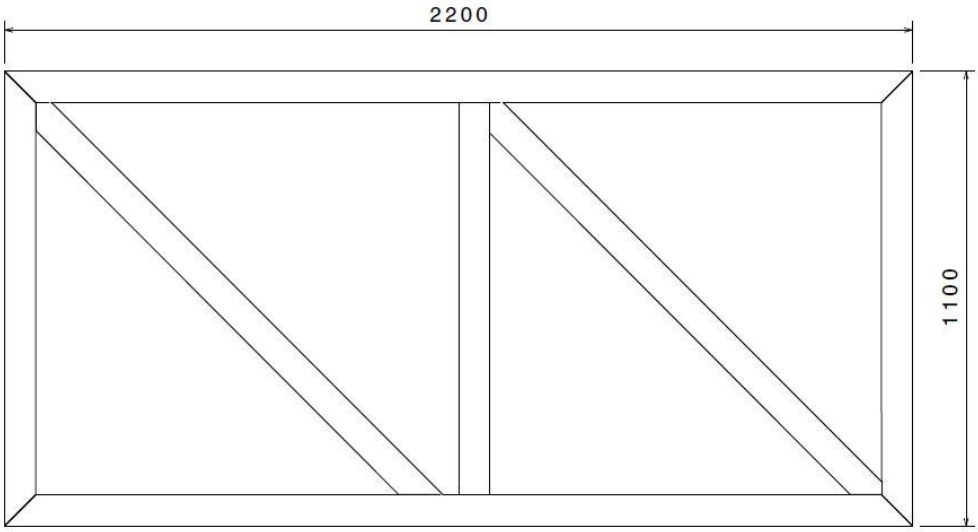

Figure 23: Framework for hinged platform

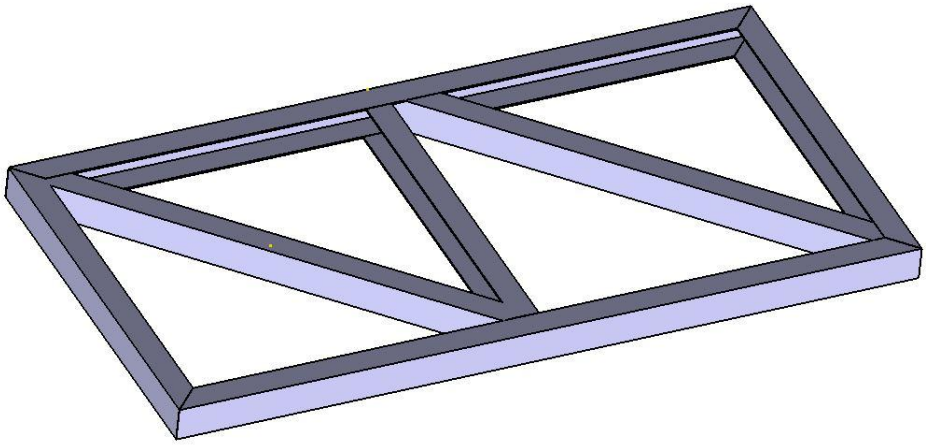

Figure 24: Hinged platform

The vendor has to fill up the following checklist and enclose the same along with technical specifications and necessary support documents while submitting the tender proposal.

Compliance Checklist

Sl No	**Requirement**	**Compliance (Yes/No)**	**Remarks**
1	Bidder should have submitted all the certificate copies related to work experience, material testing etc.		
2	Details and contact of previous customers with job description		
3	Whether the bidder has attended the pre-bid meeting and made a site visit		
4	Conformance to the design and specifications as proposed in the tender notification.		
	i) Stainless Steel Container		
	Dimensions as mentioned in table:		
	Material: SS grade 304		
	Provision of alignment dowel pins in flanges		
	Stiffeners provided wherever required to withstand load and force due to pressure.		
	The inner surface of cylinder should be smooth and free of any protrusions		
	Provision of vibration isolators as per the specification.		
	ii) Platforms		
	Dimensions as mentioned in table:		
	Loading Capacity – 2 ton		
	GI/ MS powder coated checkered plate 10 mm thick for base platform		
	GI/MS powder coated checkered plate 6 mm thick for		

	top platforms		
	Framework as specified in tender or better		
	iii) Inspection door : Ground Floor Level		
	Door dimensions as specified in the tender		
	Double door hinged type		
	Provision of stiffeners		
	iv) Pneumatic/ Electrical Control hinged platform		
	Frame work as specified in tender or better		
	Separate leaf control		
	Manual override in case of power failure		
	Capacity – 2 ton		
	Checkered plate 10 mm SS 304 grade		
5	12 month guaranteed trouble free operation.		
6	All the components should be given two coatings of zinc chromate primer. The bottom section should be given corrosion resistant epoxy coating.		
7	Specify the estimated time period for completion of the project		