



**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: 13 Mar. 2014**

**Due date: 3 Apr. 2014**

**Item name: HEATER ASSEMBLY FOR SCRAMJET**

1. Quotations are invited in duplicate for the items shown overleaf (in Annexure I). The quotations duly sealed and superscribed on the envelope with reference no. and due date, should be addressed to the undersigned so as to reach on or before the due date mentioned above.
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. In case of any technical clarifications, please contact Ariff Magdoom (E-mail: [ariffatmail@gmail.com](mailto:ariffatmail@gmail.com)) or P. John George (E-mail: [nccrdengr@pallava.iitm.ac.in](mailto:nccrdengr@pallava.iitm.ac.in), Phone: 044-22575026).
14. 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**

**(P) +91-44-22575025**



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**Annexure I**

Ref. No. ICS/11-12/013/DSTX/TSUN

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**Specifications for HEATER ASSEMBLY FOR SCRAMJET**

Scope of work for Heater Assembly for SCRAMJET:

This tender includes Heater Assembly which includes the following

Si NO	Item	File Name	Material	Number
1	Heaterbase	Heaterwocone	SS 310	1
2	Cone	conefinal	SS 310	1
3	Burner	burner	SS 310	8
4	Plate	plate	SS 310	1
5	Manifold	Manifold	SS310	2
6	18" Schedule 80 Flange	-----	SS310	3
7	4 " Schedule 80 Flange	-----	SS 310	1
8	18 inch to 4 inch reducer	-----	SS 310	1
9	Fasteners	-----	SS 310	Appropriate for all Places
10	Hoses and connectors	-----	---- (For connectors Swagelok fittings are recommended)	-----

Heaterbase and cone has to be welded resulting unit will look like heater drawing in the file name "Heater". then this unit will be welded with 18 inch schedule 80 flanges on either side.

Reducer of 18 inch to 4 inch will be welded with schedule 80, 18 inch and 4 inch flanges on either side appropriately Refer Heater schematic.

From Manifold to burner they have to be connected with flexible hoses(Rated for 50 bar) and connected with Swagelok connections refer "Manifold schematic". Which requires 16 hoses with connectors. Open end of the manifold has to be connected with threaded connector for pipe connections

Fasteners for flanges of appropriate dimensions and appropriate numbers has to be proved , Fasteners for burner also has to be provided. Plugs for all 1 inch tapped hole has to be provided.



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All dimensions in mm in all the engineering drawings attached. Unspecified tolerances has to be 0 to + 0.1mm .

Note: Engineering Drawing are attached and Cad file and few images of the same and is available in the following link

<https://drive.google.com/file/d/0B5oETyagwN1CTy1sNTZJN3JYdHM/edit?usp=sharing>

**Price should include Materials, Manufacturing, Assembly, Testing, and transporting the same to IIT Madras.**

The drawings are uploaded in the institute website: <http://tenders.iitm.ac.in/>

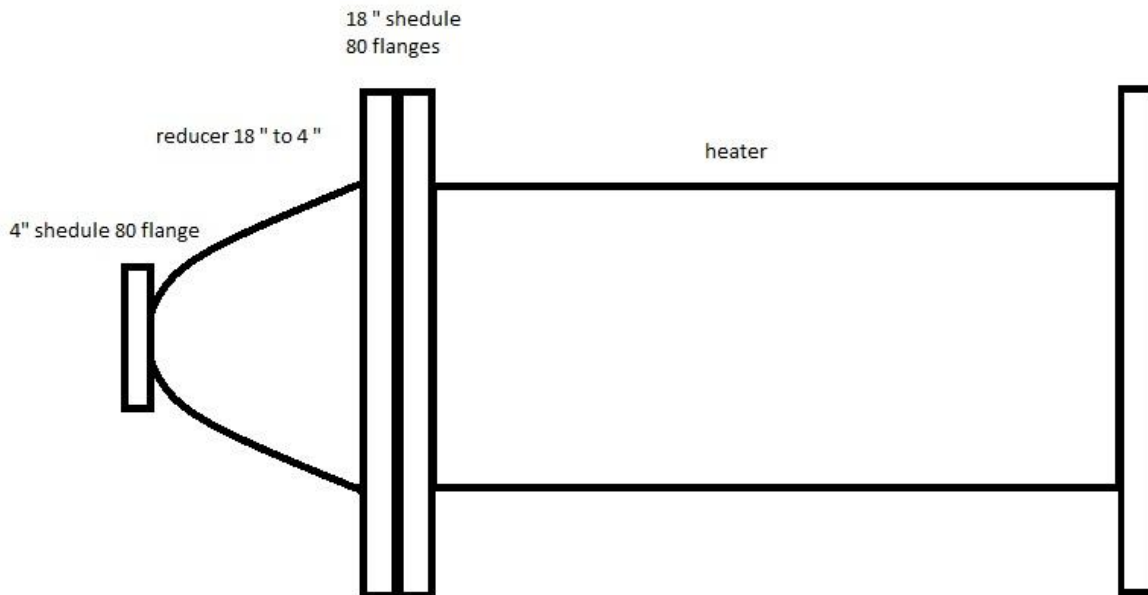


Fig : Heater schematic



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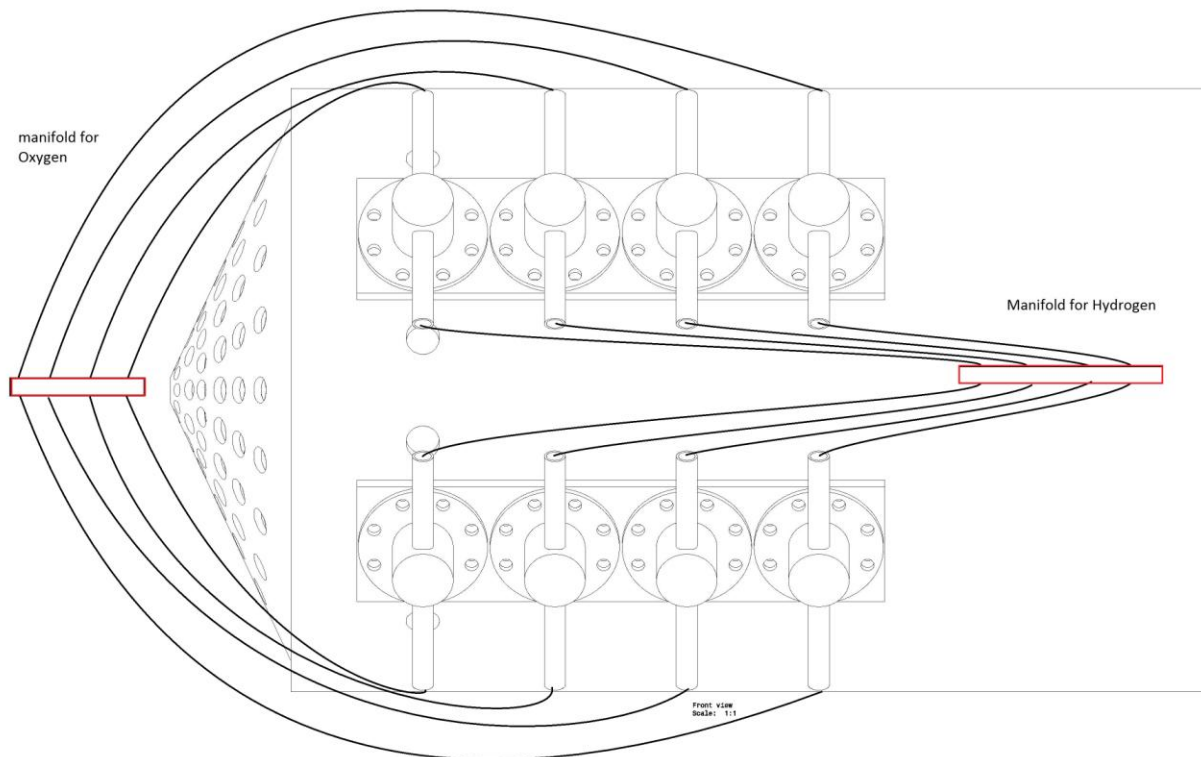
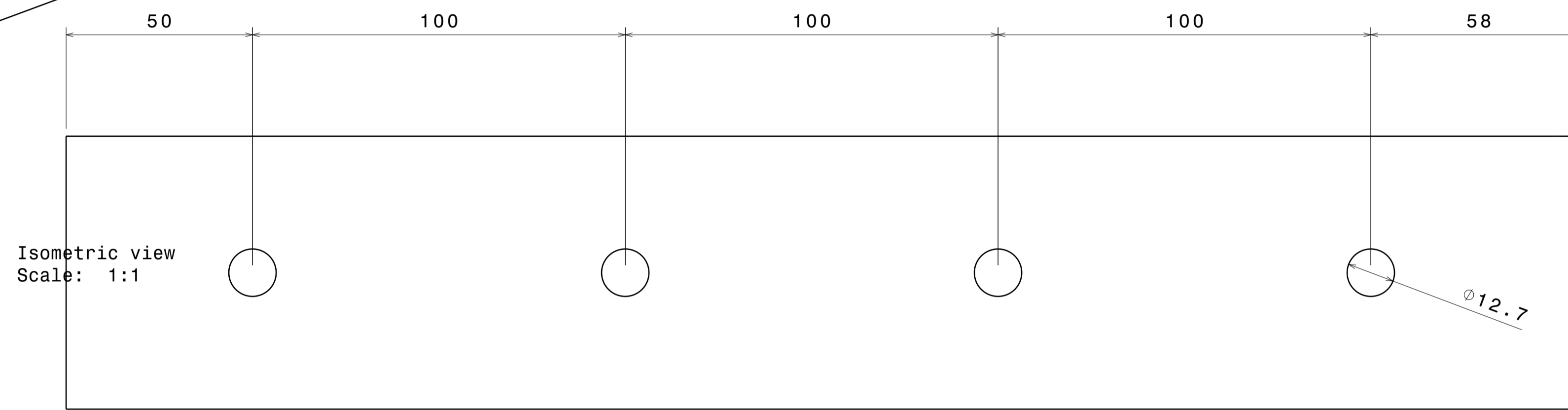
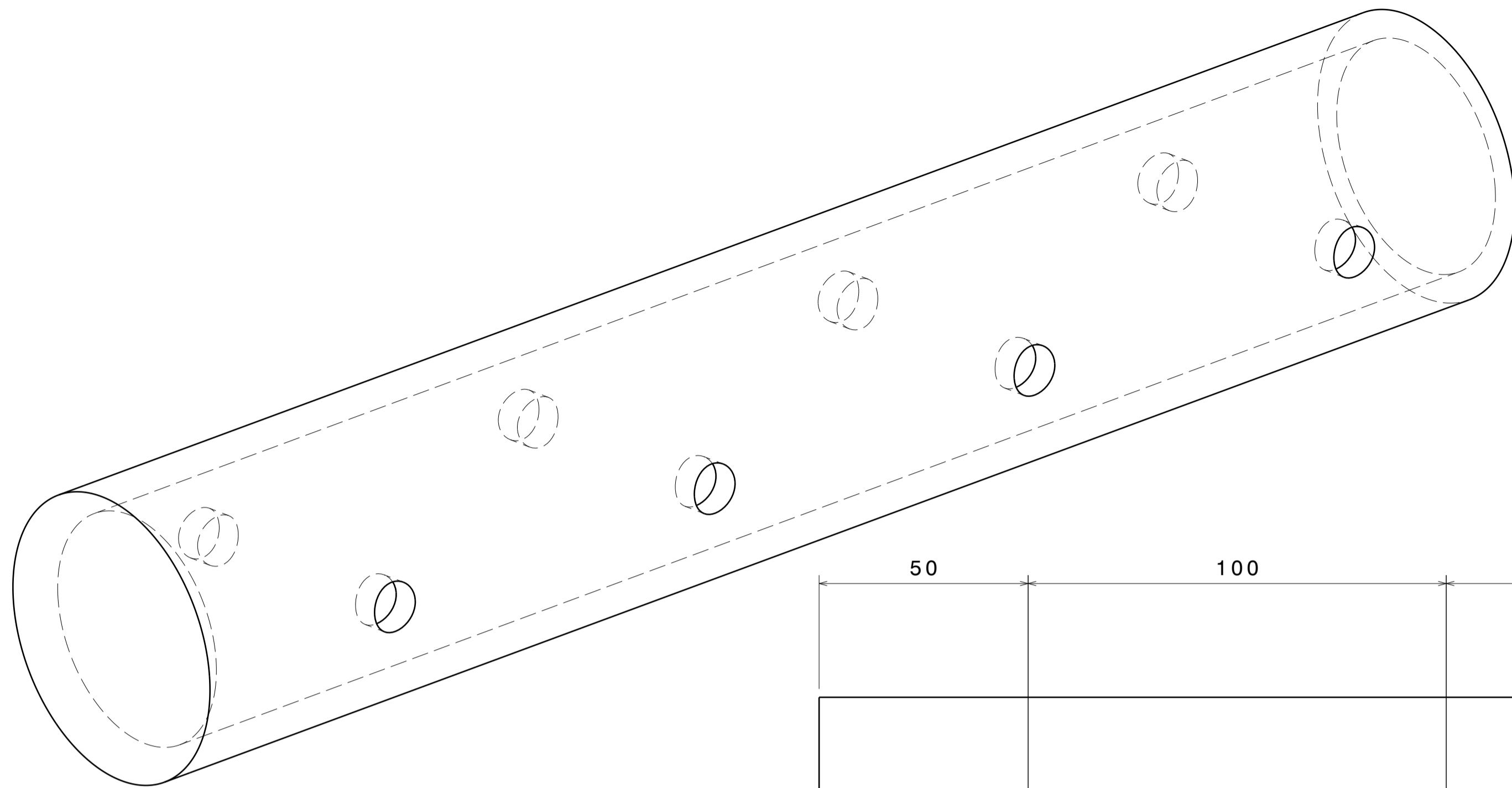


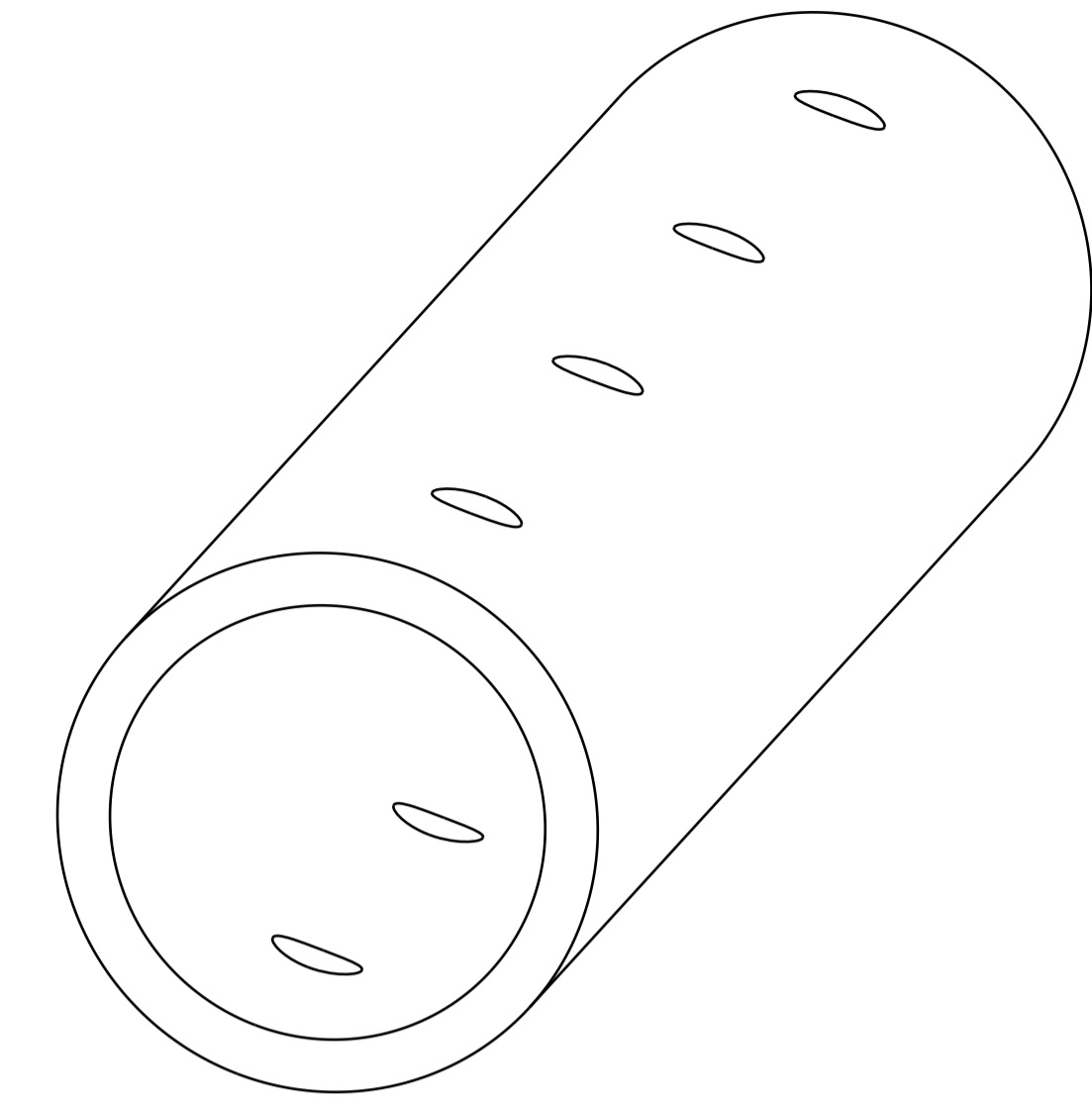
Fig : Manifold Schematic

Fig : Manifold

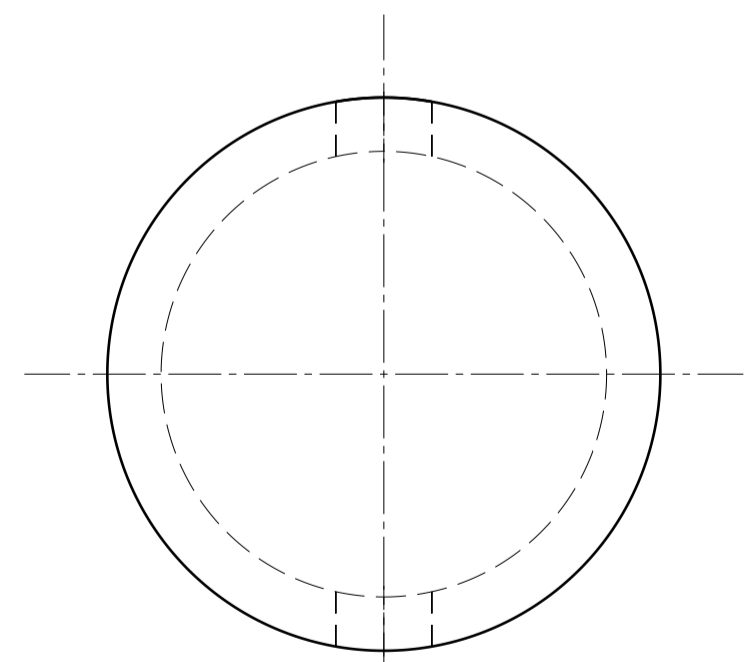


Isometric view  
Scale: 1:1

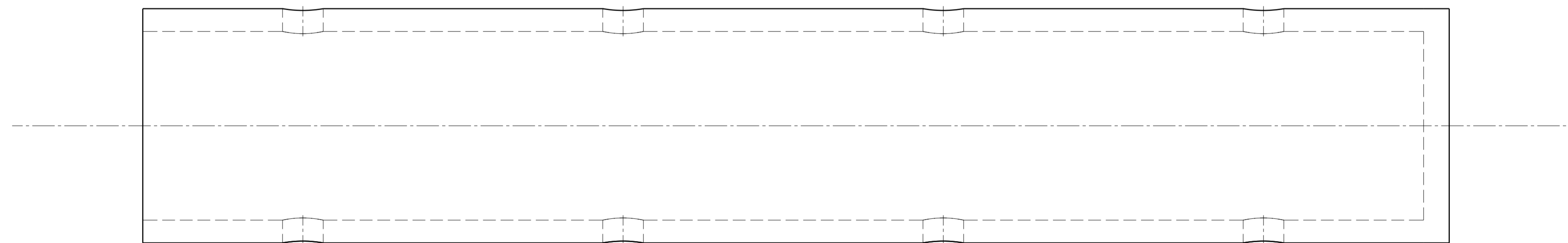
Bottom view  
Scale: 1:1



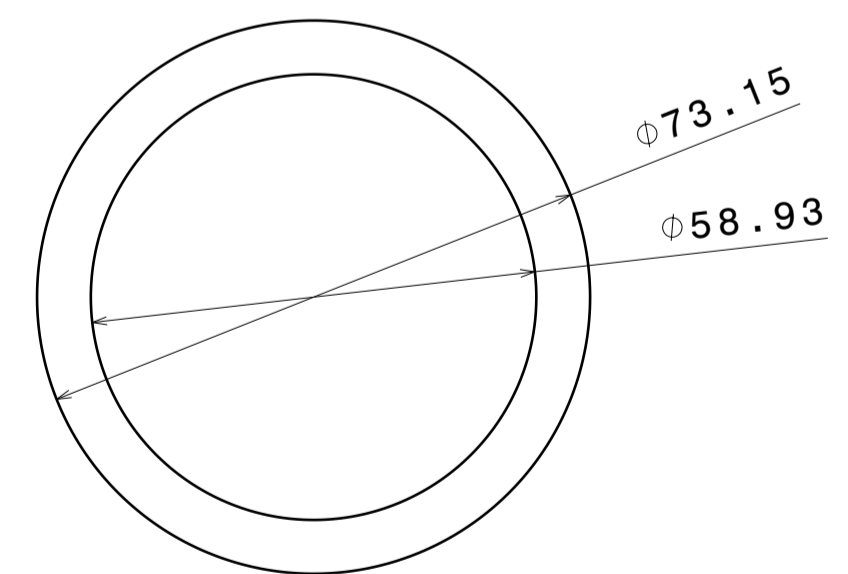
Isometric view  
Scale: 1:1



Right view  
Scale: 1:1

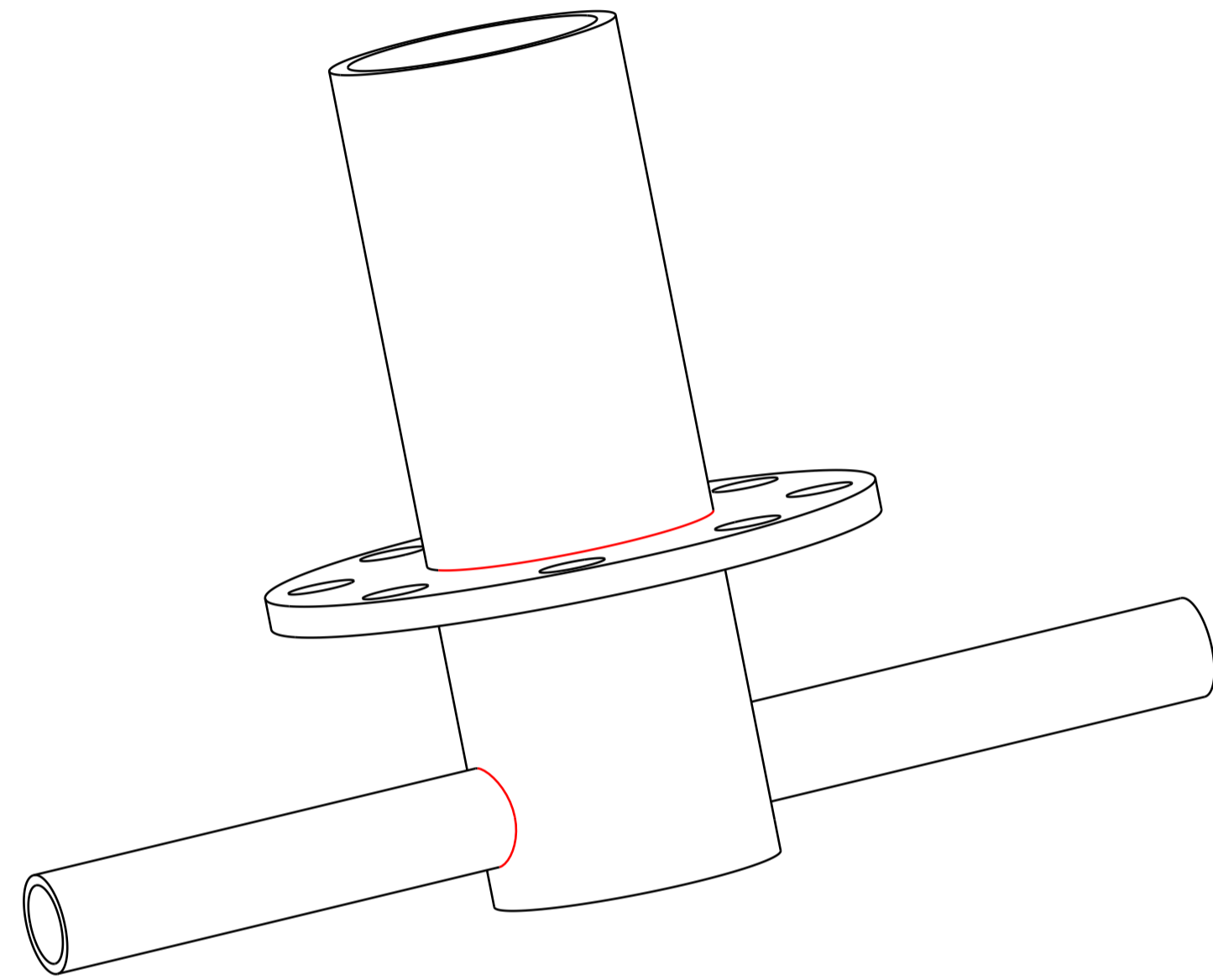


Front view  
Scale: 1:1

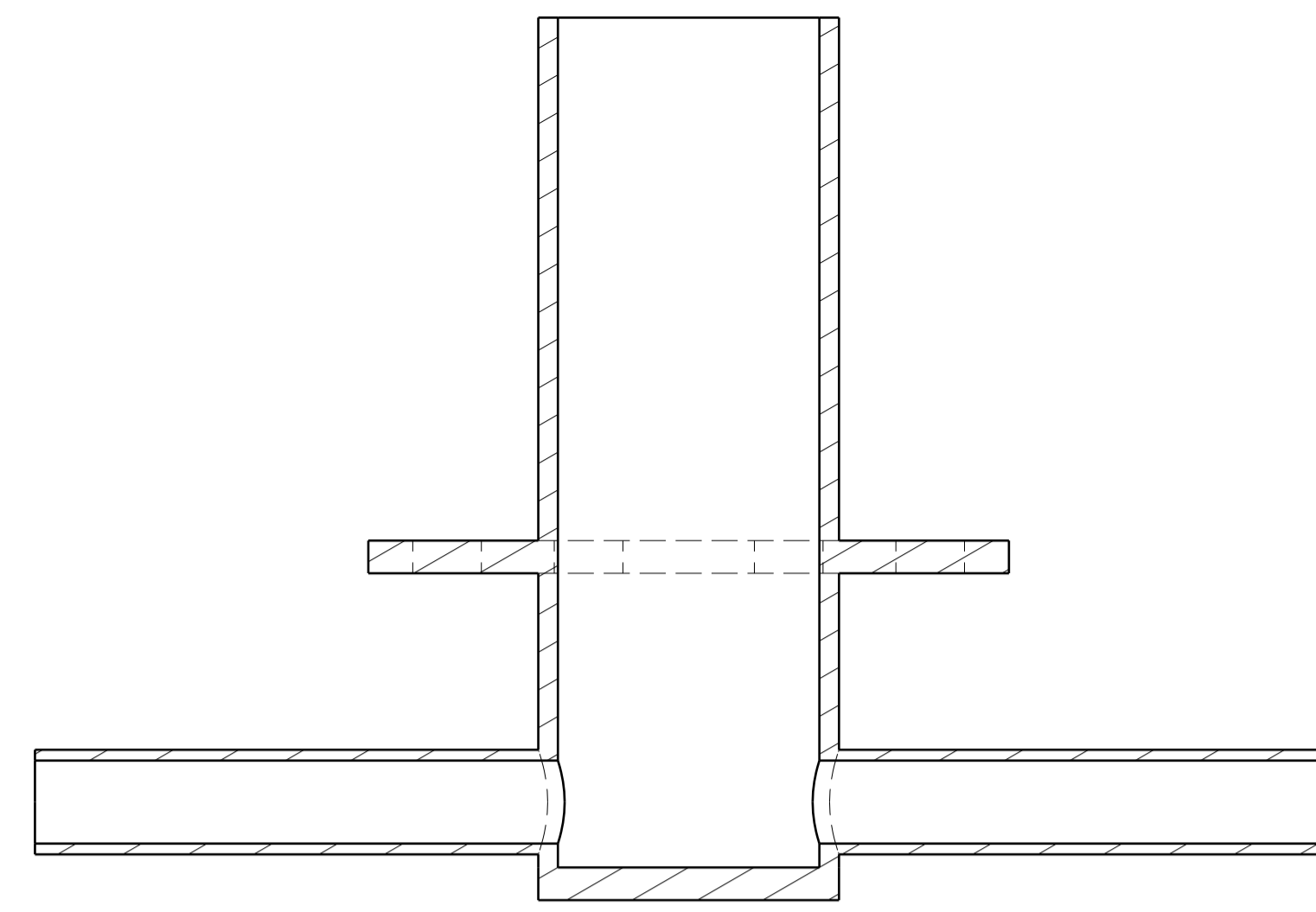


Left view  
Scale: 1:1

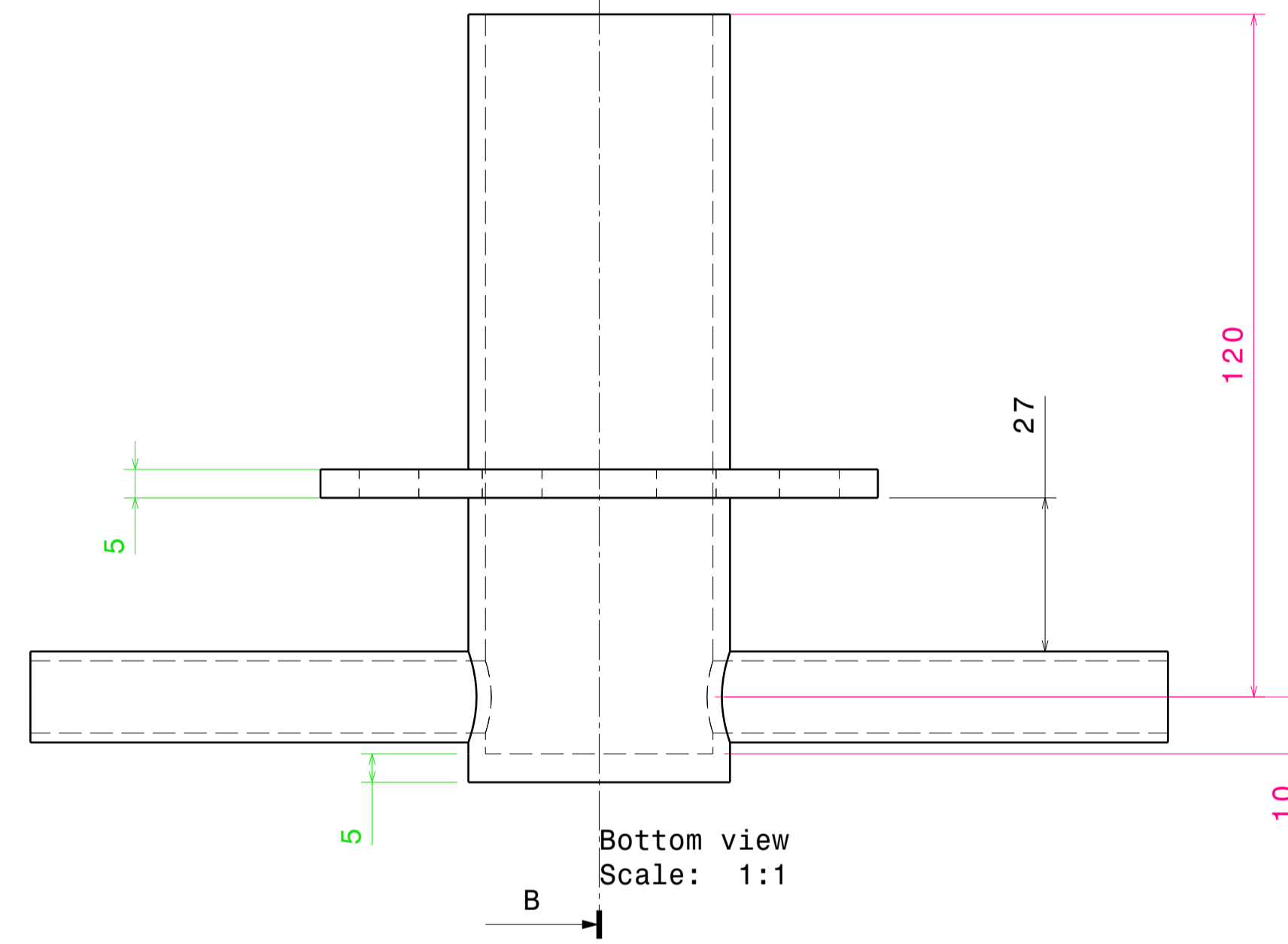
Fig : burner



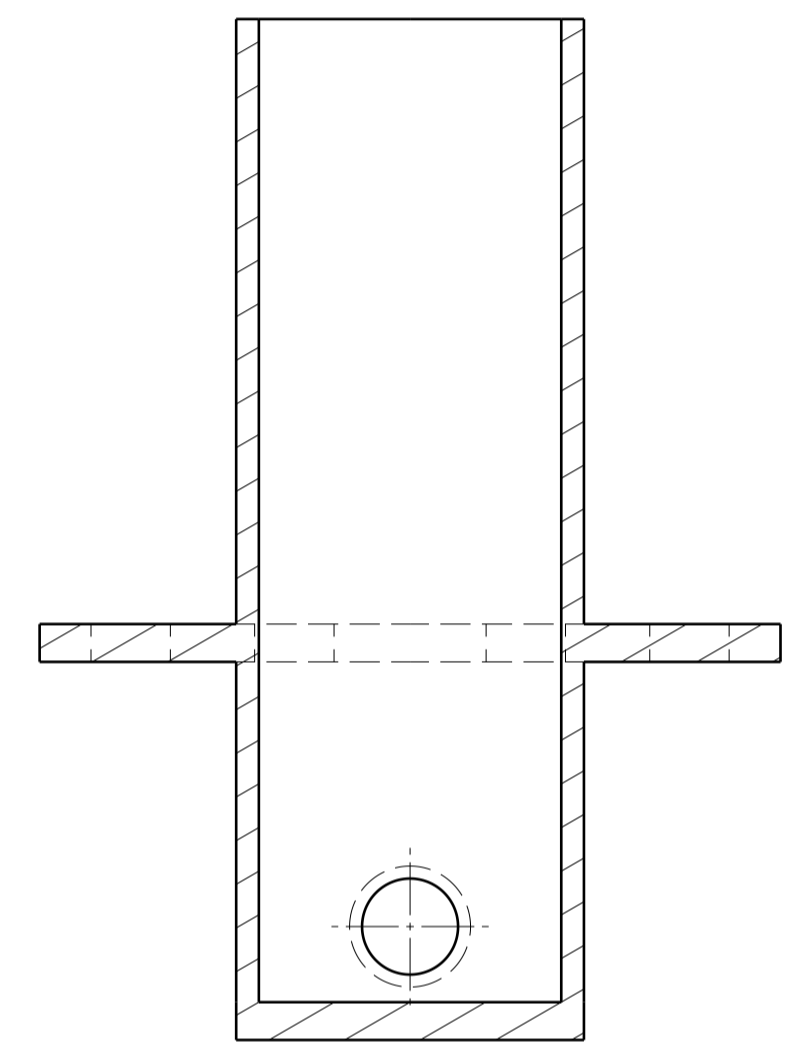
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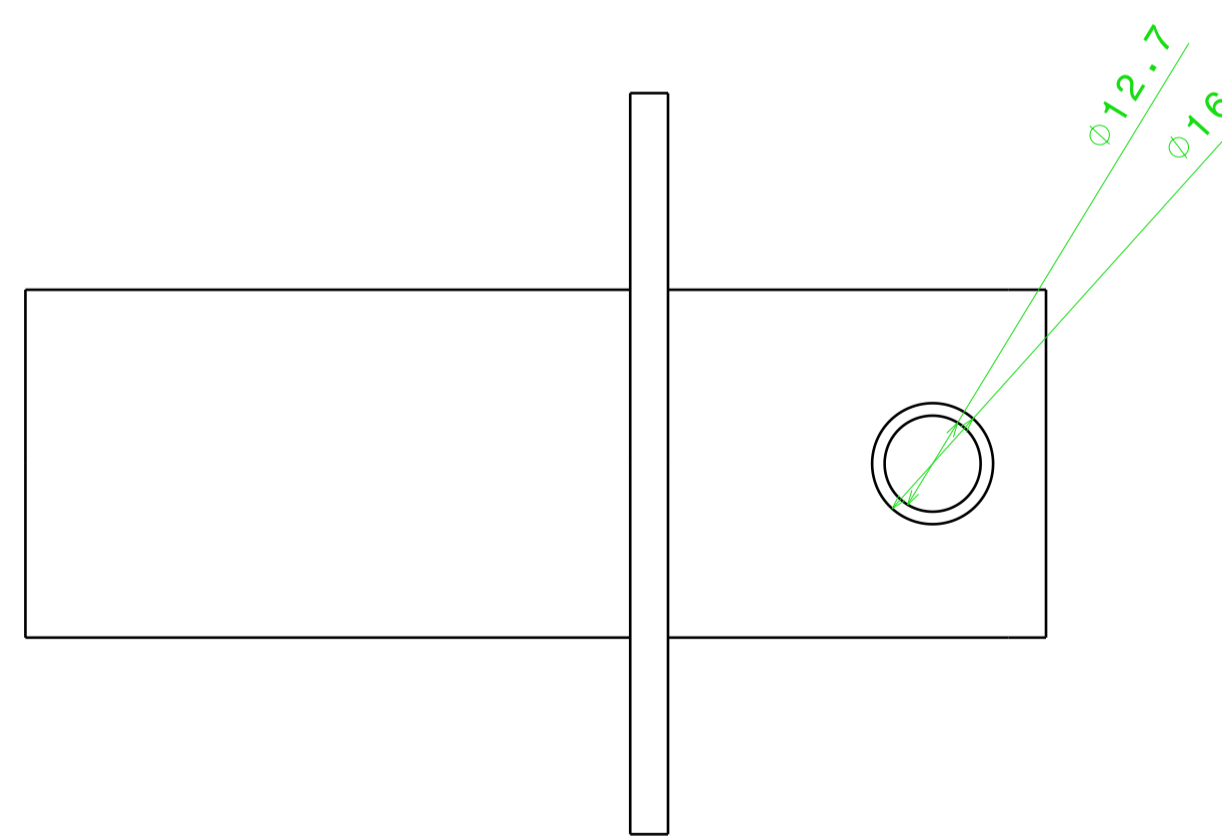
Section view A-A  
Scale: 1:1



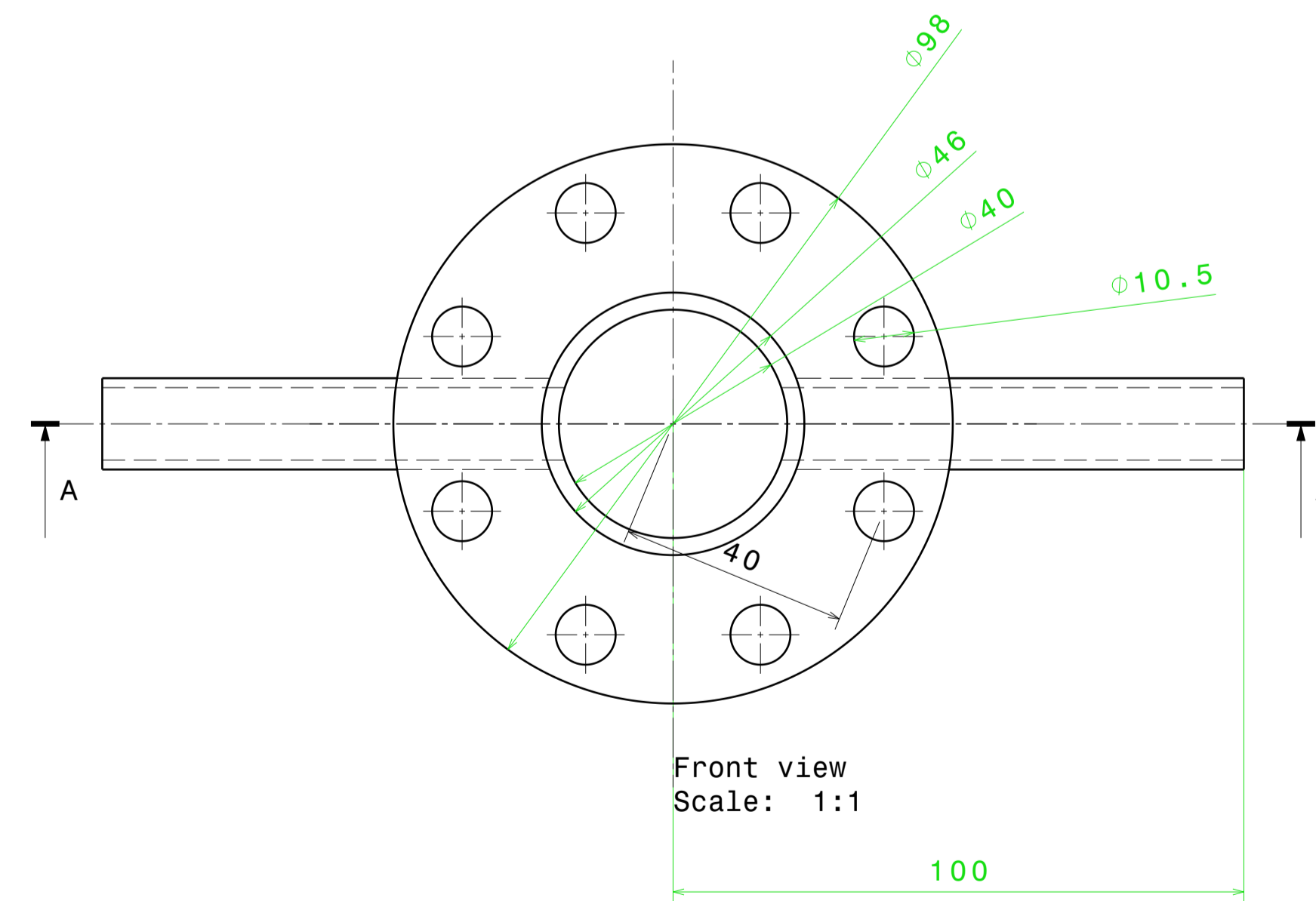
Bottom view  
Scale: 1:1



Section view B-B  
Scale: 1:1



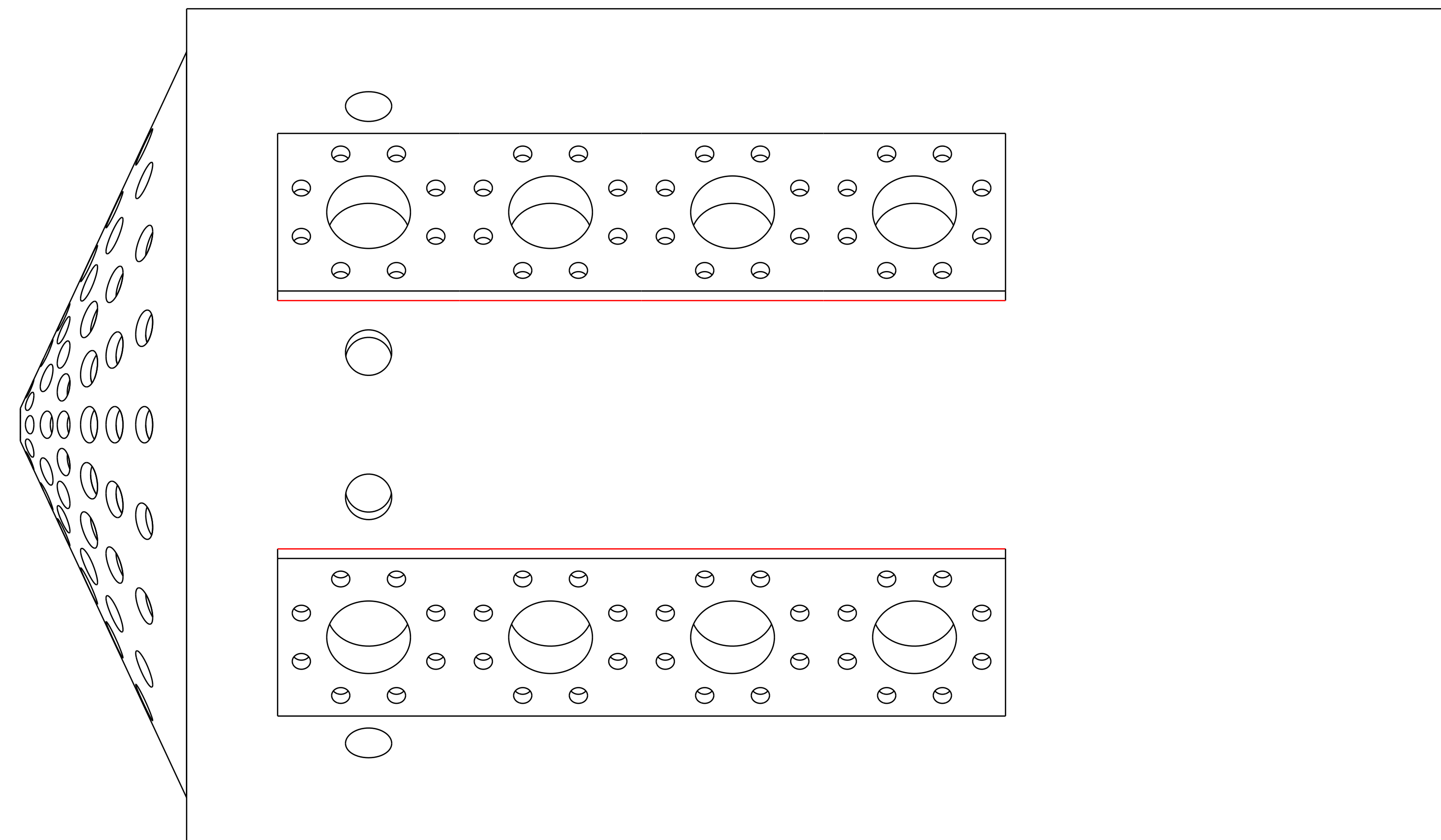
Right view  
Scale: 1:1



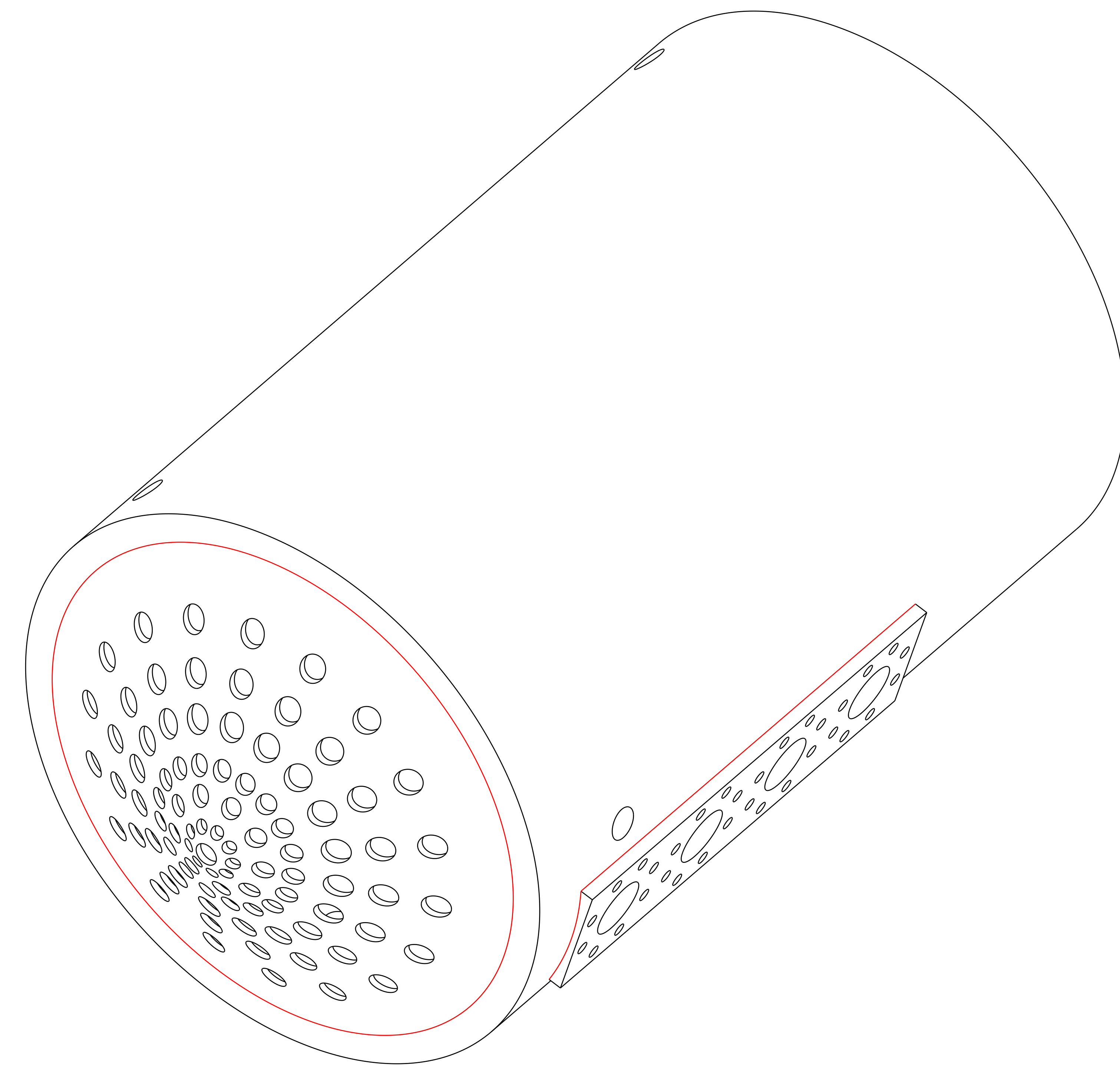
Front view  
Scale: 1:1

Red lines are welded edges

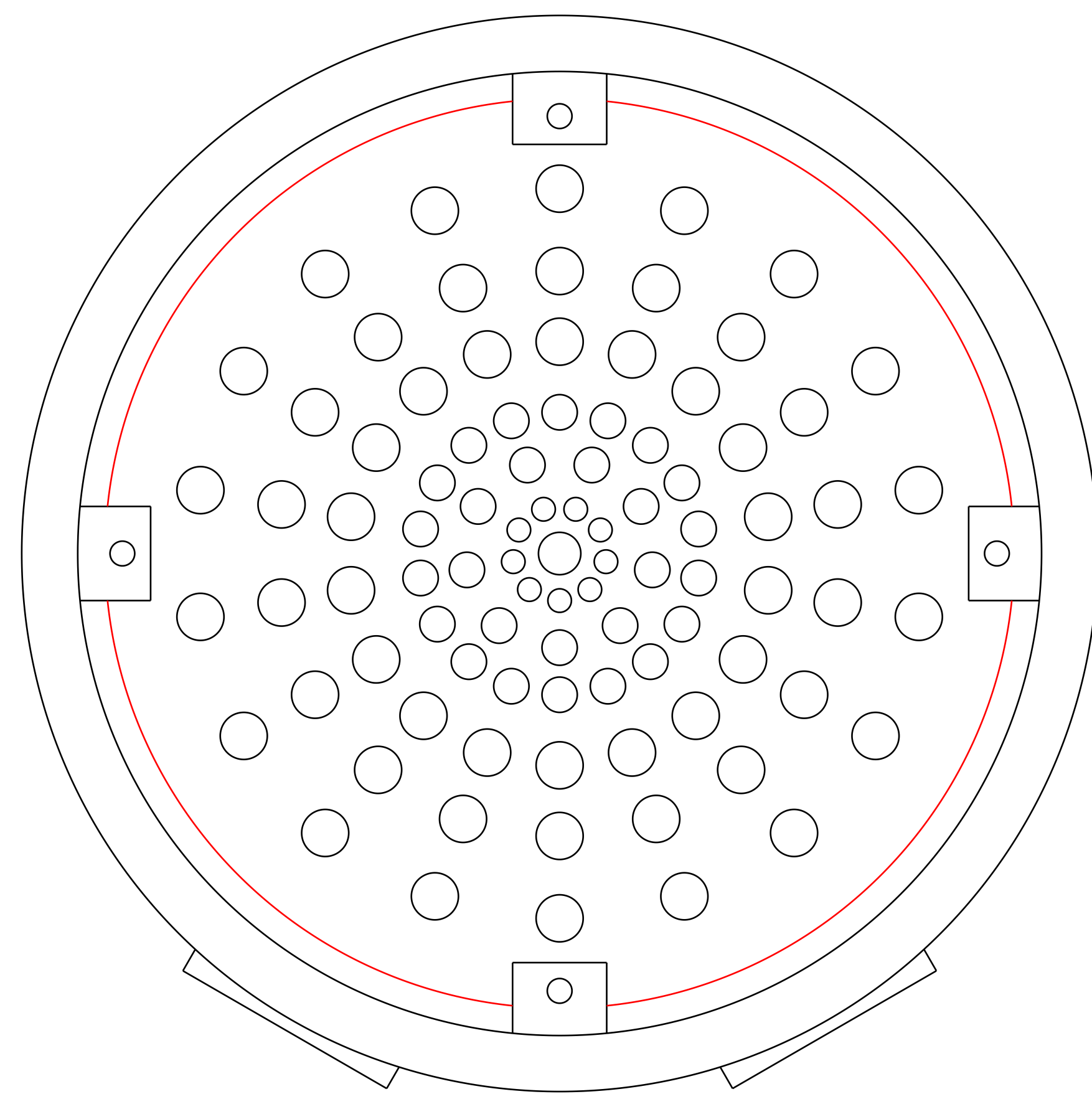
Fig : Heater



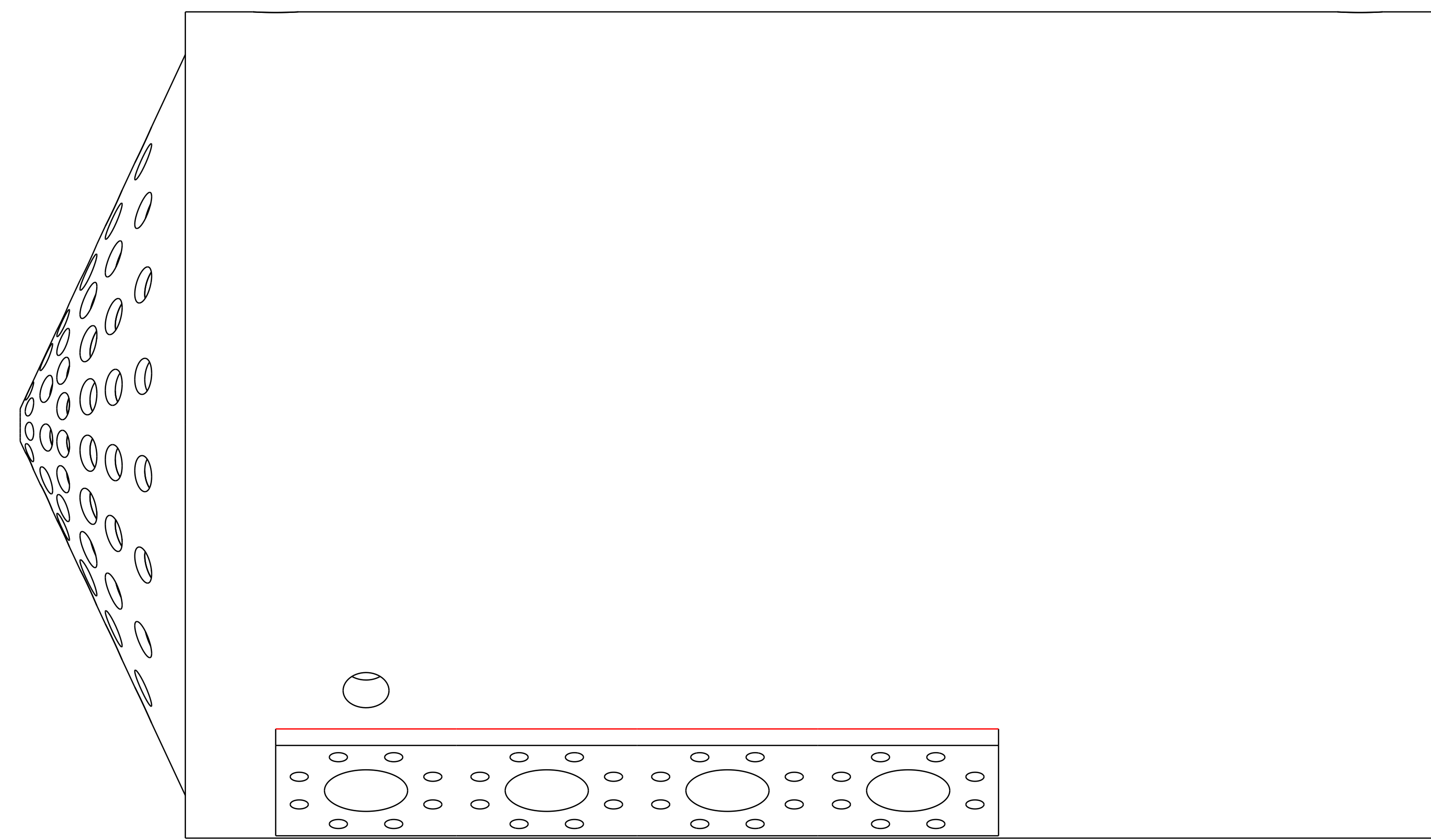
Bottom view  
Scale: 1:2



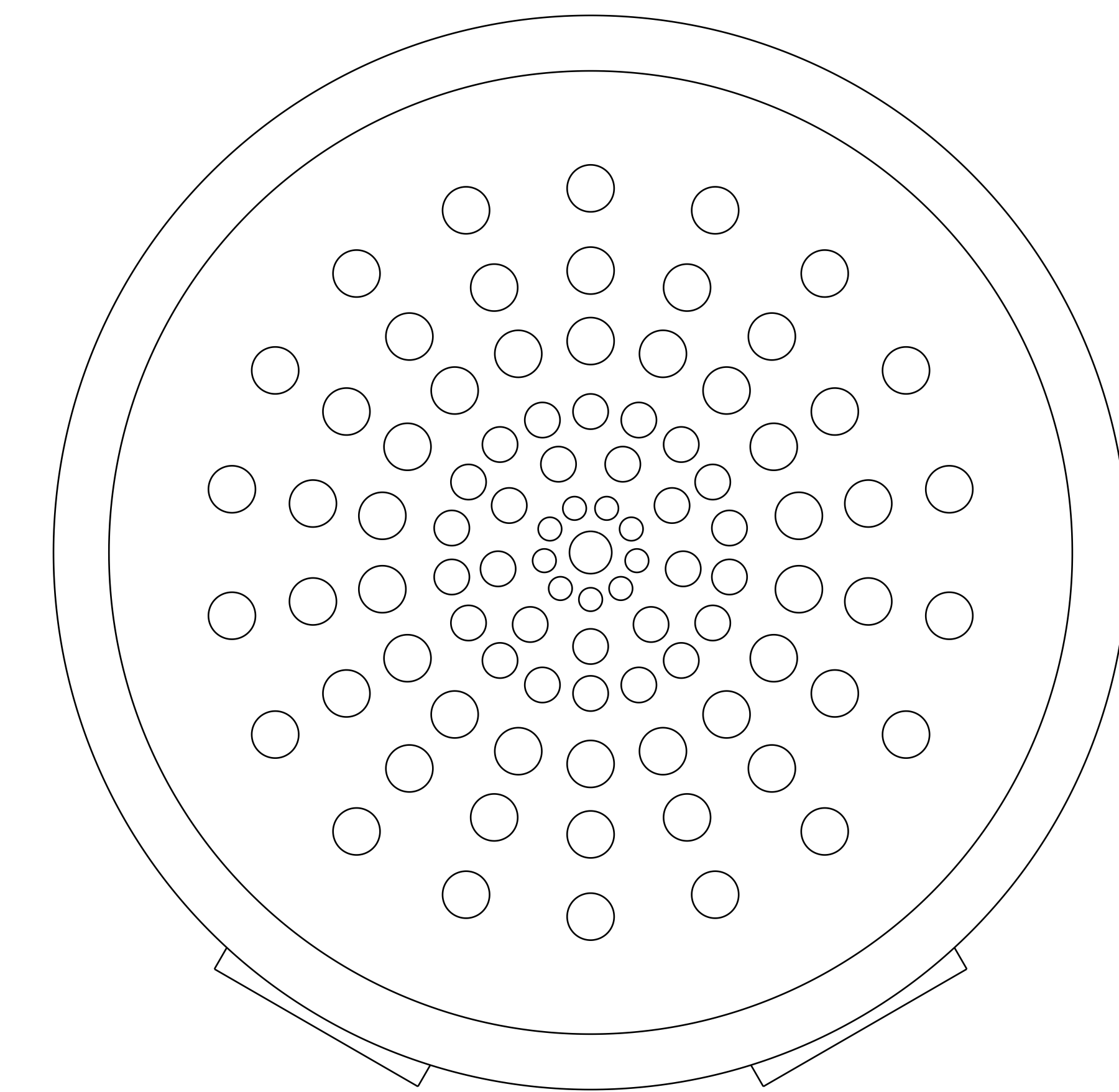
Isometric view  
Scale: 1:2



Right view  
Scale: 1:2



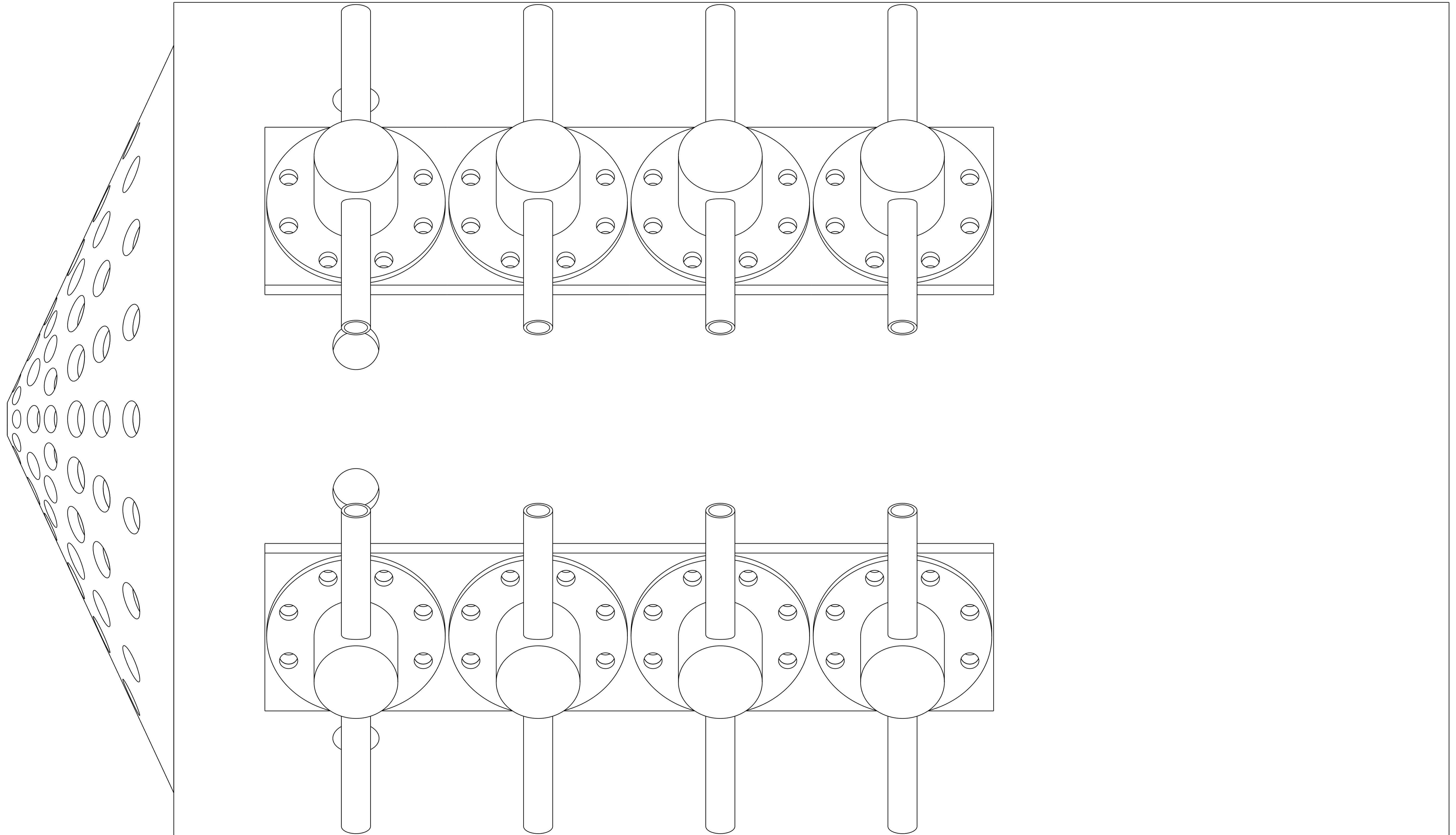
Front view  
Scale: 1:2



Left view  
Scale: 1:2

Red lines are welded edges

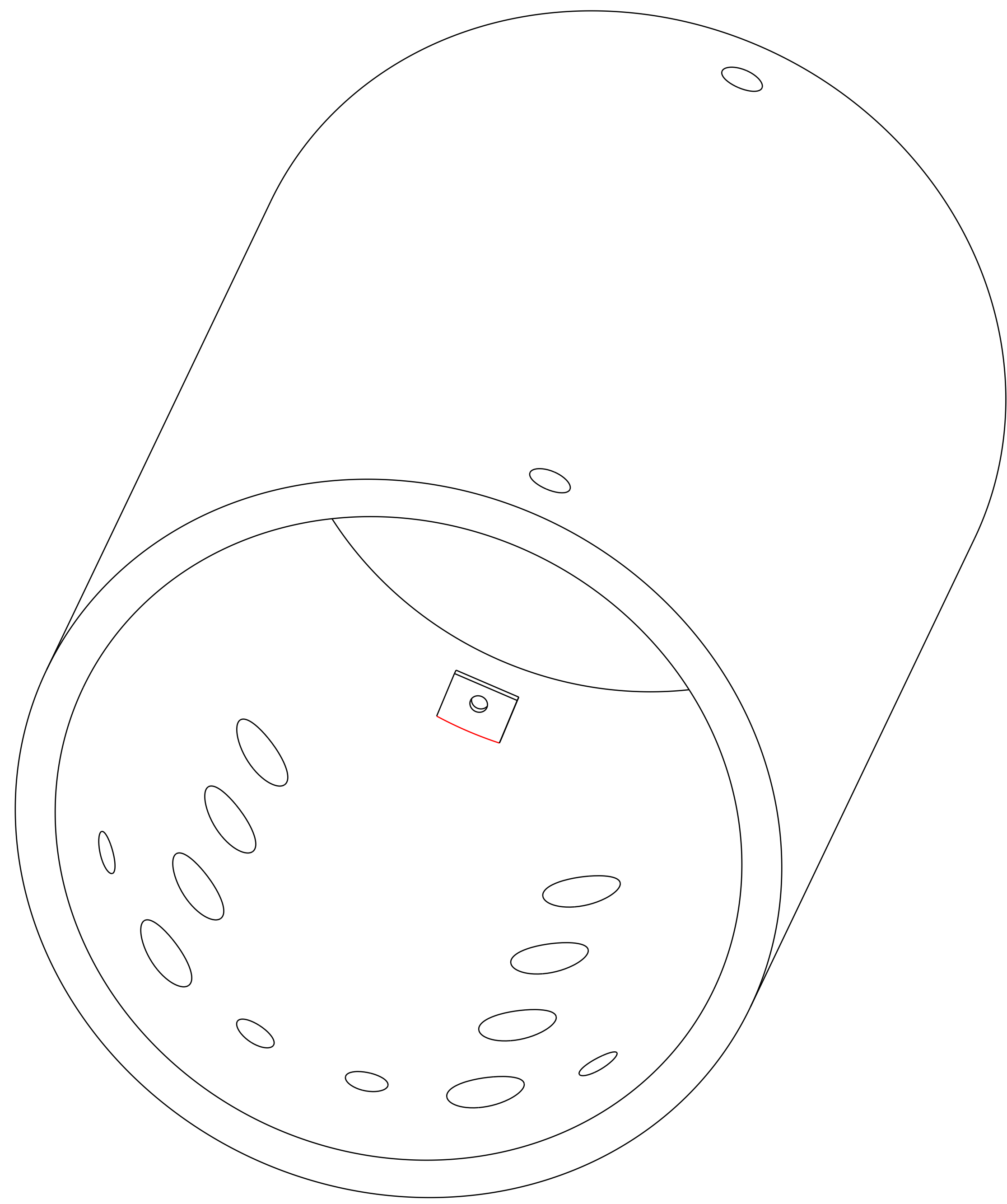
Fig : heaterassembled



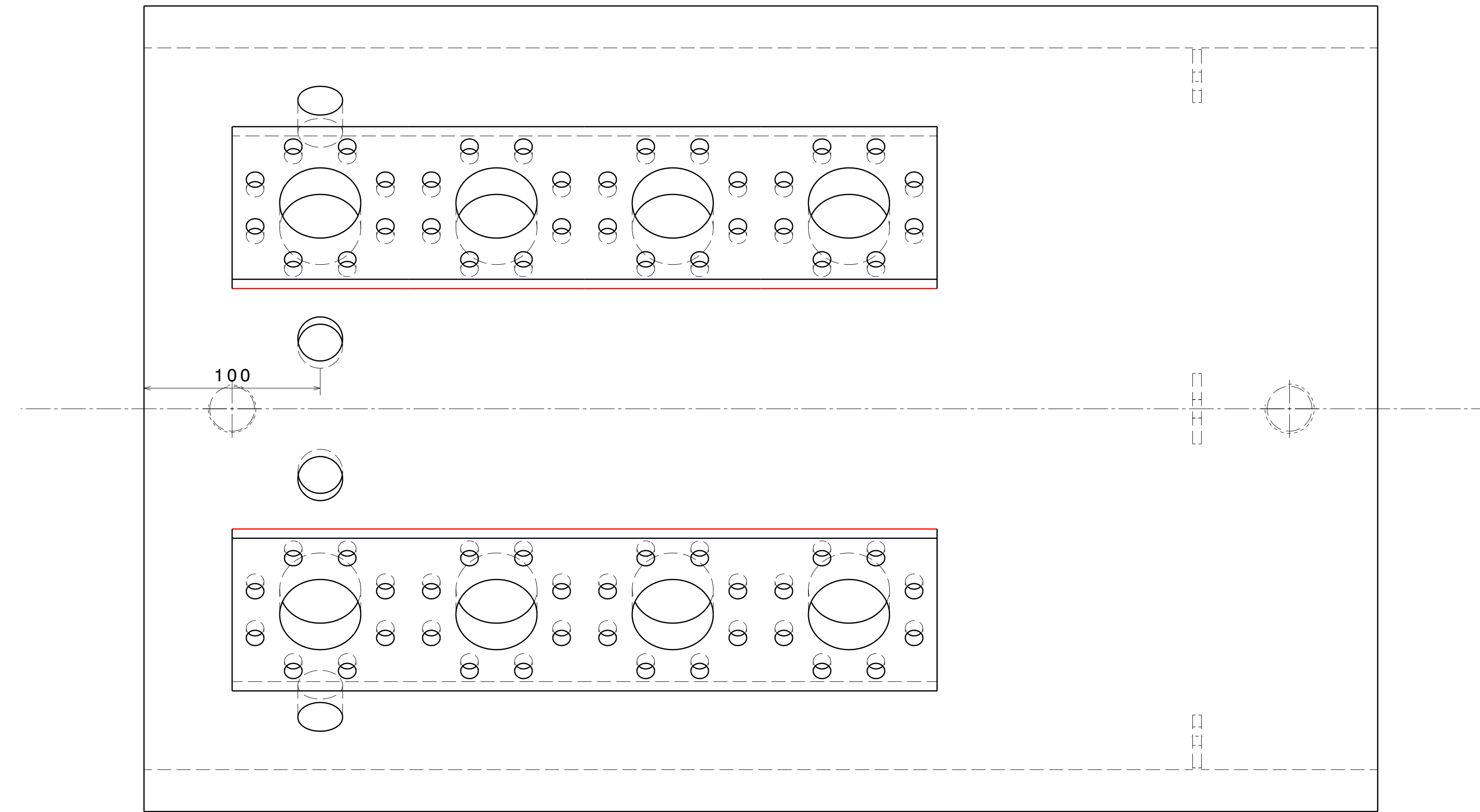
Front view  
Scale: 1:1



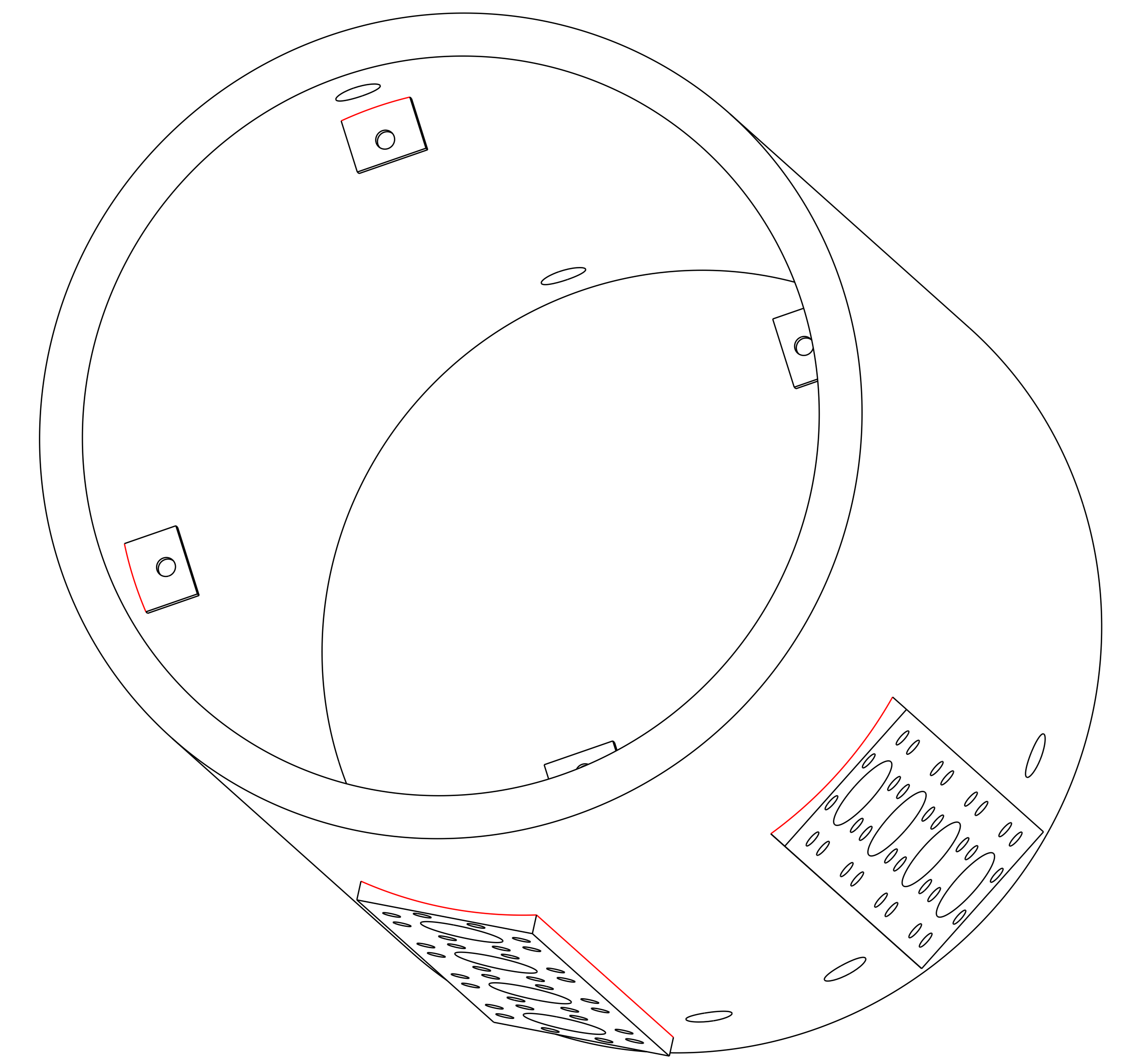
Fig : Heaterwocone



Isometric view  
Scale: 1:2

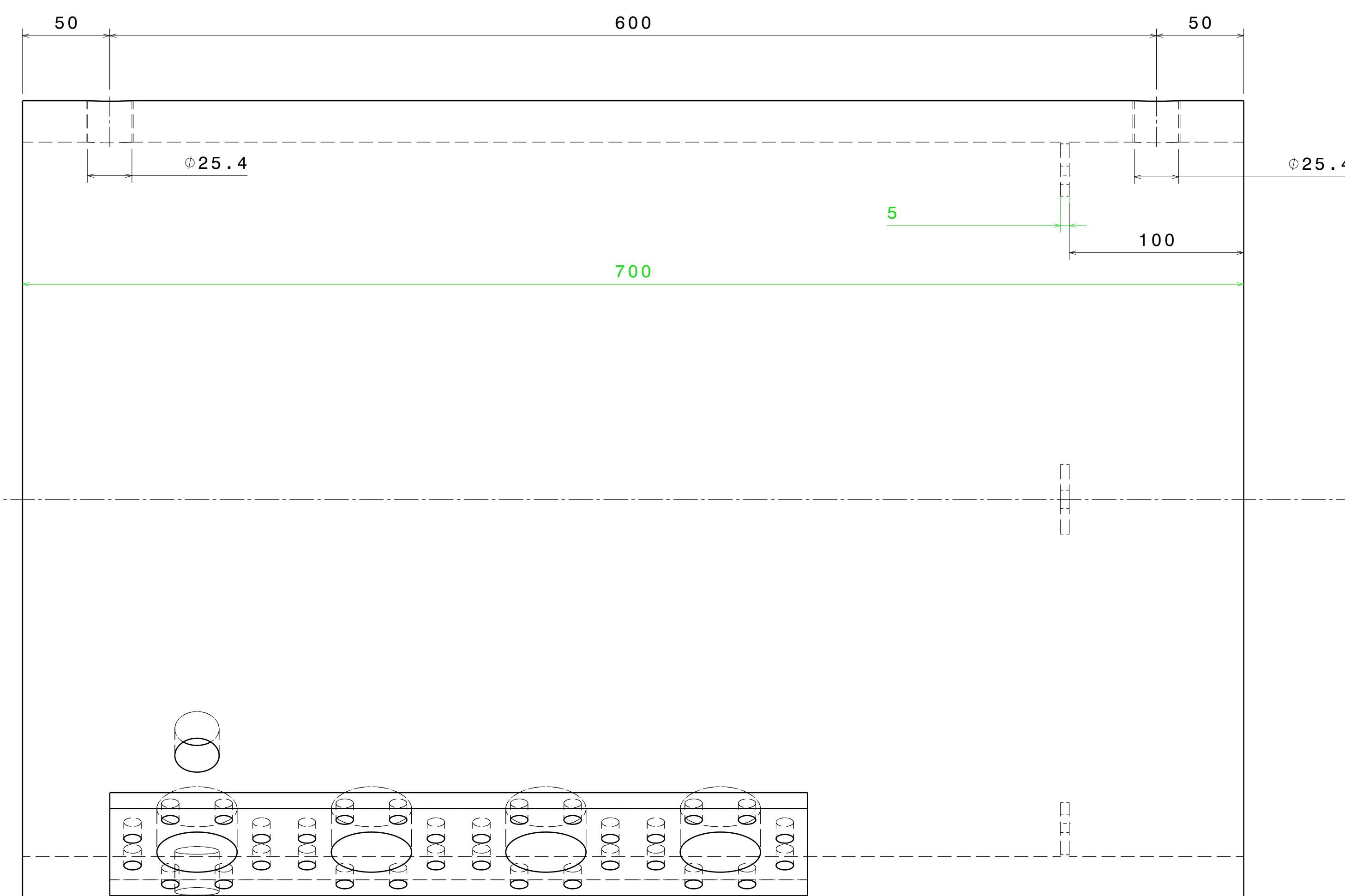


Bottom view  
Scale: 1:2



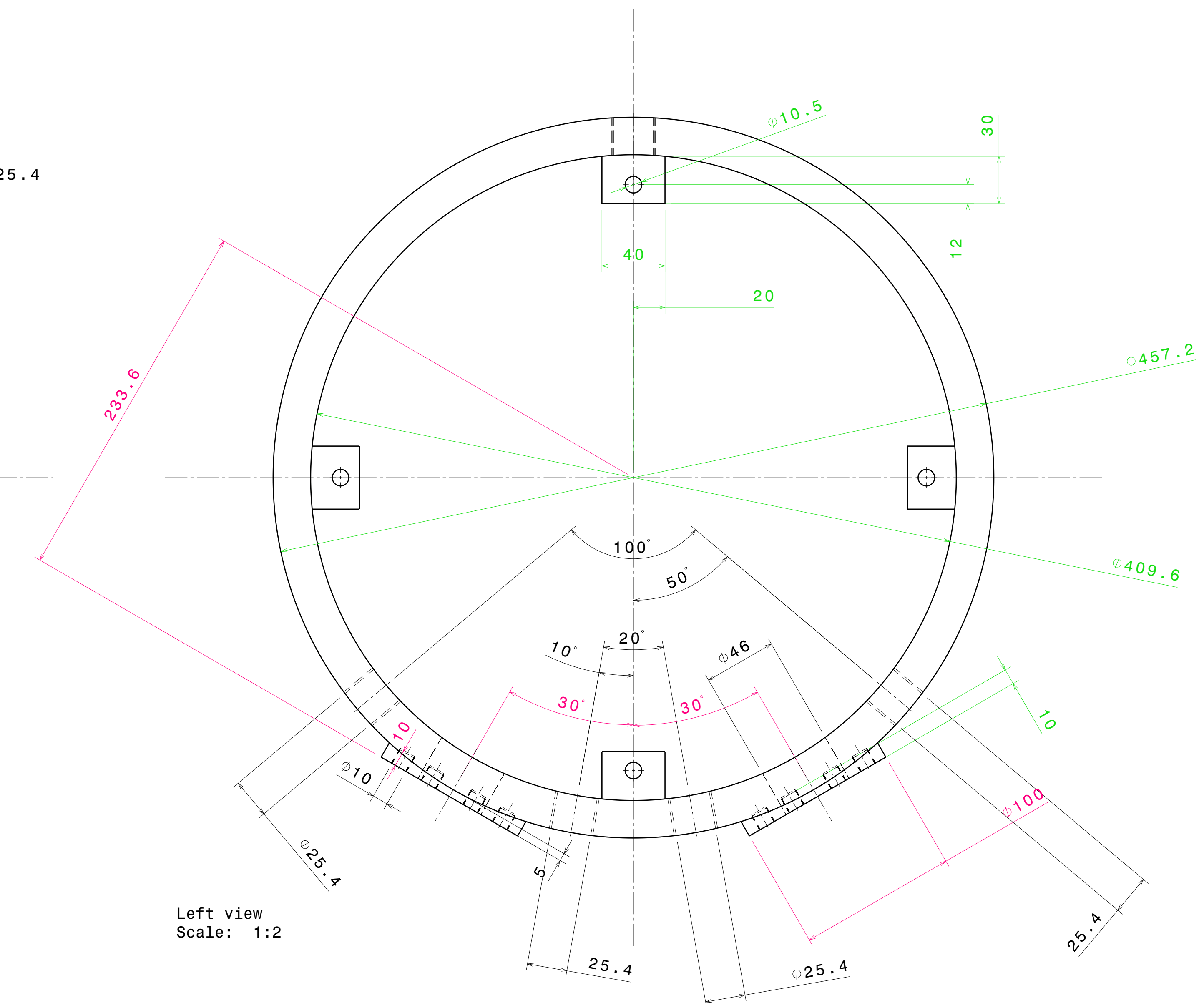
Isometric view  
Scale: 1:2

All 25.4 mm (hole) are drilled and tapped to 1 inch standard



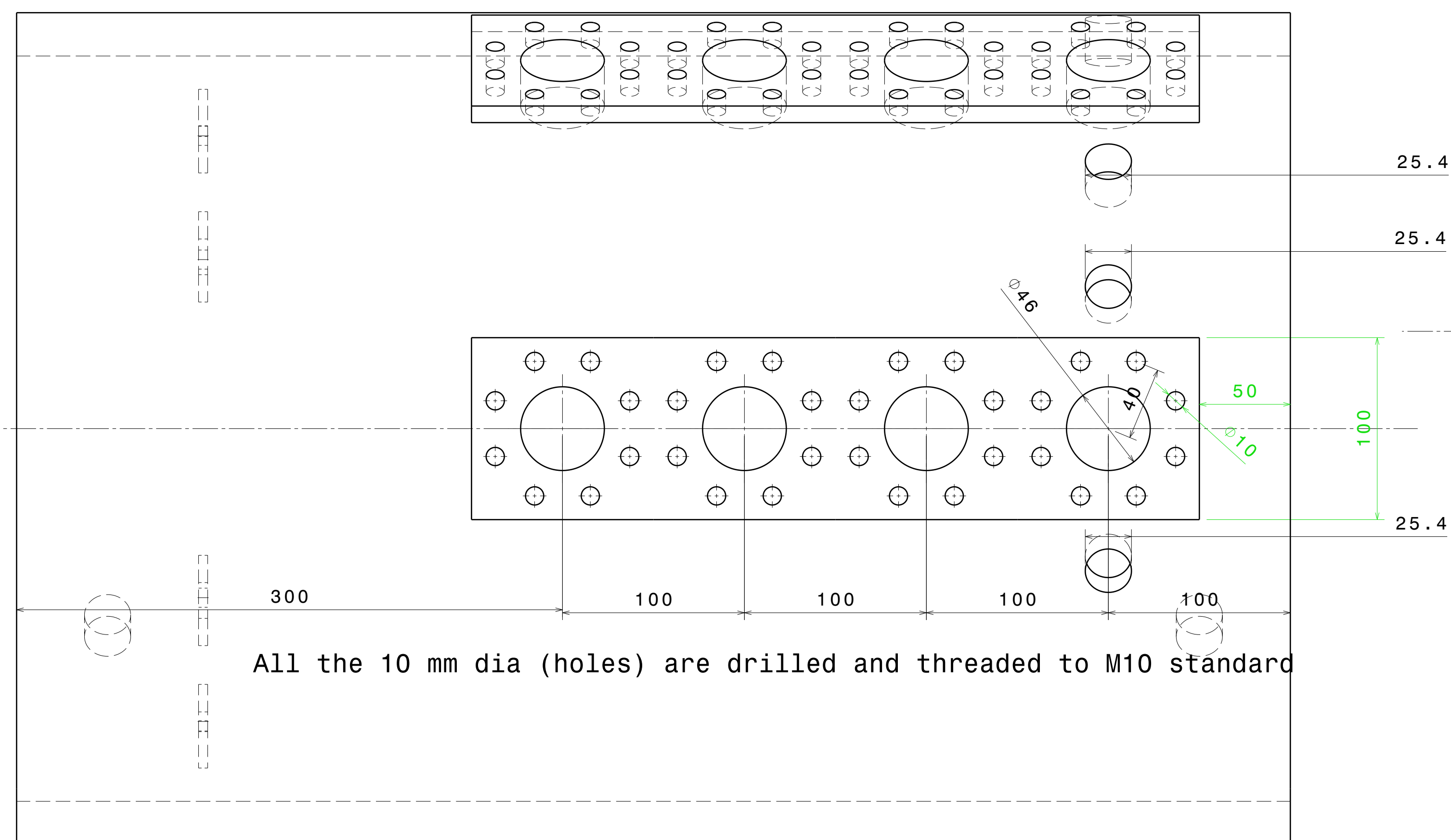
Front view  
Scale: 1:2

Red lines are welded edges



Left view  
Scale: 1:2

All 25.4 mm (hole) are drilled and tapped to 1 inch standard



Front view  
Scale: 1:2

All the 10 mm dia (holes) are drilled and threaded to M10 standard

Fig : conefinal

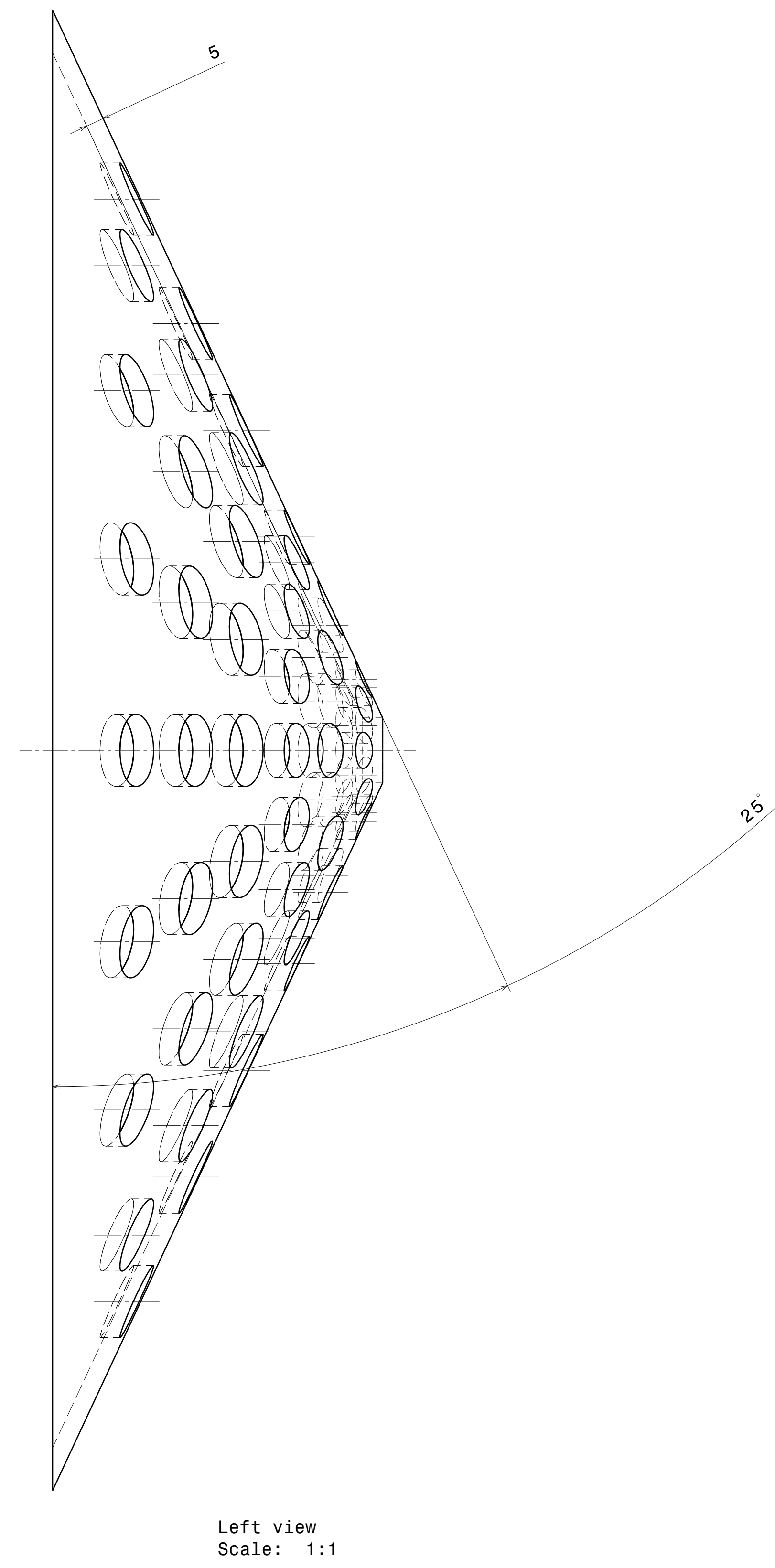
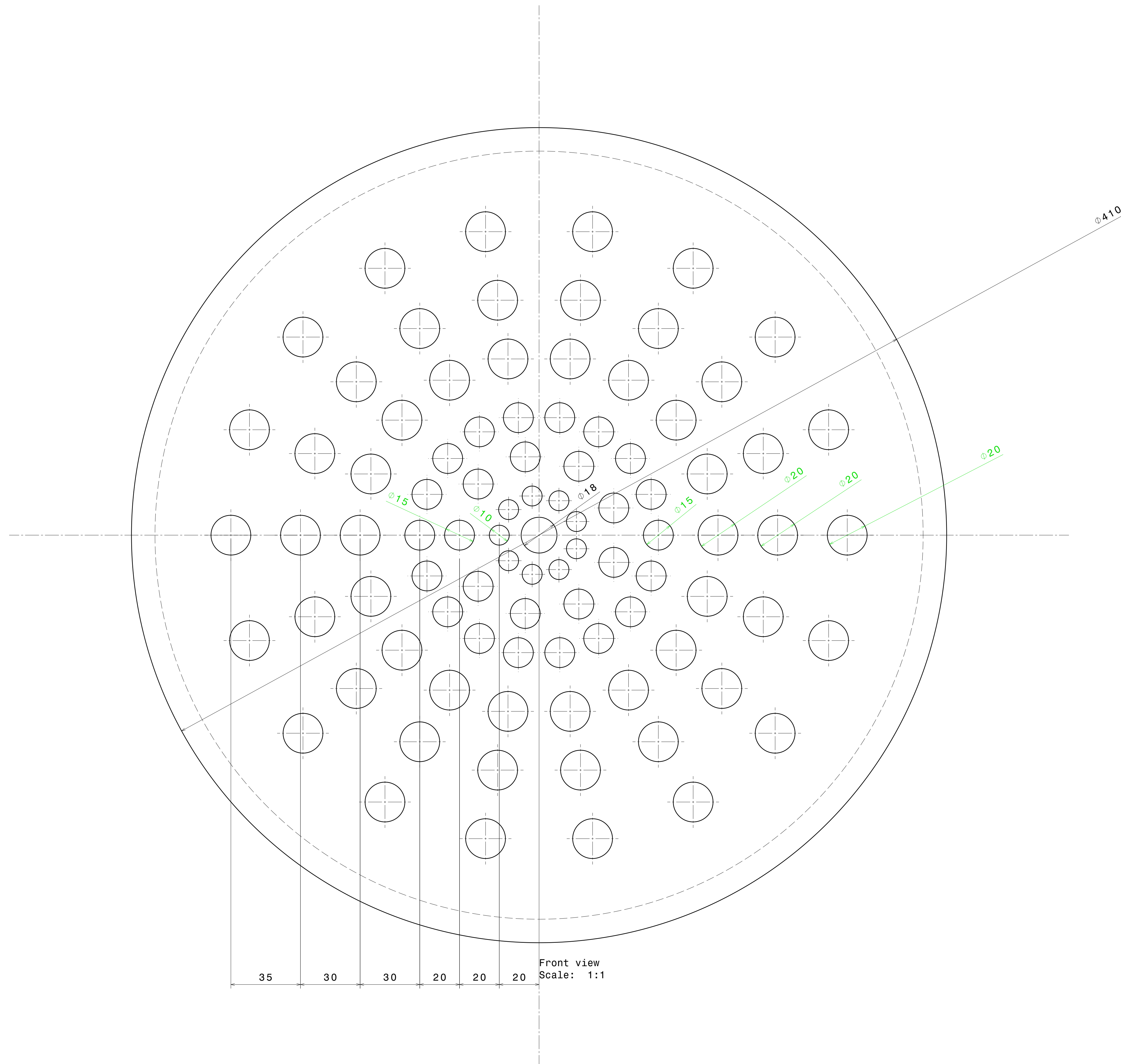
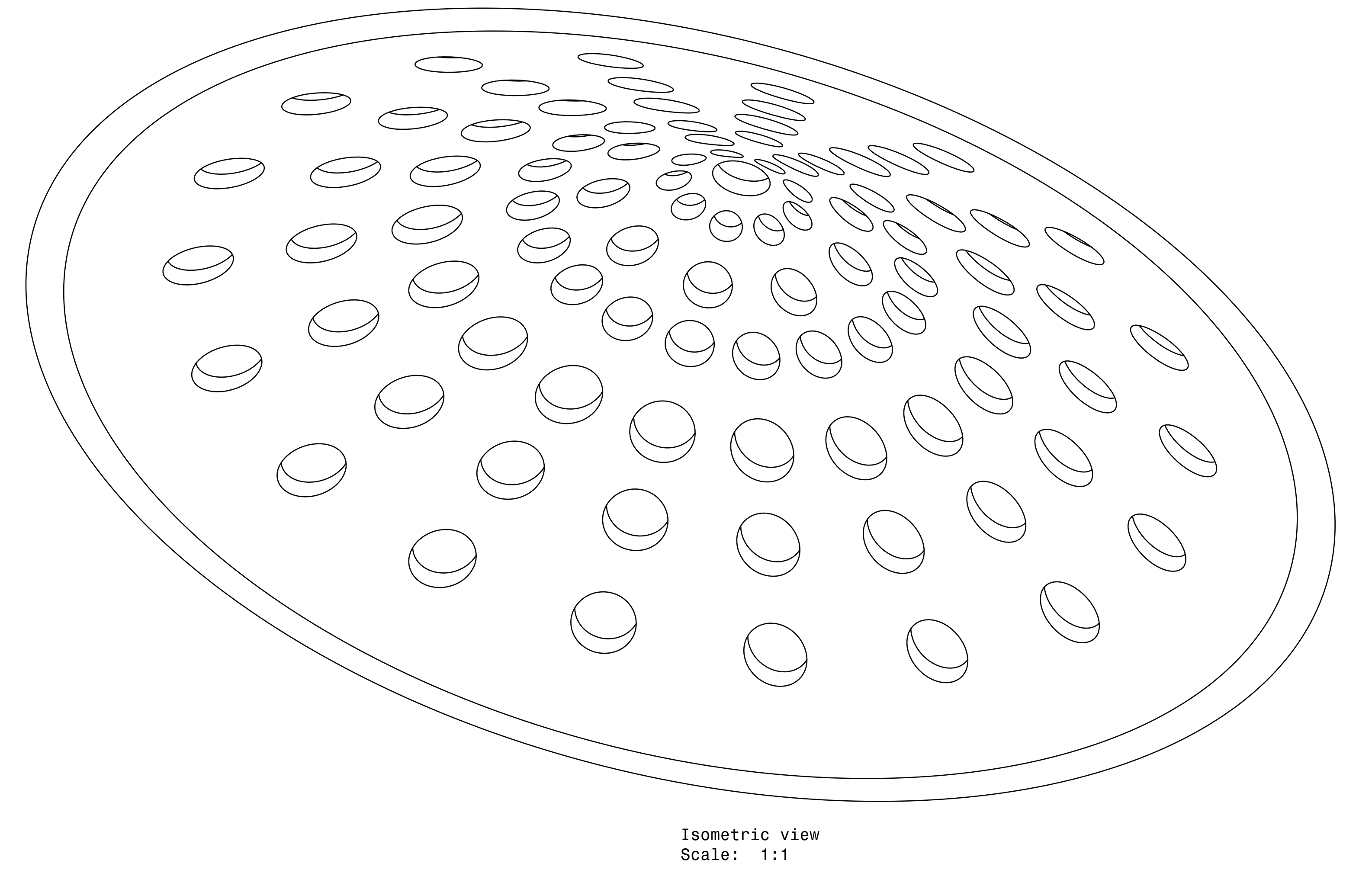
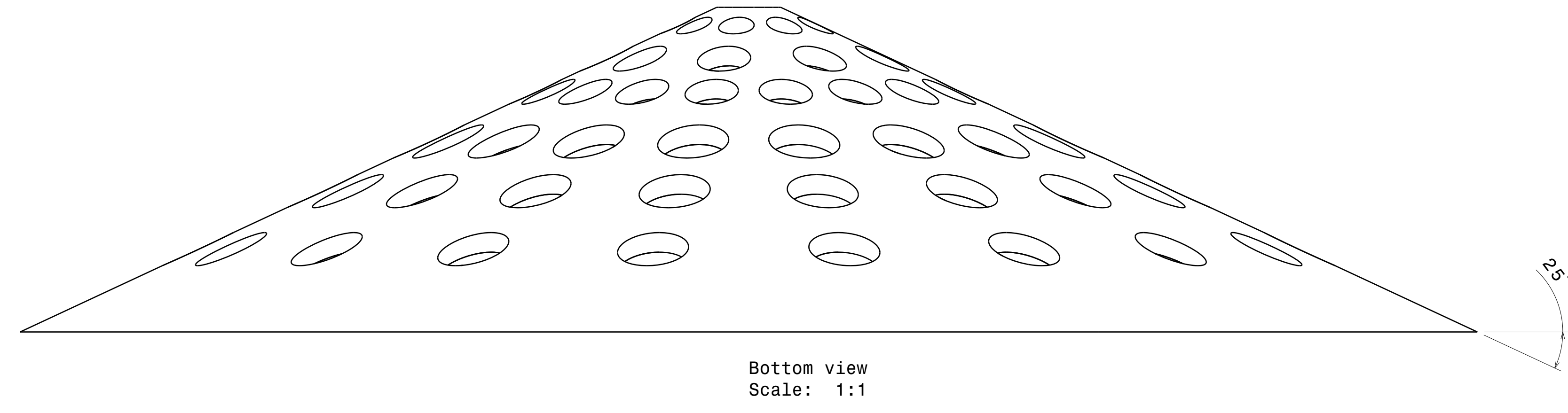
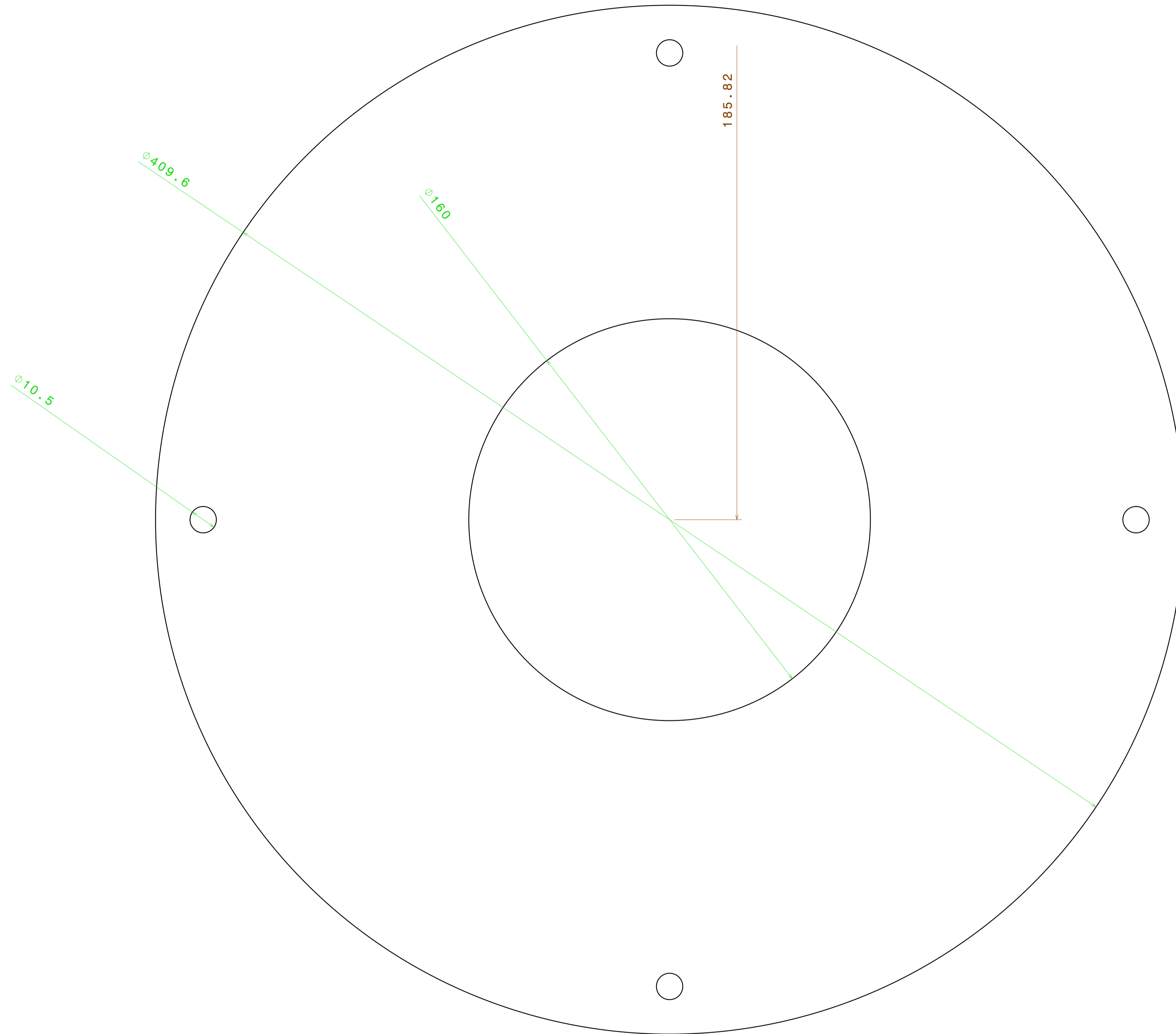
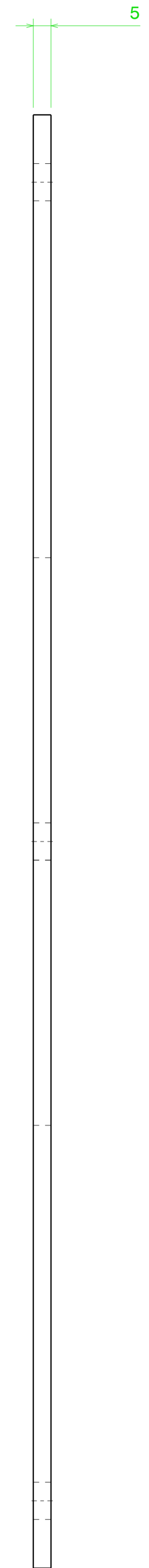


Fig : plate



Right view  
Scale: 1:1



Front view  
Scale: 1:1