



**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: 28 October 2013

Due date: 18 November 2013

Item name: Combustion Tube

1. Quotations are invited in duplicate for the various 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. In case of any queries/clarifications, please contact Dr. S. Sujith, Senior Project Officer, NCCRD, Dept. of Aerospace Engineering, IIT Madras, Chennai – 600036. Ph.No: 09884304983. E-mail: sujith9051@gmail.com
13. The sealed quotation may be sent to

Dr. S. Sujith (Senior Project Officer, NCCRD)

Dept. of Aerospace Engineering, IIT Madras

Chennai – 600036

(M) +91 9884304983

E-mail: sujith9051@gmail.com



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Annexure I

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

Date: 28 October 2013

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Item name: Combustion Tube

Combustion Tube – Technical Specification

Description

The combustion tube consists of a square cross-section tube of 2 m length, in parts, consisting of sheet-metal obstacles with a through path in the middle for a flame to propagate, so that once the tube is filled up with a gaseous fuel-air mixture (at atmospheric pressure and room temperature) and ignited at one of the ends that is closed, the flame would propagate past the obstacles and progressively accelerate.

Specification of combustion tube

The combustion tube should meet the following specification

1. The combustion tube maximum pressure reaches up to up to 170,000-180,000 Pa
2. The combustion tube maximum temperature is about 2600K-2700K
3. The combustion tube shall be structurally intact up to 10bar pressure.
4. The fuel used shall be hydrogen.
5. The duration of maximum pressure and temperature, that the wall face would last is very less than 1second.
6. The fabrication tolerance shall be 0.1mm.
7. The fabricator should fabricate the entire facility and check for alignment of assembly.
8. High tension bolts are to be provided for all flanges.
9. Toughened glass panes are to be provided for the windows of the test section.
10. The toughened glass panes should be bonded inside the test section with suitable heat resistant adhesive,in consultation with IITM.
11. Gaskets(heat resistant) are to be provided on all flanges
12. The supplier in consultation with IITM should also design and fabricate a rigid stand/frame out of mild steel on which the test facility can be mounted upright.
13. The supplier shall assemble and erect the facility at a chosen site at IITM

Material List for Combustion Tube

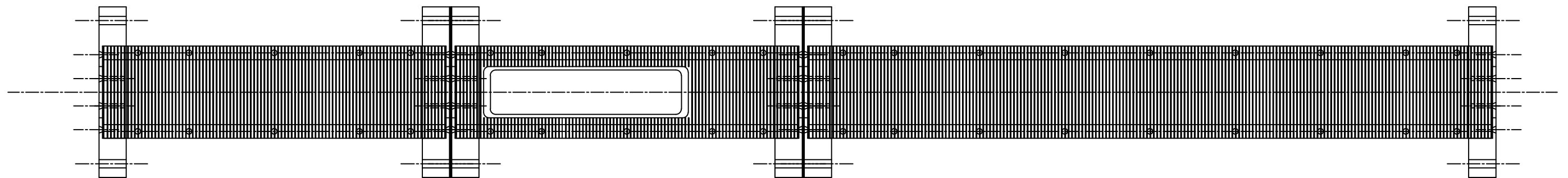
Sl.No	Category	Material	Qty	Finished size	Raw material required
1	Flange	SS 304	6 Nos:	O.D. Dia 250mm x 40 mm height	O.D Dia 255mm x 45mm (subject to condition no taper found while cutting)
2	Part 1: Top Plate	SS 304	1 No:	500mm x 75mm x 30mm	510mm x 80mm x 30mm (subject to condition no bend and taper cutting found)
3	Part 1 : Bottom Plate	SS 304	1 No:	500mm x 75mm x 30mm	510mm x 80mm x 30mm (subject to condition no bend and taper cutting found)
4	Part 1 : Side Plates	SS 304	2 Nos:	500mm x 95mm x 30mm	510mm x 105mm x 30mm (subject to condition no bend and taper cutting found)
5	Part 2: Top Plate	SS 304	1 No:	500mm x 75mm x 30mm	510mm x 80mm x 30mm (subject to condition no bend and taper cutting found)
6	Part 2 : Bottom Plate	SS 304	1 No:	500mm x 75mm x 30mm	510mm x 80mm x 30mm (subject to condition no bend and taper cutting found)
7	Part 2 : Side Plates	SS 304	2 Nos:	500mm x 95mm x 30mm	510mm x 110mm x 30mm (subject to condition no bend and taper cutting found)
8	Part 3: Top Plate	SS 304	1 No:	1000mm x 75mm x 30mm	1005mm x 80mm x 30mm (subject to condition no bend and taper cutting found)
9	Part 3 : Bottom Plate	SS 304	1 No:	1000mm x 75mm x 30mm	1005mm x 80mm x 30mm (subject to condition no bend and taper cutting found)
10	Part 3 : Side Plates	SS 304	2 Nos:	1000mm x 95mm x 30mm	1005mm x 110mm x 30mm (subject to condition no bend and taper cutting found)
11	Part 1 : Sheet	SS 304	100Nos:	95mm x 95mm x 1mm	100mm x 100mm x 1mm
12	Part 2 : Sheet	SS 304	100Nos:	95mm x 95mm x 1mm	100mm x 100mm x 1mm
13	Part 3 : Sheet	SS 304	200Nos:	95mm x 95mm x 1mm	100mm x 100mm x 1mm
14	M8 Bolt	SS	60Nos:	8mm x 1.25mm x 40mm	As available in market
15	M6 Allen Bolt	SS	25Nos:	6mm x 1mm x 40mm	As available in market

COMBUSTION TUBE ASSEMBLY

PART 1

PART 2

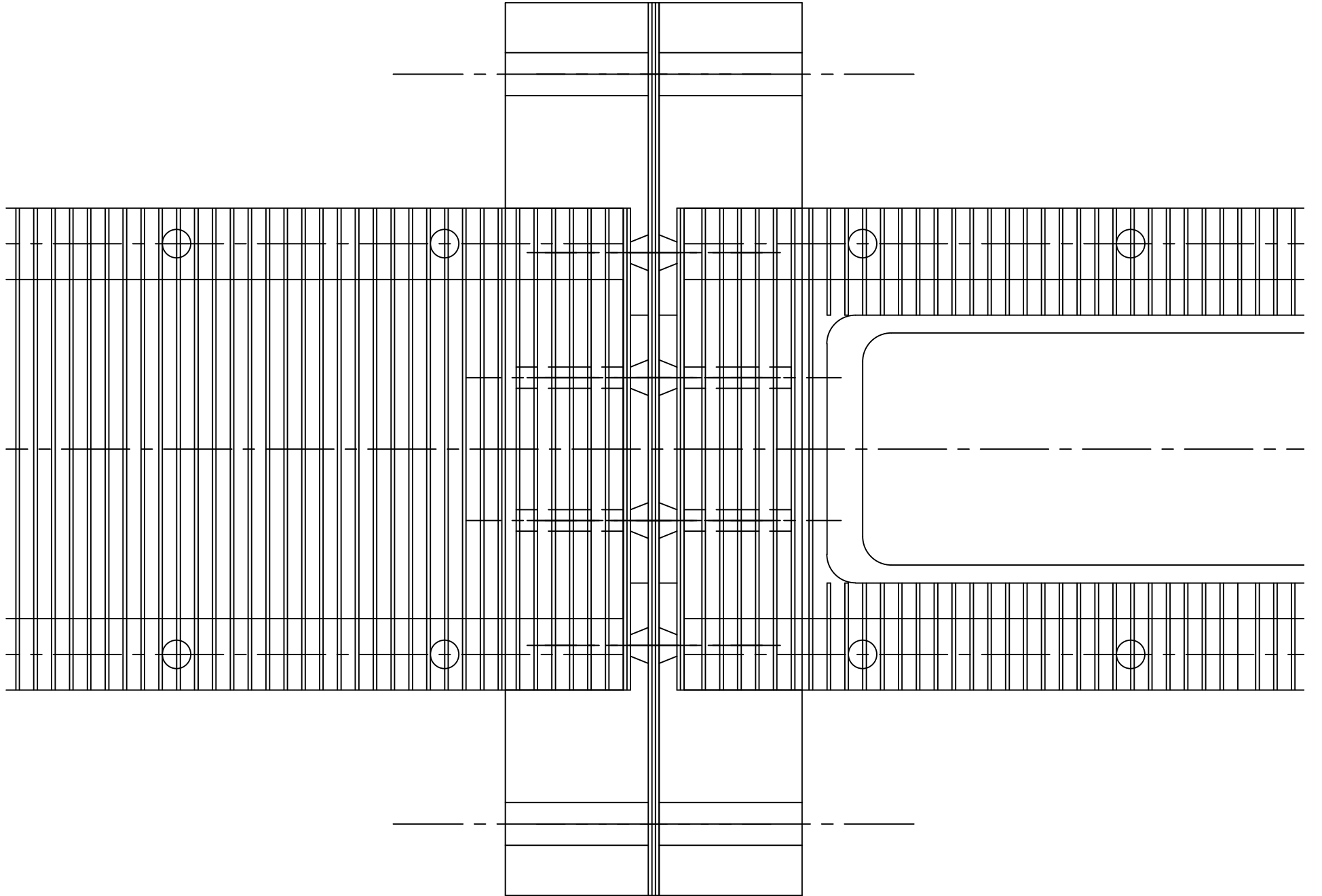
PART 3



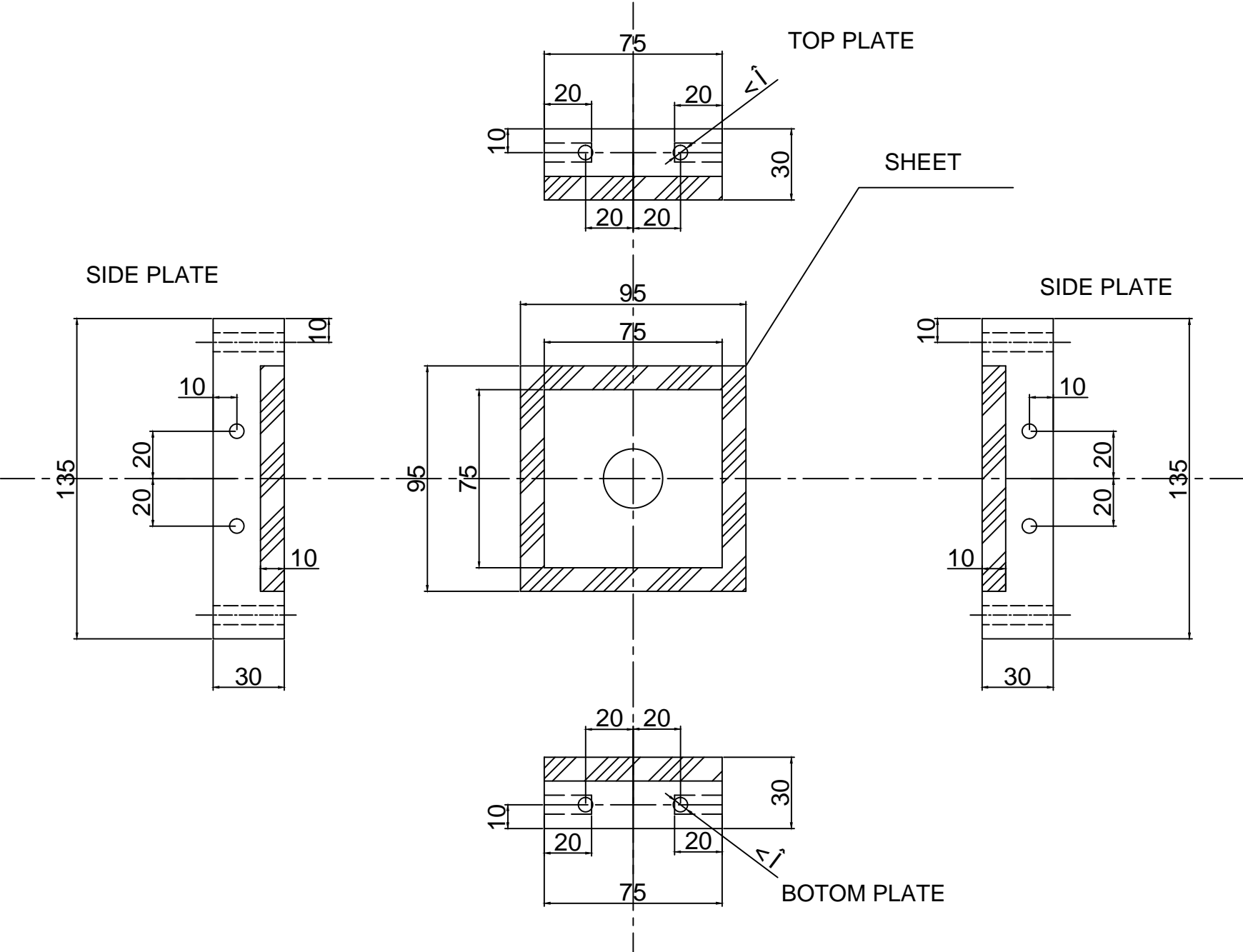
METAL

GLASS

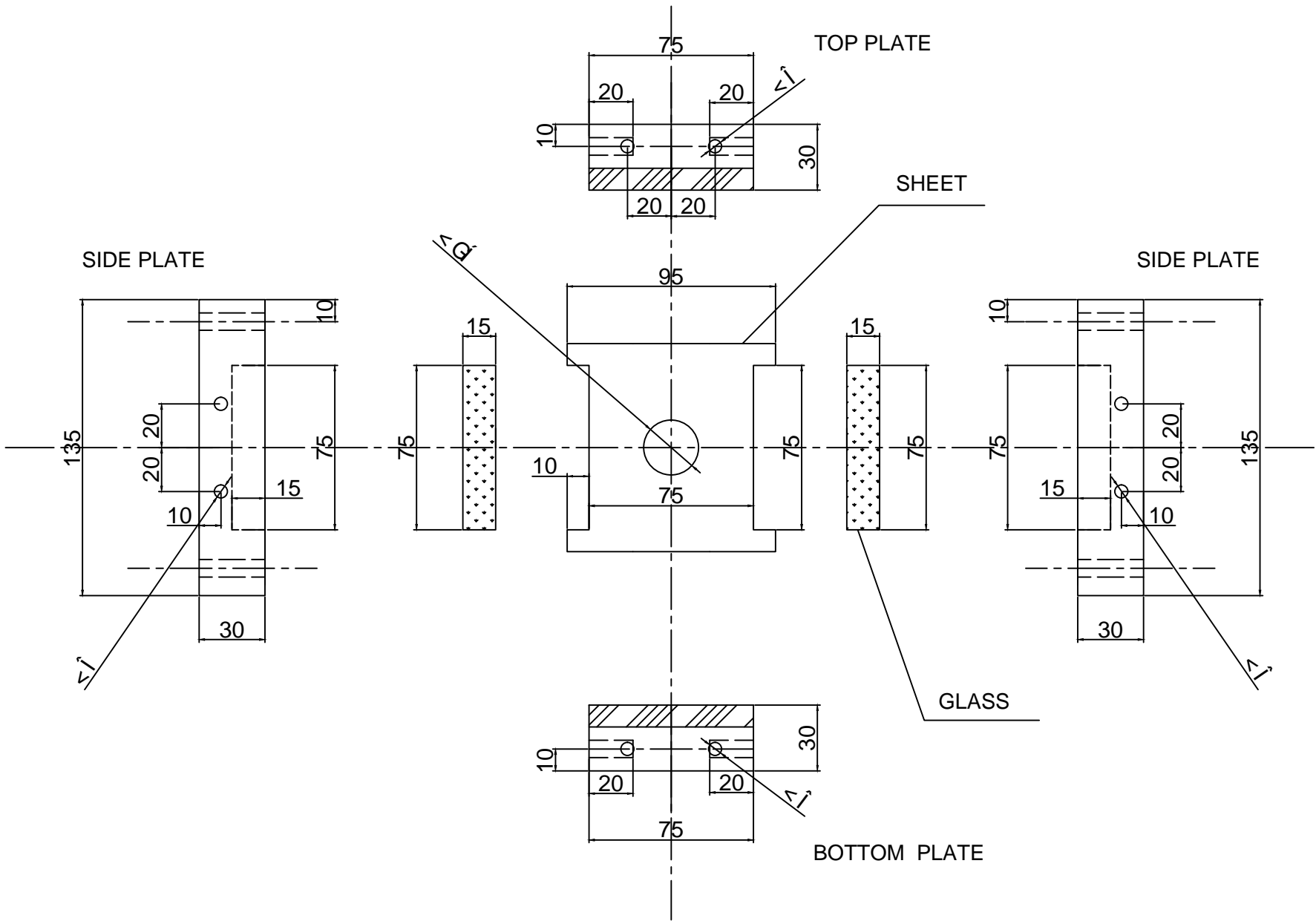
METAL



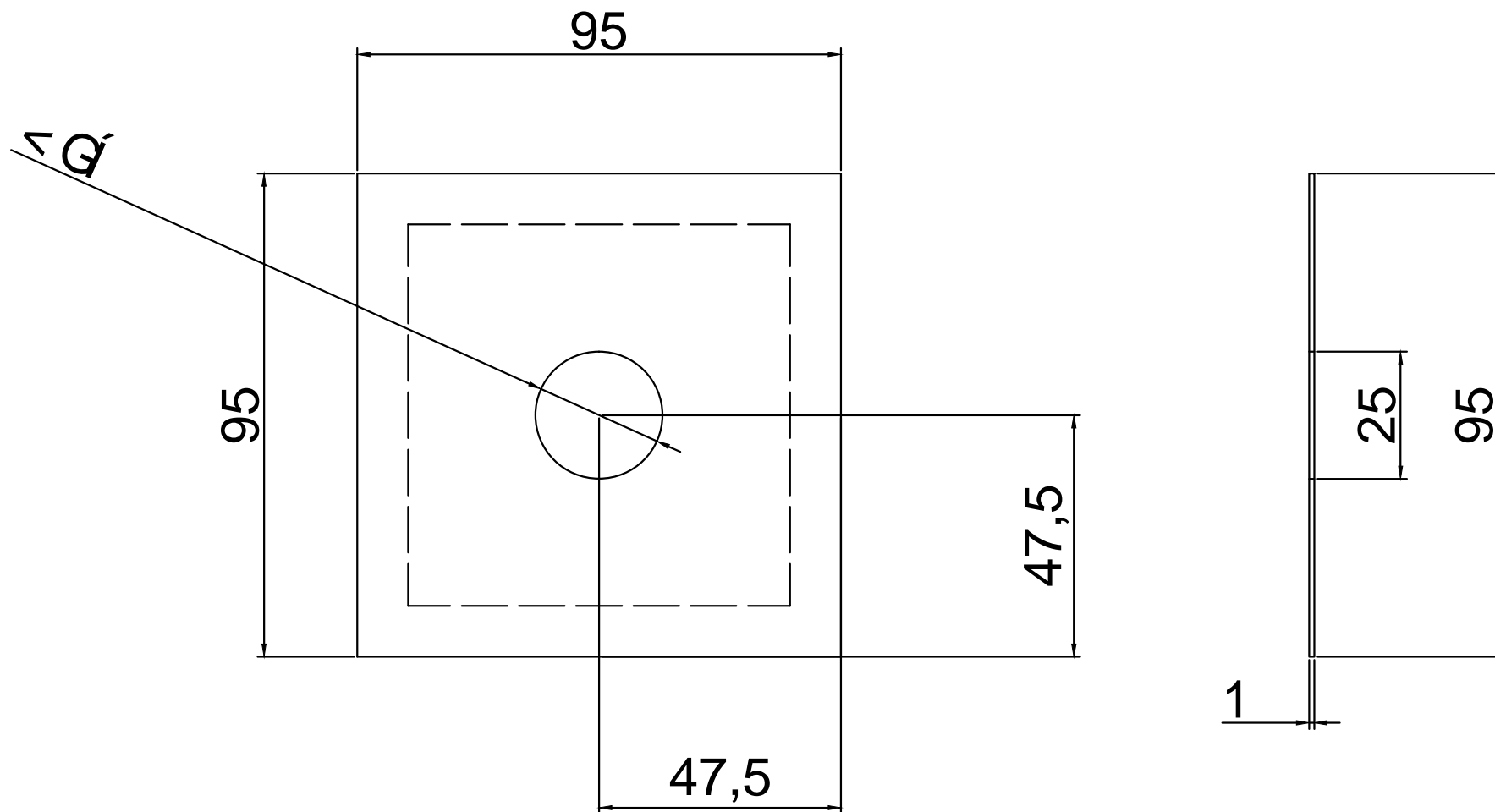
DISMANTLED VIEW OF PART 1 & 3



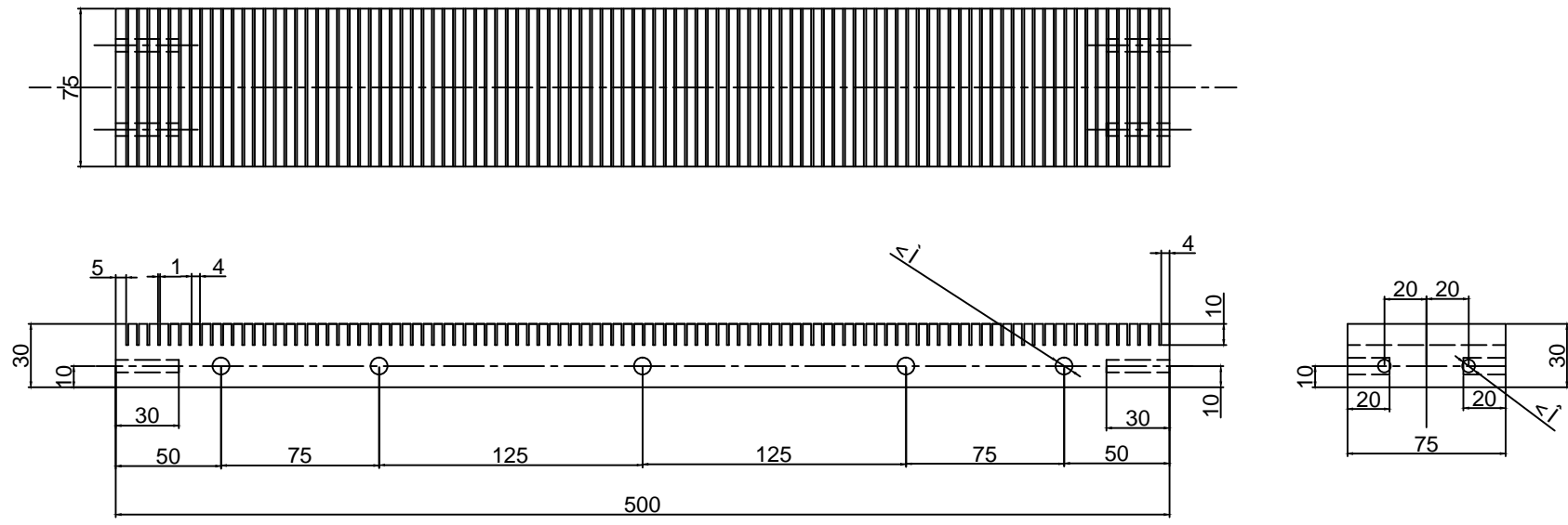
DISMANTLED VIEW OF PART 2



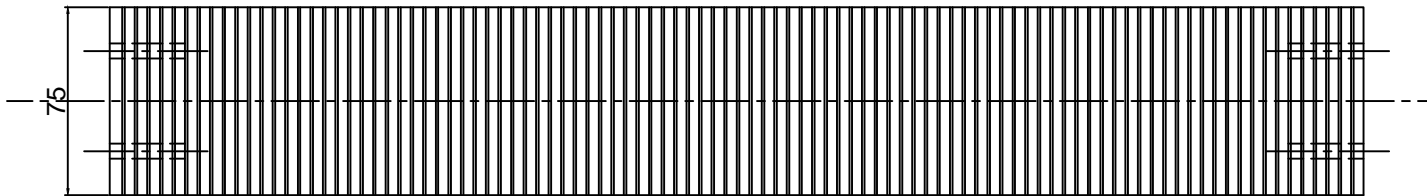
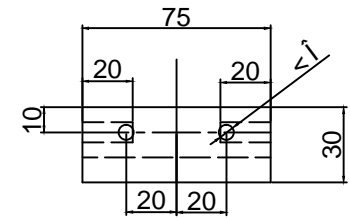
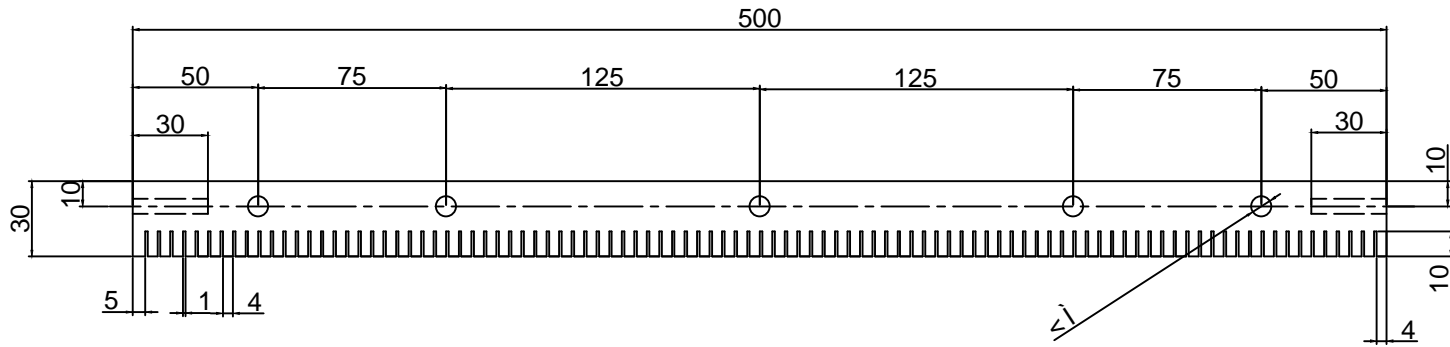
PART 1 & 3 : SHEET



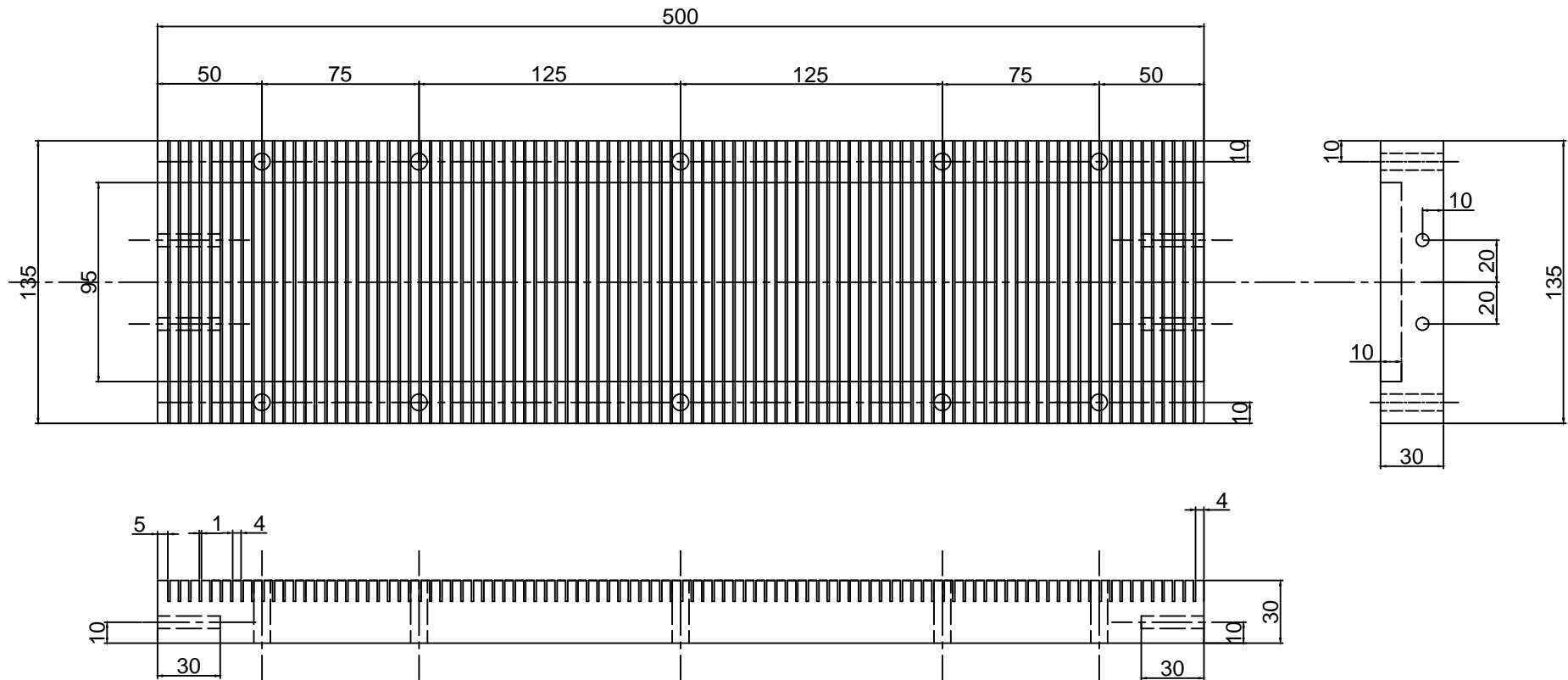
PART - 1 & 2 : BOTTOM PLATE



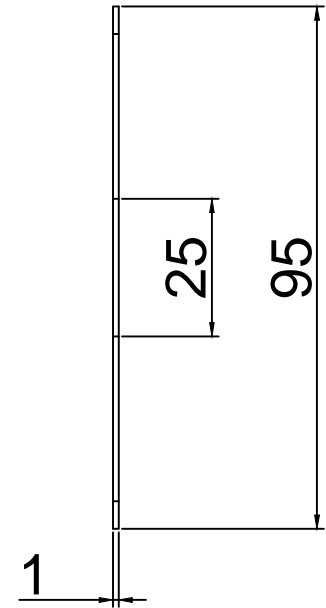
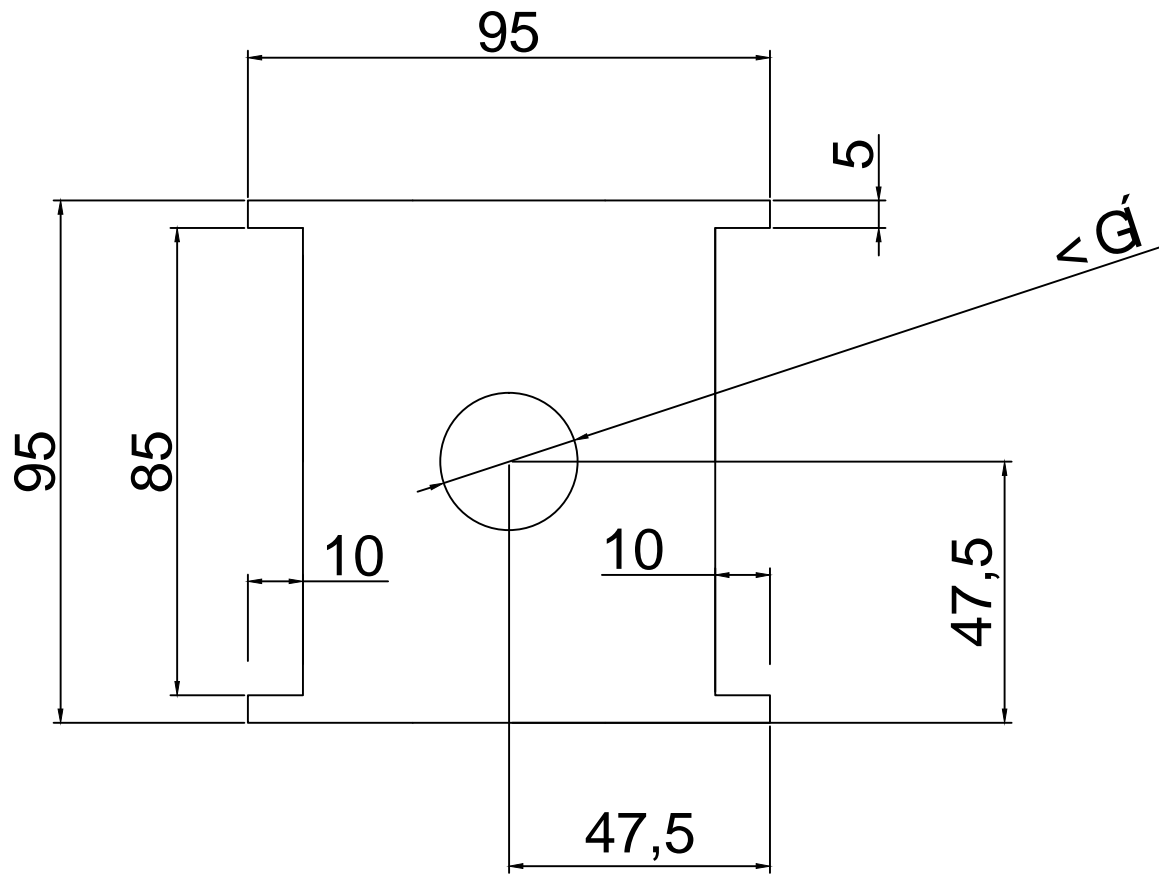
PART - 1 & 2 : TOP PLATE



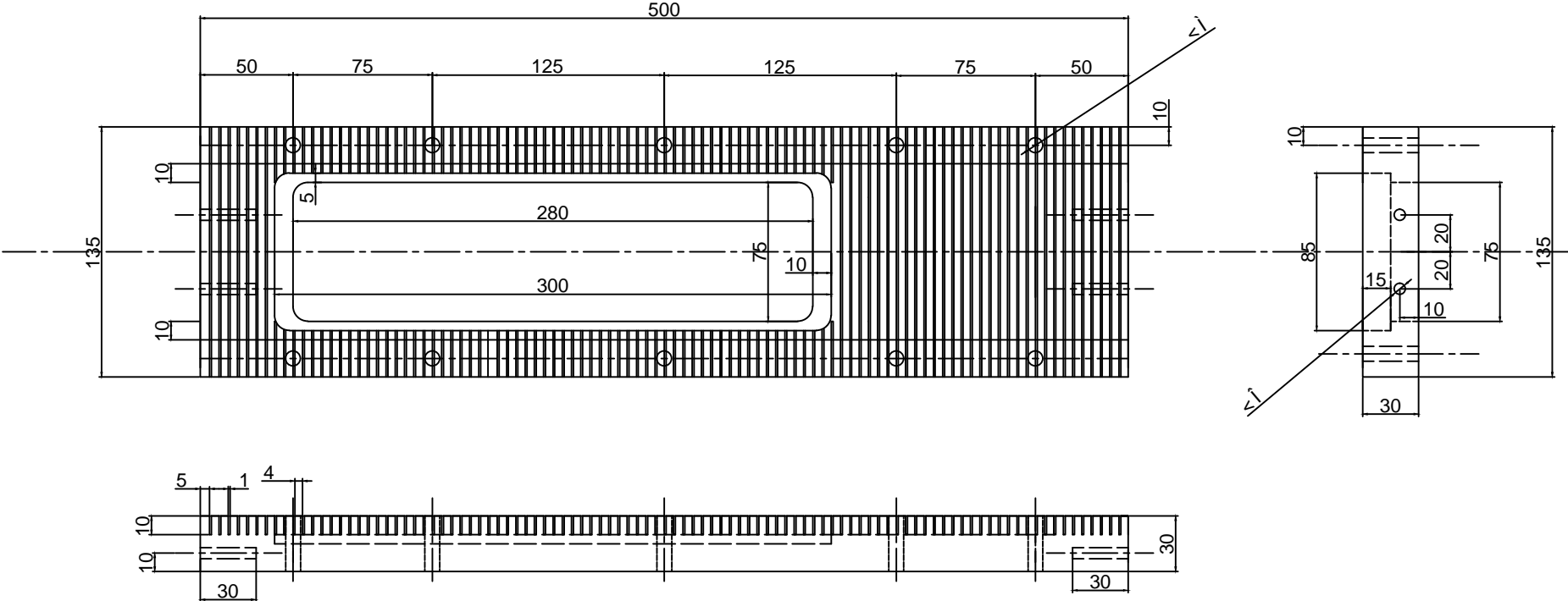
PART - 1 : SIDE PLATES



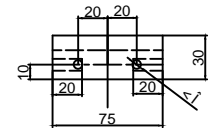
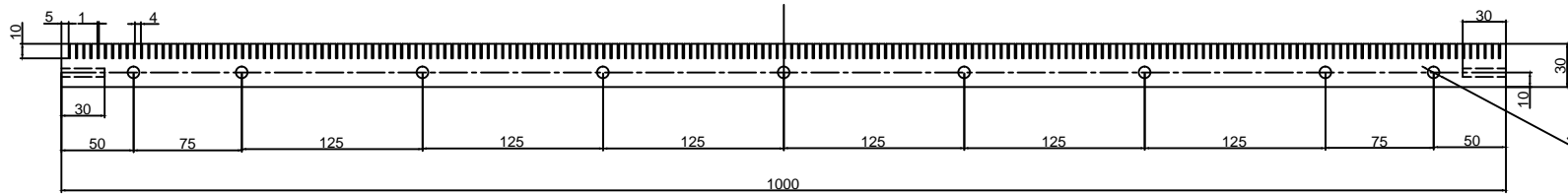
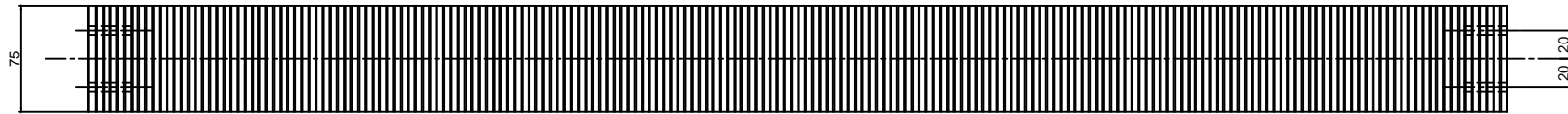
PART 2 : SHEET



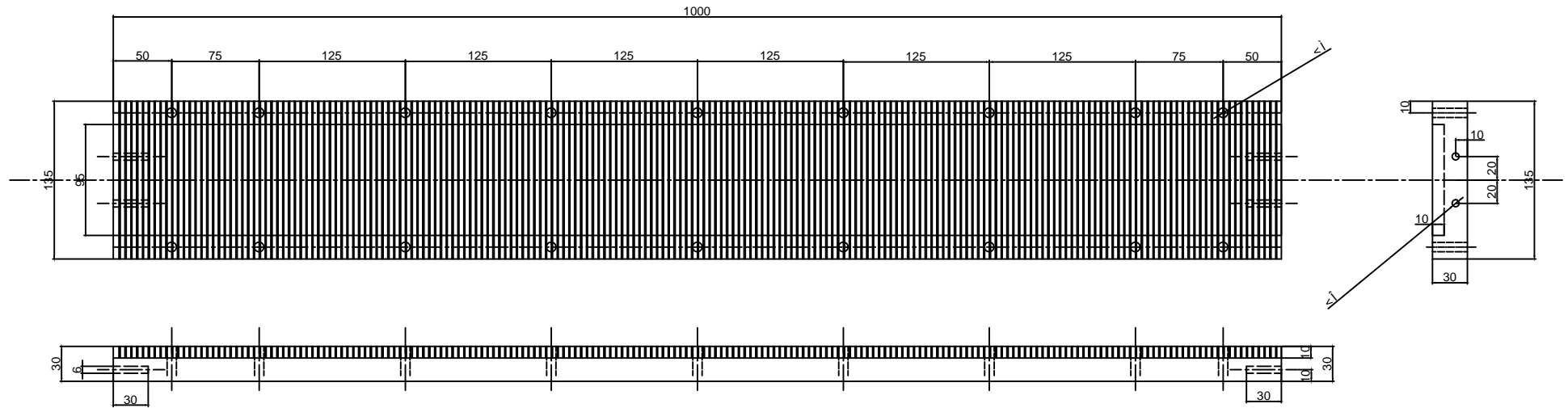
PART - 2 : SIDE PLATES



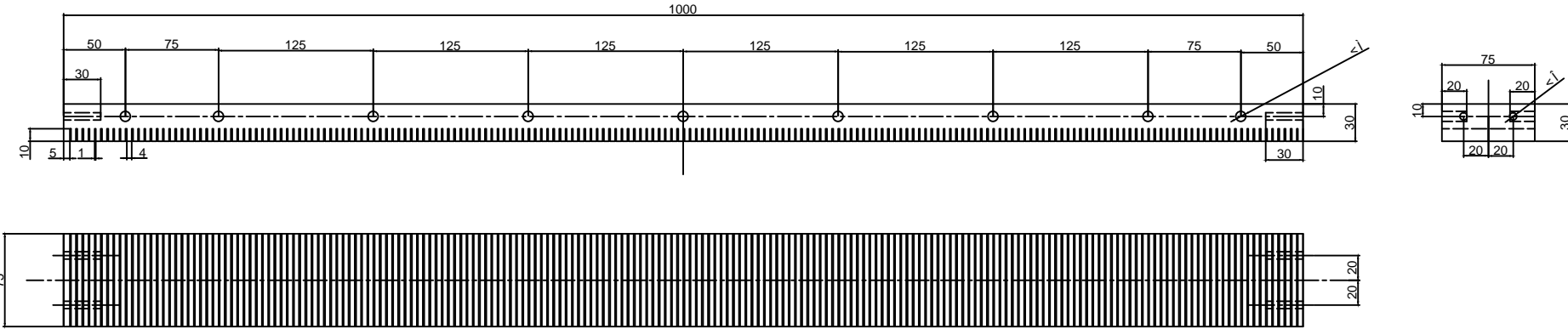
PART - 3 : BOTTOM PLATE



PART 3 : SIDE PLATES



PART - 3 : TOP PLATE



FLANGE

