Design of Cross-flow Turbine BXS/T1

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CROSSFLOW TURBINE

type: BVS / T1

- With manually operated flow regulator
- Rotor diameter: 400 mm
- Nozzle width: 50 to 400 mm

Flow: $Q = Q_s \cdot x \sqrt{H_n}$

where: Q_s = specific discharge = 0.30 l/s.

x = nozzle width (mm)

H_n = net head (m)

Rated speed: $N = n_s \cdot \sqrt{H_n}$

n_s = 98.5 RPM

Calculation of nozzle width:

$$x\ [mm] = \frac{Q\ [l/s]}{Q_s \cdot \sqrt{H_n}\ [m]}$$

$$P\ [kW] = \frac{Q \cdot H_n}{102} \cdot \eta \qquad (\eta = 0.7 \text{ at full opening})$$

SKAT

Varnbüelstraße 14, CH-9000 St Gallen,
Switzerland. Tel 071 23 54 81

CF Turbine BVS/T1

Hints for the use of the drawing set:

- Drawing are divided into sub-assembly and assembly groups. Parts-lists and (sub)-assembly drawings bear an identical number code, followed by drawings of individual parts with the same code and serial number.
- Assembly groups T1-10.0 and T1-11.0 refer to the gate operation by hydraulic cylinder only.
- Drawings 01.1/1-3, 01.2, 01.3, 01.4 are required only for execution with draft-tube.
- Reinforcing disk (drwg. 04.4) and inlet rib (drwg. 08.9) are optional depending on head and turbine width. This must be determined by a separate stress calculation (on request done by SKAT).
- Permissible shaft loading requires to be checked for P>10 kW and H<7 m and also P>20 kW and H<14 m.
- Assembly groups 05.0 and 07.0 (bearing housings) may be replaced by commercially available standard bearing housings. However, height of shaft axis has to be taken into account.
- Code "x" refers to the variable nozzle width. All drawings with x-related measurements have to be completed by adding the chosen x. Example: x=400 as calculated. For drawing 01.5 : x + 412 = 400 + 412 = 812 mm.
- On some drawings not all standard sizes could be in cluded on a single drawing. Example: For x = 400, drawing 01.1/3 is required where measurements for y, z and k are found. Drawings 01.1/1 and 01.1/2 are not required for this turbine size.

SKAT

Varnbuelstraße 14, CH-9000 St.Gallen,
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SKAT
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SKAT
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SKAT
Centro Suizo para la Tecnología Apropiada
Instituto de Investigaciones sobre América Latina y de Cooperación al Desarrollo, Universidad de St.Gallen

POS	NO.OF ITEM	ITEMS	DRAWING NUMBER	SPECIFICATION	REMARKS
1	1	FOUNDATION FRAME	T1-01 0		SUB ASSEMBLY
2	1	SUPPORT ASSEMBLY	T1-02 0		" "
3	1	BAFFLE HOUSING	T1-03 0		" "
4	1	ROTOR ASSEMBLY	T1-04.0		" "
* 5	2	MAIN BEARING ASSEMBLY	T1-05.0		" "
6	1	REGULATOR WING ASSEMBLY	T1-06.0		" "
* 7	2	R.W BEARING HOUSING ASSEMBLY	T1-07.0		" "
8	1	INLET ASSEMBLY	T1-08 0		" "
9	1	REGULATOR MECHANISM ASSEMBLY	T1-09.0		" "
12	2	STUFFING BOX	T1-12,1		
13	2	STUFFING BOX LID	T1-12.2		
14	2	STUFFING BOX GASKET	T1-12.3		
15	2	OIL SEAL			
16	2	OIL SEAL HOUSING	T1-12.4		
17	2	LOCK SPRING	T1-12 5		
18	2	OIL SEAL HOUSING GASKET	T1-12.6		
19	2	COVER SHEET	T1-12.7		
20	1	COVER SHEET GASKET	T1-12.8		
21	2	SEALING PLATE 'A'	T1-12.9		
22	2	SEALING PLATE 'B'	T1-12.10		
23	1	SEALING FLAP GASKET	T1 12.11		
24	1	BAFFLE PLATE GASKET	T1-12.12		
25	1	SUPPORTING STRIP	T1-01.5		
26	1	FOUNDATION FRAME GASKET	T1-12.13		
27	2	GLAND PACKING			
28	16	TAPER PIN			
29	2	GREASE CUP			
30	X	NUT/BOLT .HEX W1/2" X 1 1/2"			SEE PART LIST T1-13.0
31	X	" " - W3/8" X 3/4"			
32	12-2	—/ " " W1/4" X 5/8"			
33	2	" " " W3/4" X 1 1/2"			
34	4	" " " W3/4" X 2"			
35	4	" " " W1/2" X 2"			
37	4	" " " W1/4" X 5/8"			
36	1	ADAPTER	T1-14 0		SUB.ASSEMBLY

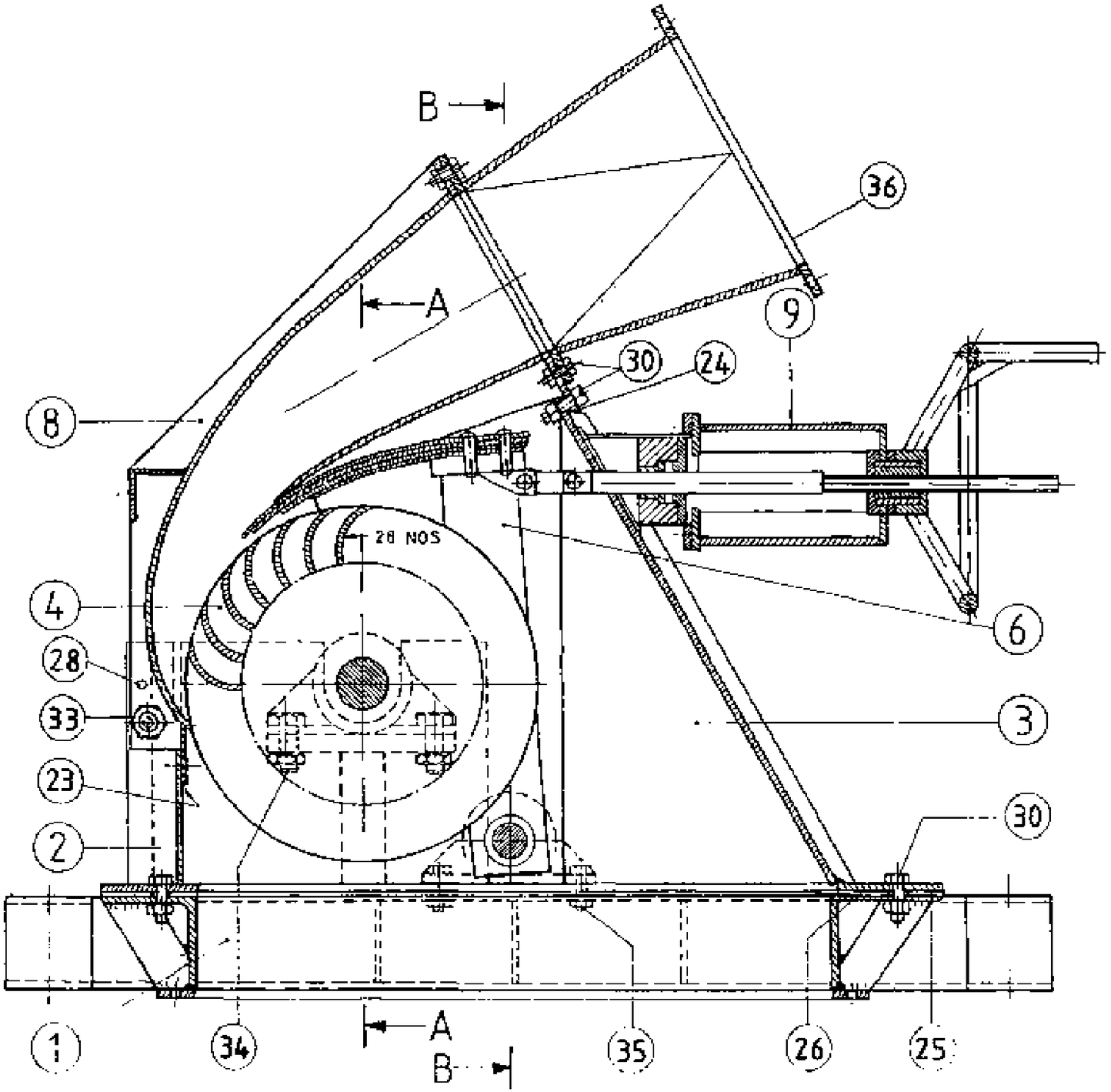
* STANDARD BEARING HOUSING MAY BE USED INSTEAD.

PART LIST

TURBINE ASSEMBLY

00.1-1/00.2/00.3

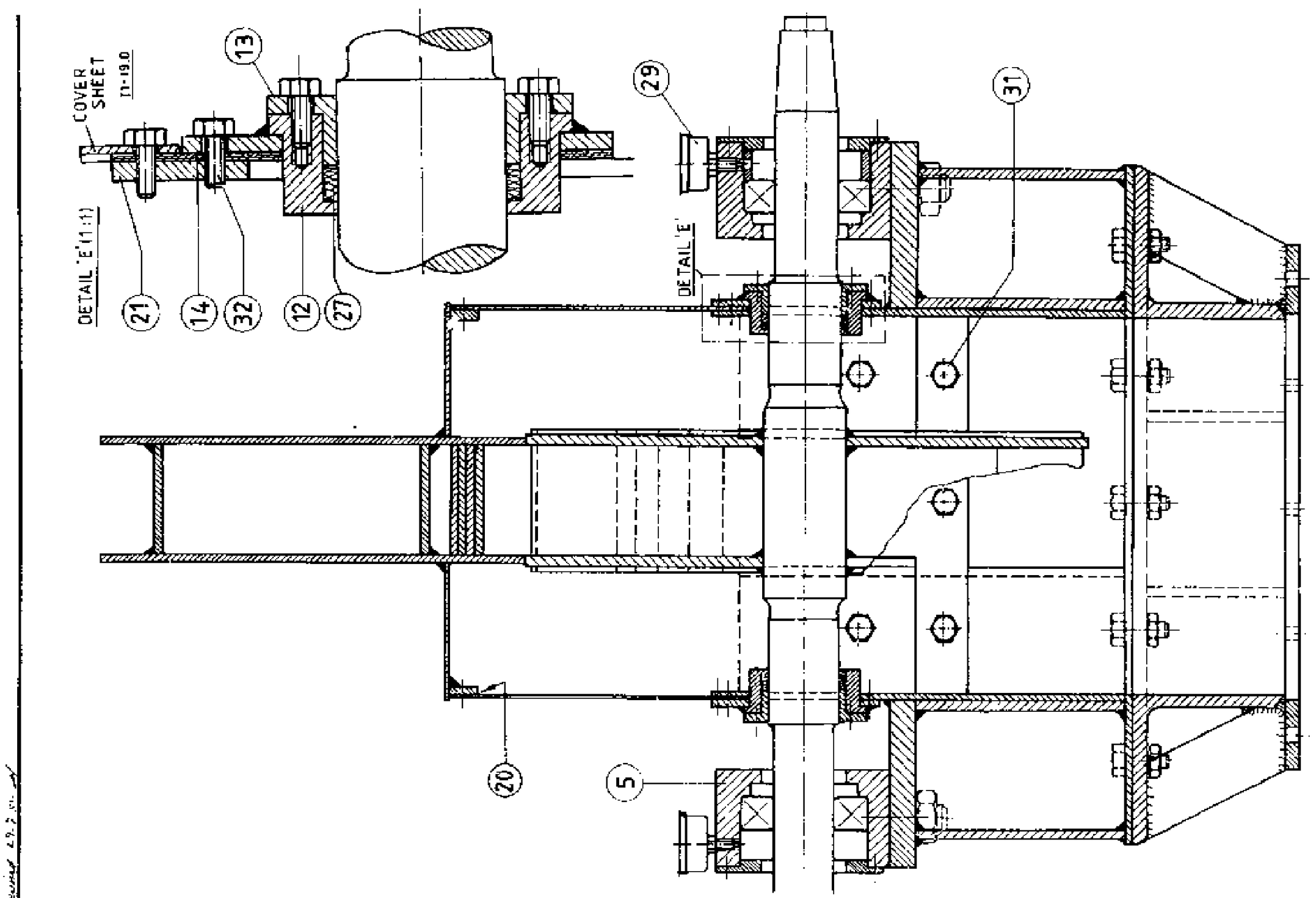
WITH HAND REGULATOR



CF TURBINE ASSEMBLY 1:5

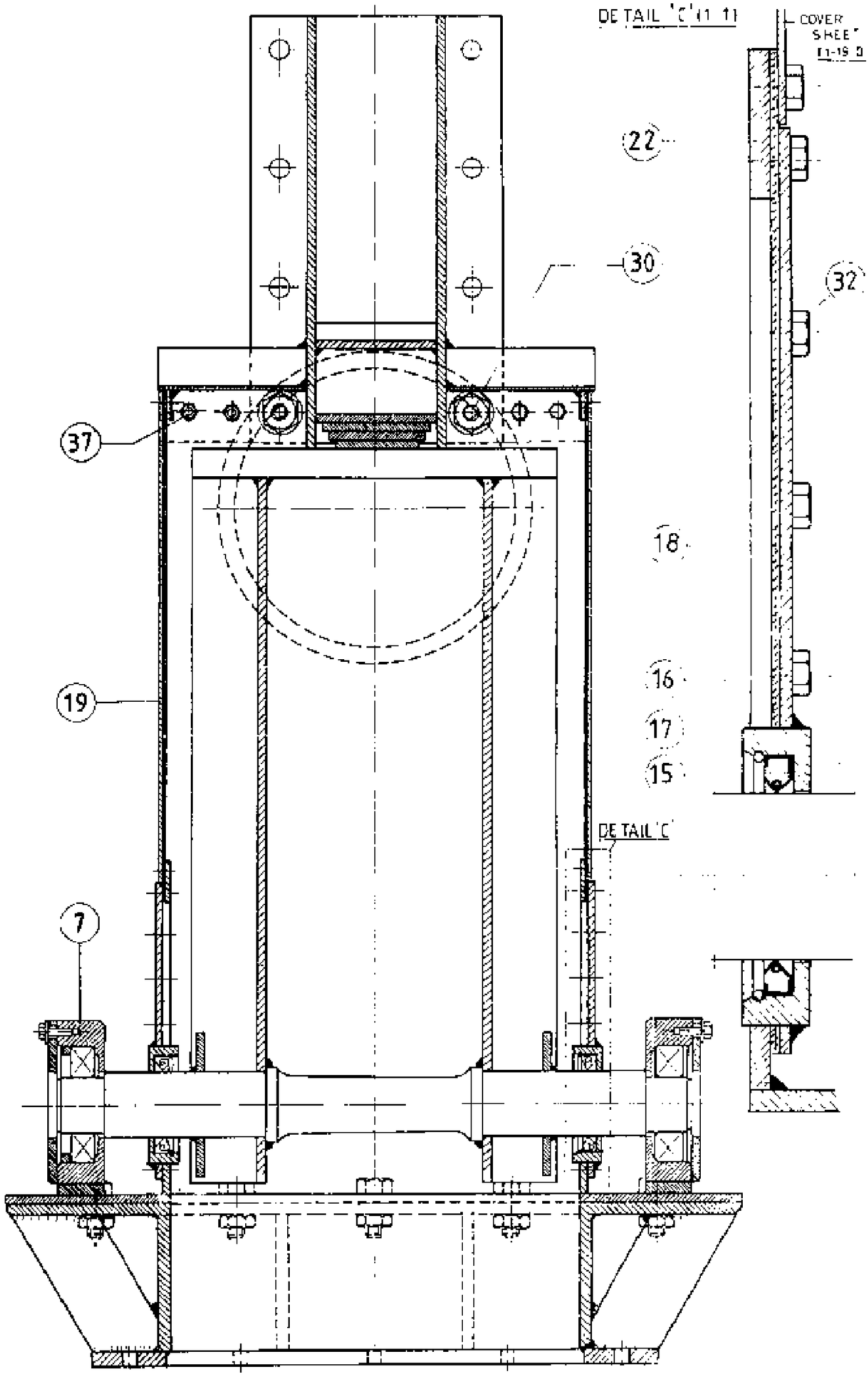
WITH HAND REGULATOR

T1-00



SECTION A-A (1:2.5)

T1-00.2



SECTION B-B

T1-003

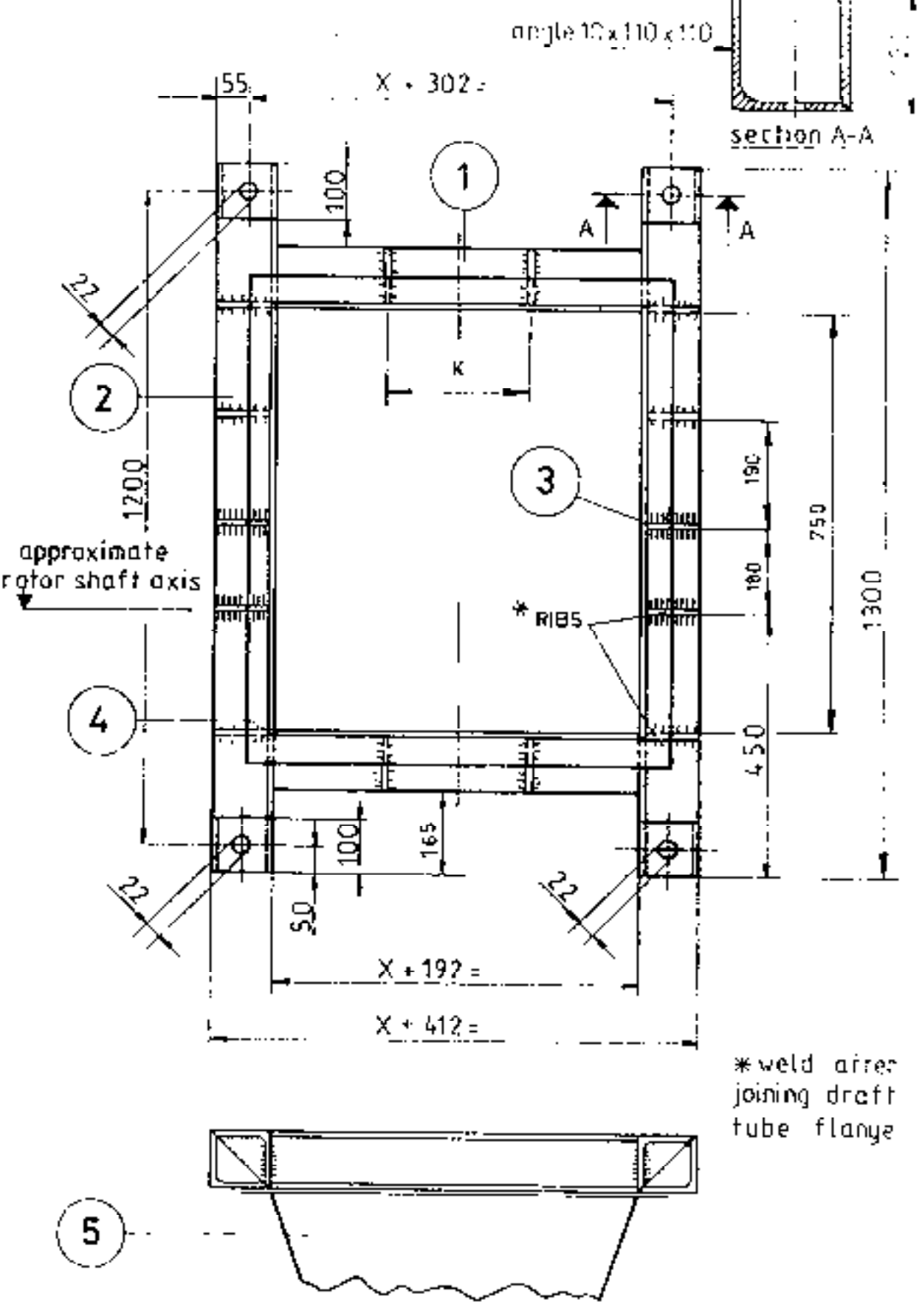
POS	NO OF ITEMS	ITEM	DRG NO	SPECIFICATIONS	REMARKS
1	2	M.S ANGLE 110 X110 X 10 LENGTH: X .	T1-010		
2	2	M.S. ANGLE 110 X 110 X 10 LENGTH:	T1-010		
3	14	RIB OUT OF M.S.FLAT 8 X 50	T1-012		
4	2	DRAFT TUBE FLANGE	T1-011/1-4		
5	1	DRAFT TUBE	T1-013		
	2	DRAFT TUBE SUPPORT	T1-014		USED IN INSTALLATION ONLY
—	4	SUPPORTING STRIPS	T1-015		USED IN FINAL ASSEMBLY ONLY DRG NO T1-C01-1

CONSISTING OF

FOUNDATION FRAME

PARTS LIST

T1-010

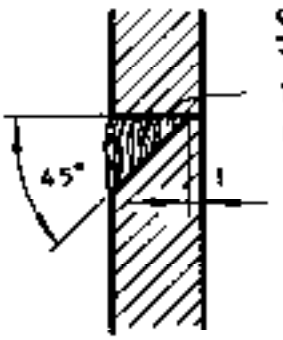


scale 1:10

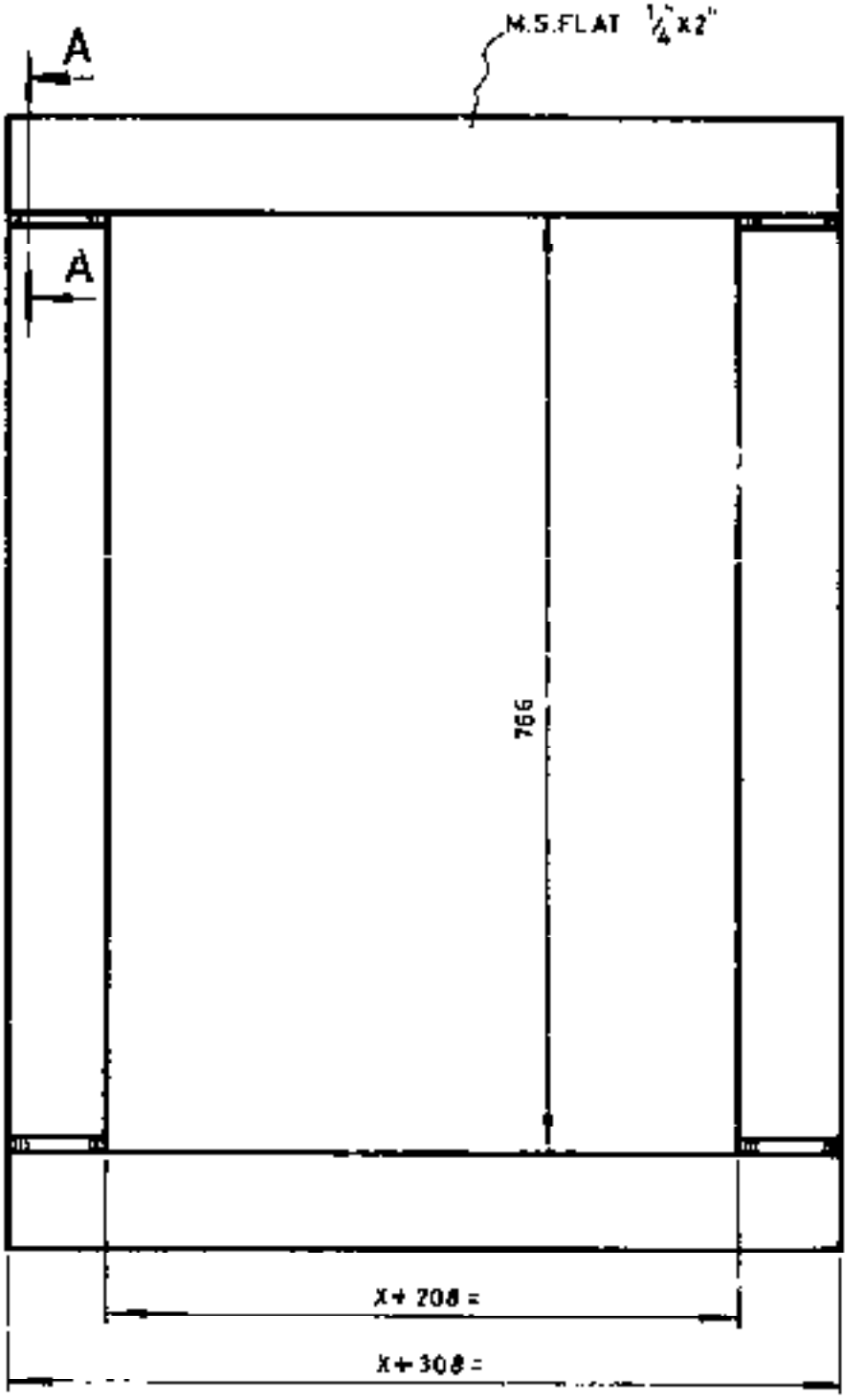
FOUNDATION FRAME

T1-01.0

SECTION A-A (2:1)



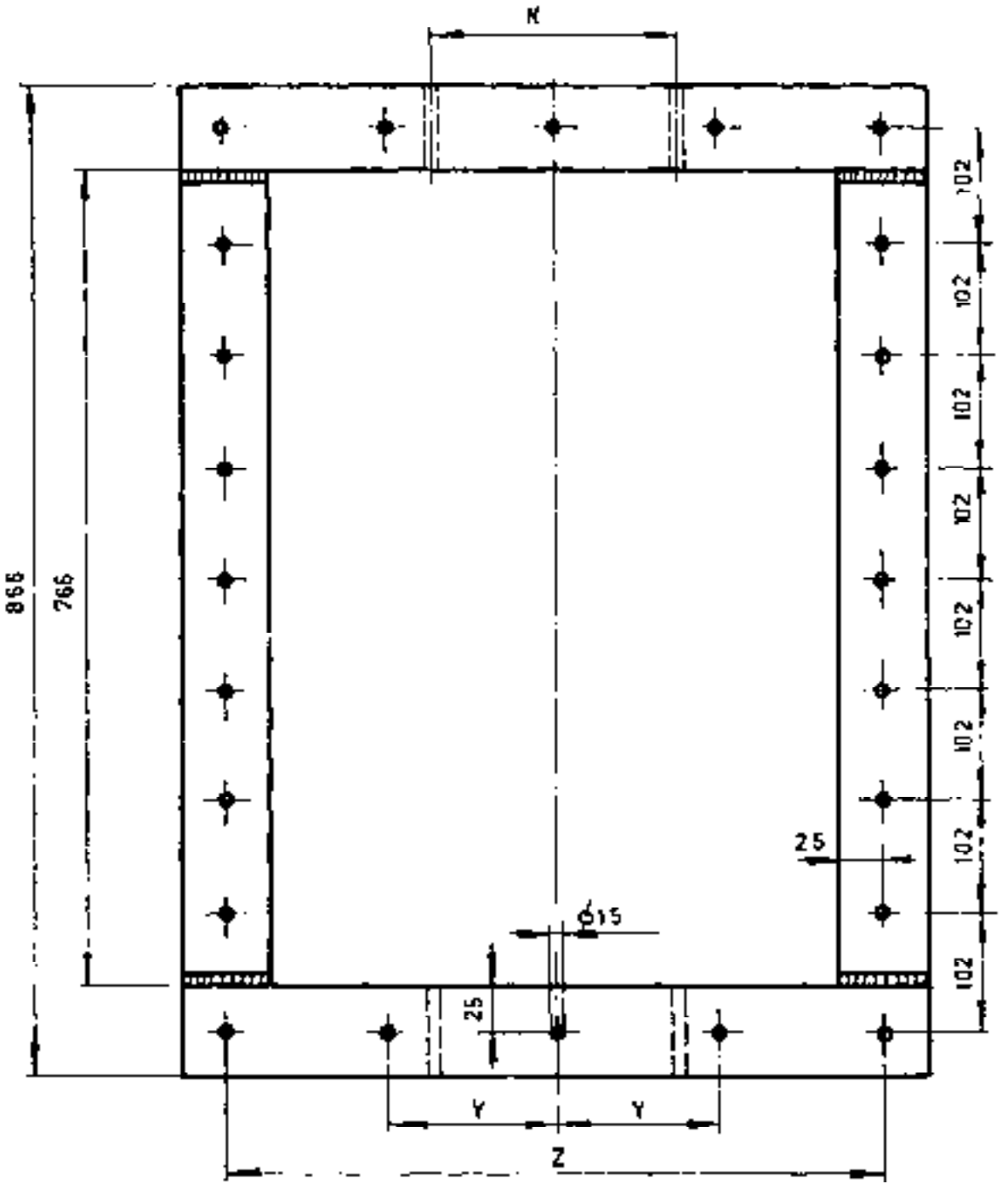
TACK WELD ONLY. FULL WELDING TO BE DONE IN ASSEMBLY WITH T1-01.0



DRILLING ACCORDING TO DRAWING T1-01.1/1-1/4

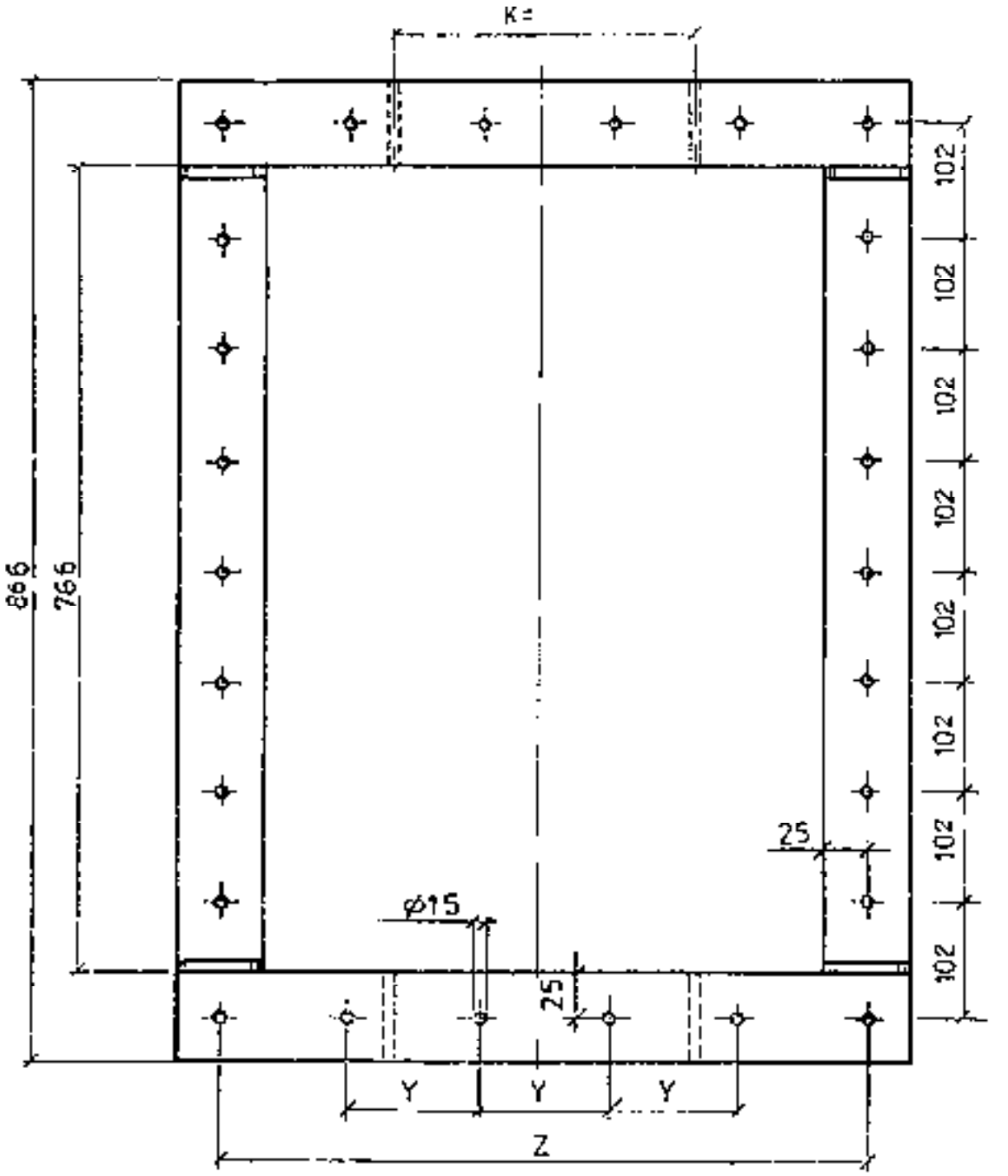
DRAFTTUBE FLANGE

T1-01,1



	X 70	X 100	X 150
Y	80	92	110
Z	328	358	408
K	90	130	170

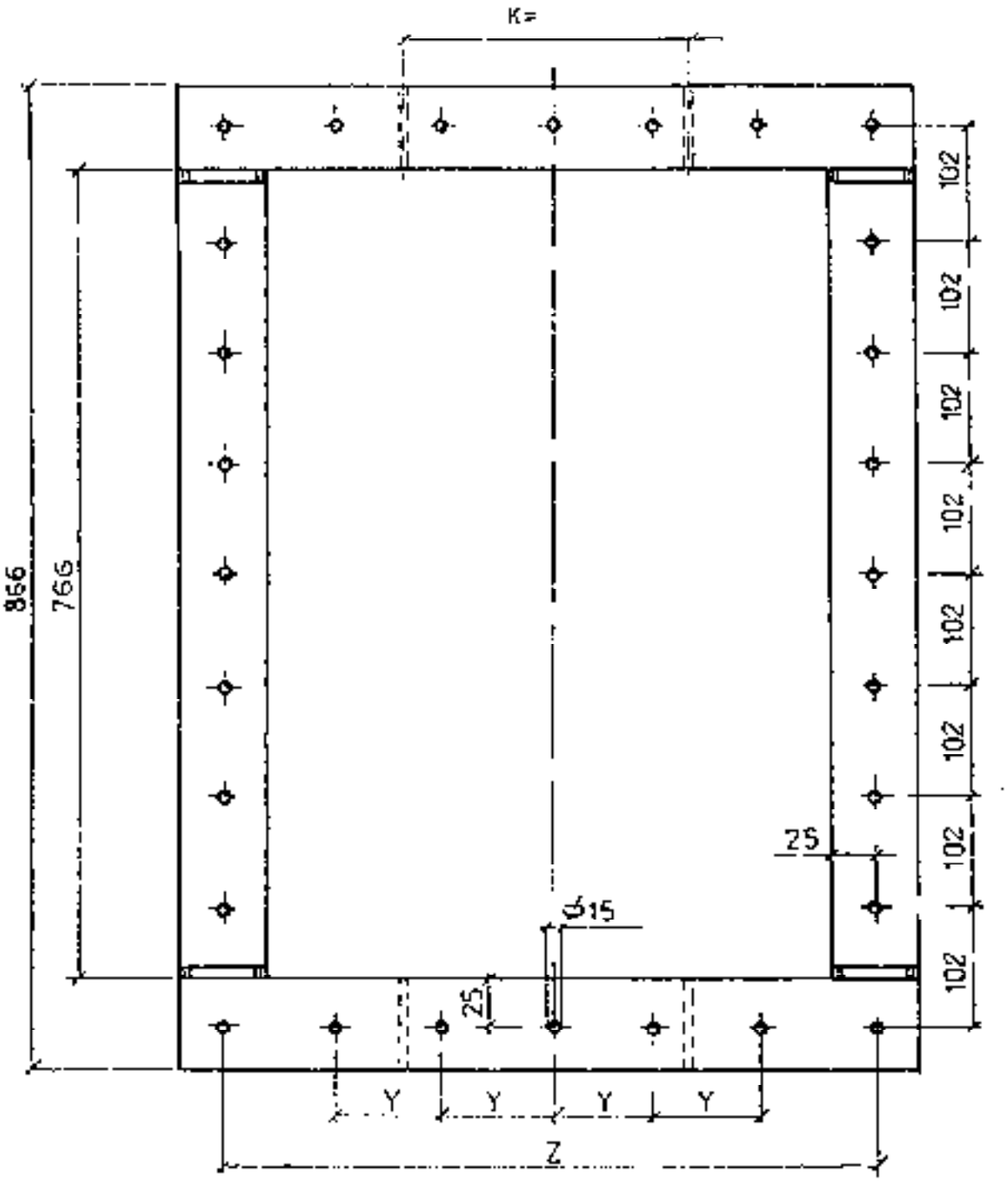
DRAFTTUBE FLANGE (X100,X150) T1-01,1/1
X 70



	X180	X200	X220
Y	90	94	98
Z	438	458	478
K	186	196	206

DRAFTTUBE FLANGE (X180, X200, X220)

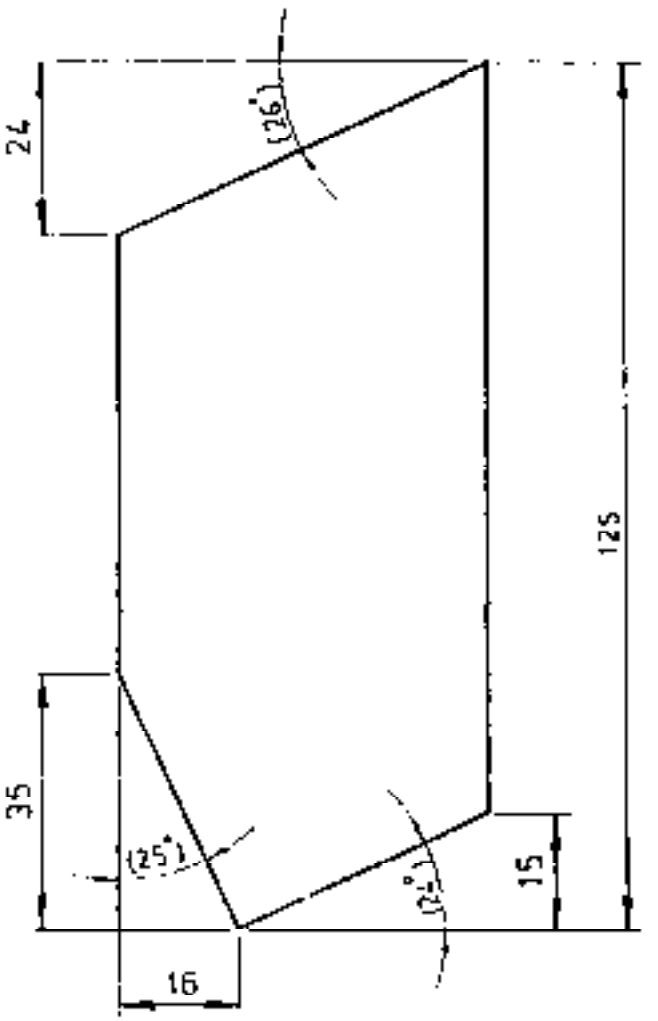
T1-01.1/2



	X300	X360	X400
Y	95	105	112
Z	558	618	658
K	250	284	296

DRAFTTUBE FLANGE (X300,X360,X400)

T1-01.1/3

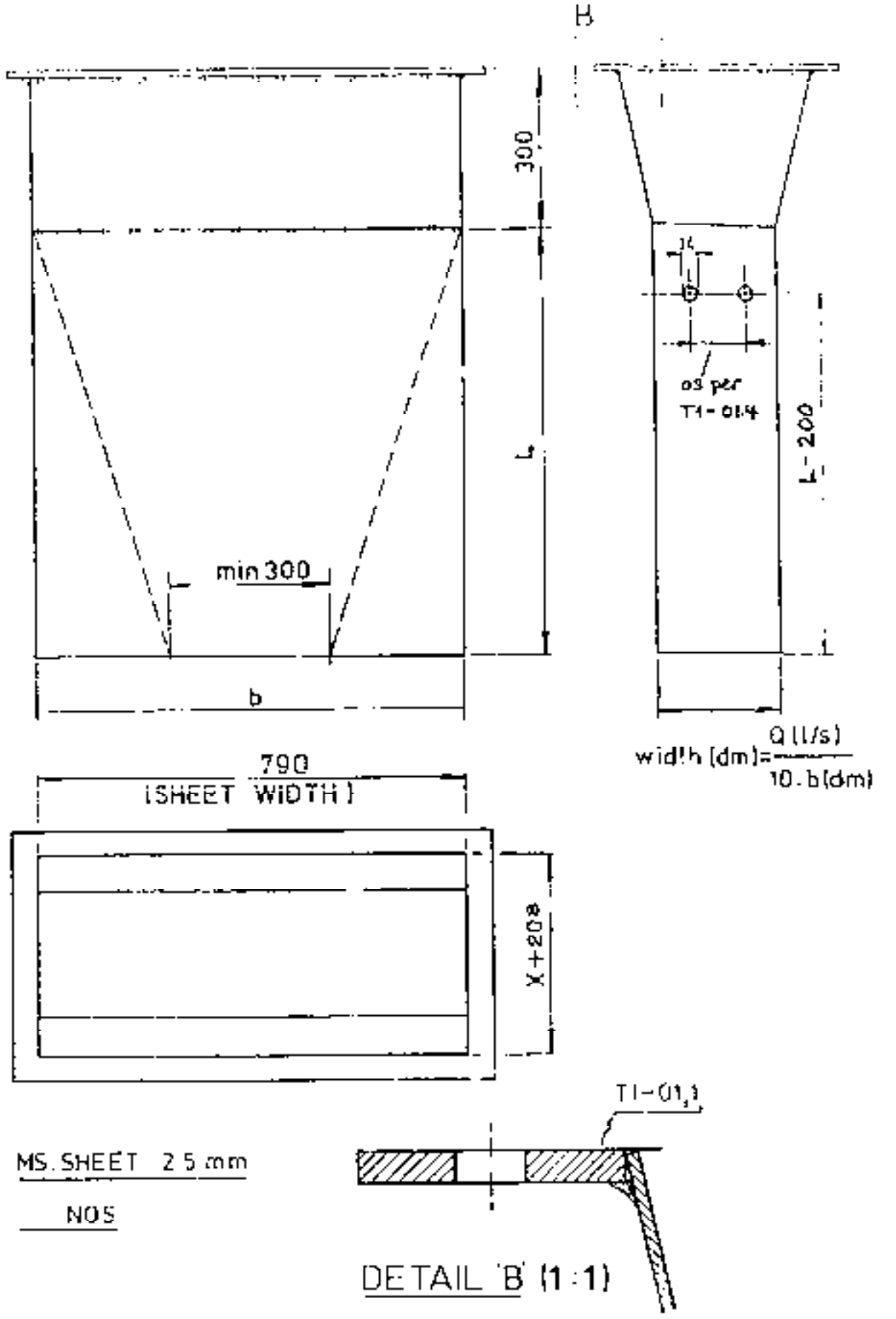


M.S FLAT 6 X 50

14 .NOS

RIB

T1-01.2



$$\text{width (dm)} = \frac{Q\ (l/s)}{10 \cdot b\ (dm)}$$

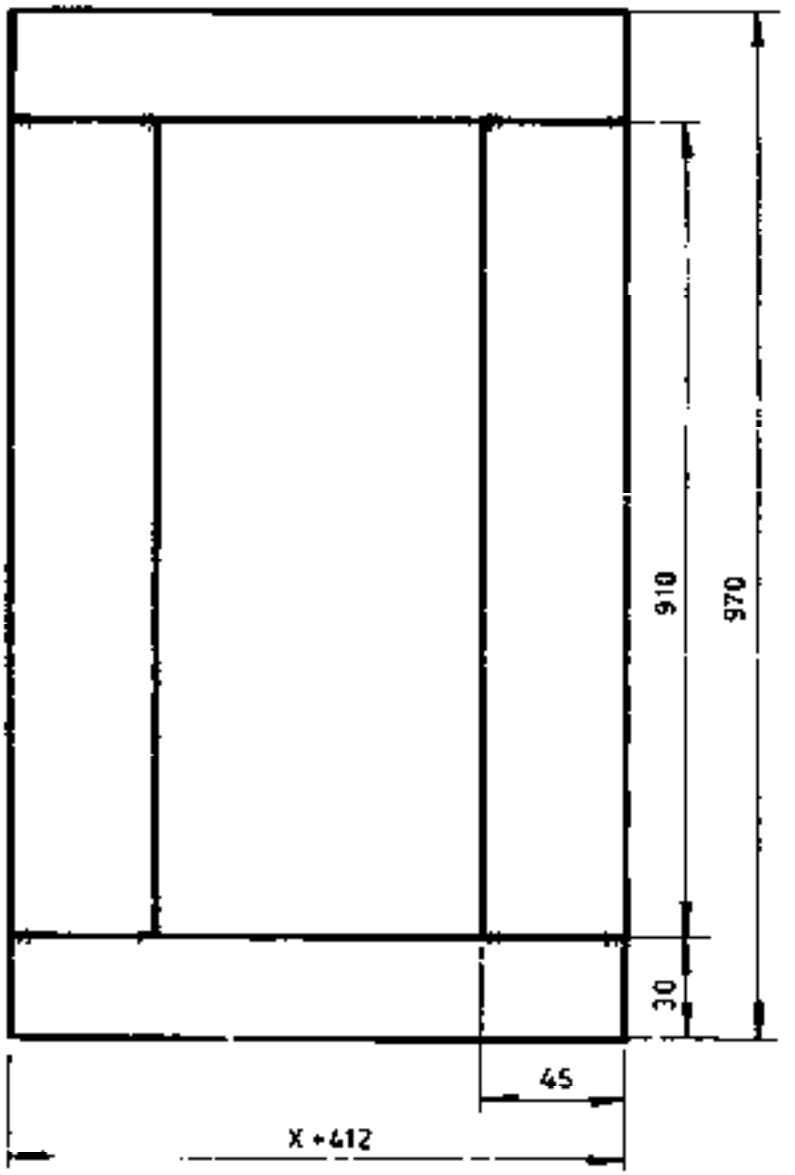
DRAFTTUBE

T1-01.3

DRAFT TUBE SUPPORT

U CHANNEL 75 X 40
2. NOS.

MOUNT FLUSH WITH OUTSIDE EDGES OF SUPPORT ASSEMBLY AND BAFFLE HOUSING ASSEMBLY ON BASE FRAME DURING FINAL ASSEMBLY. SPOT WELD AFTER ASSEMBLY.



315 MM SHEET : 2 STRIPS 45 x 910
2 STRIPS 30 x X + 412

SUPPORTING STRIPS

T1- 01,5

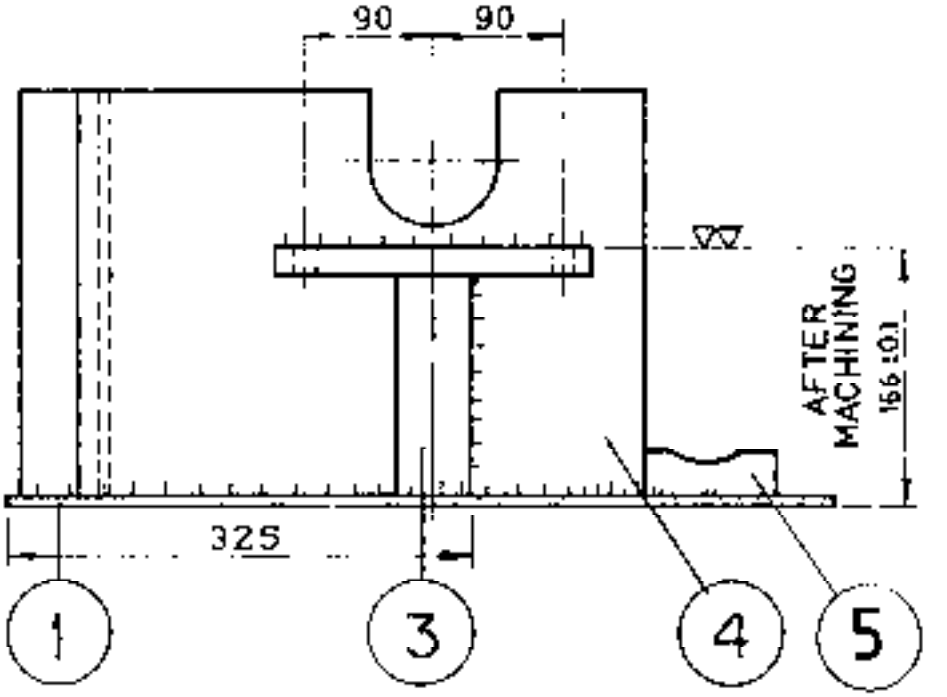
POS	NO.OF ITEMS	ITEM	DRAWING NO.	SPECIFICATIONS	REMARKS
1	1	SUPPORT BASE	T1-02 1	M.S.Plate 6mm	——
2	1	SUPPORT FRONT	T1-02.2		Sub assay
3	2	SUPPORT MEMBER	T1-02 3	M.S.Plate 25mm U.Chan.100 X 50	——
4	2	SUPPORT PANEL	T1-02 4	M.S. Plate 6mm	——
5	2	SEALING PLATE	T1-02.5	M.S.Plate 6mm	——

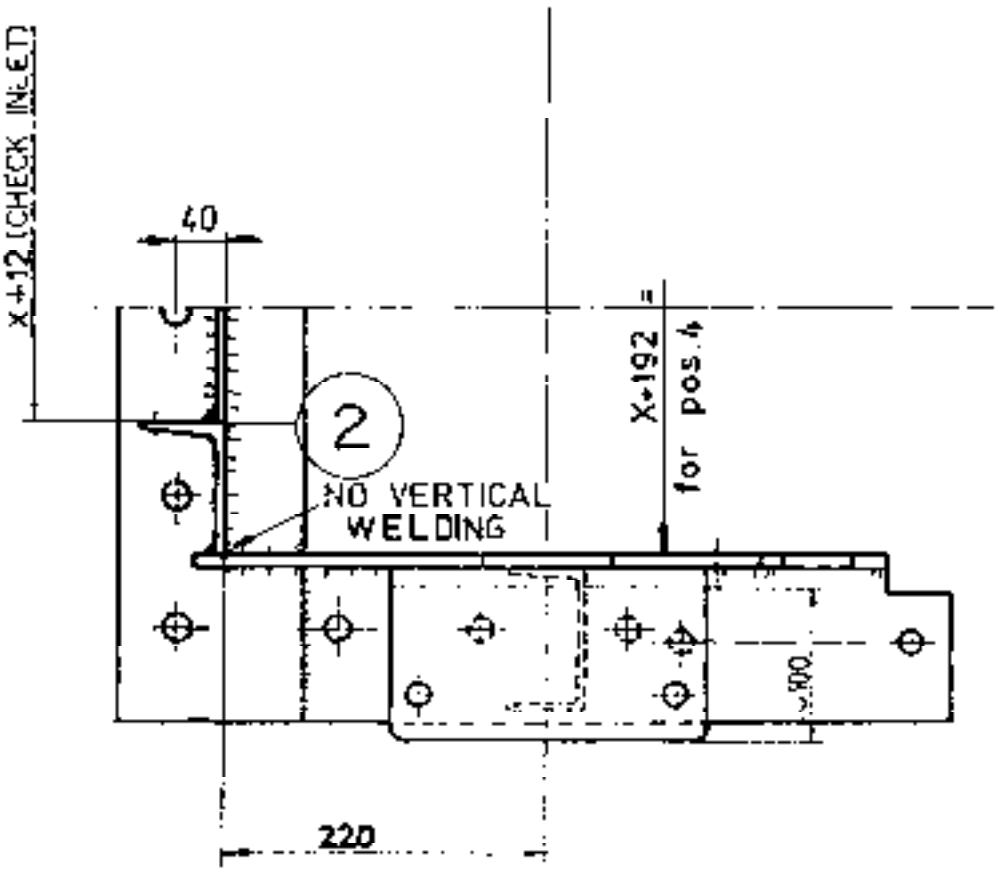
CONSISTING OF

SUPPORT ASSEMBLY

PARTS LIST

T1-02.0

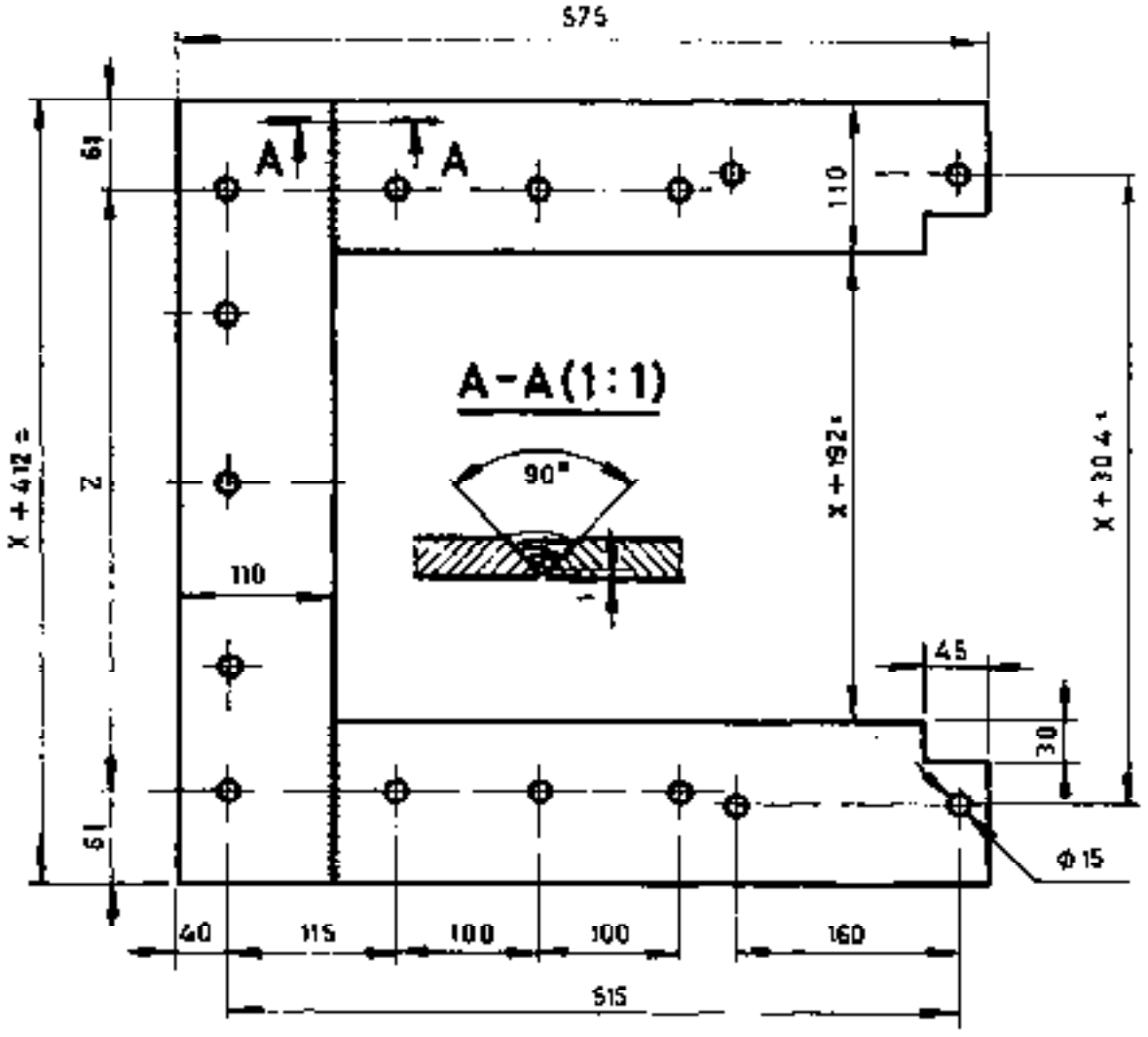




SUPPORT ASSEMBLY

T1-020

SCALE 1:5



HOLE CENTERS

	Z				
X 70	90	90	90	90	
X 100	98	97	97	98	
X 150	88	88	88	88	88
X 180	94	94	94	94	94
X 200	98	98	98	98	98
X 220	102	102	102	102	102
X 300	100	100	95	95	100	100
X 360	109	108	108	108	108	109
X 400	105	125	115	115	125	105

6 MM SHEET
TPC

SUPPORT BASE

T1-02,1

1:5

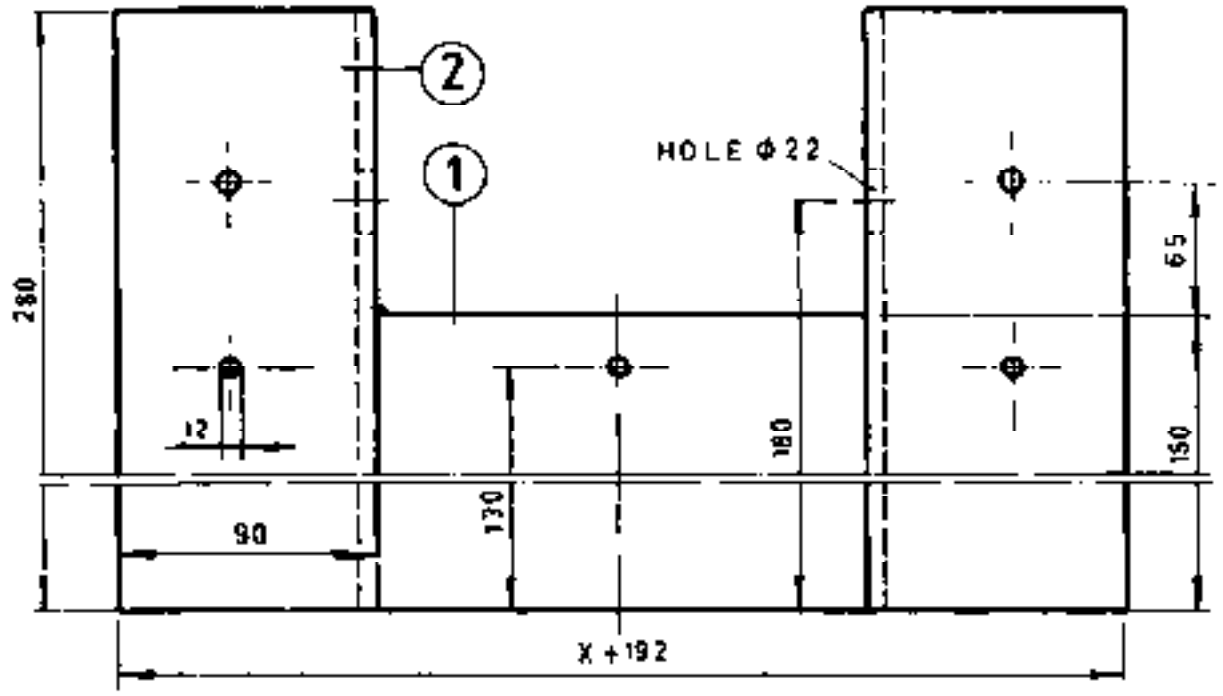
POS	NO. OF ITEMS	ITEM	DRAWING NO	SPECIFICATIONS	REMARKS
1	1	M.S. PLATE 6 X 150 LENGTH: X + 12	T1 - 02.2		
2	2	M S. ANGLE 60 X 90 X 6 LENGTH: 280	T1 - 02 2		

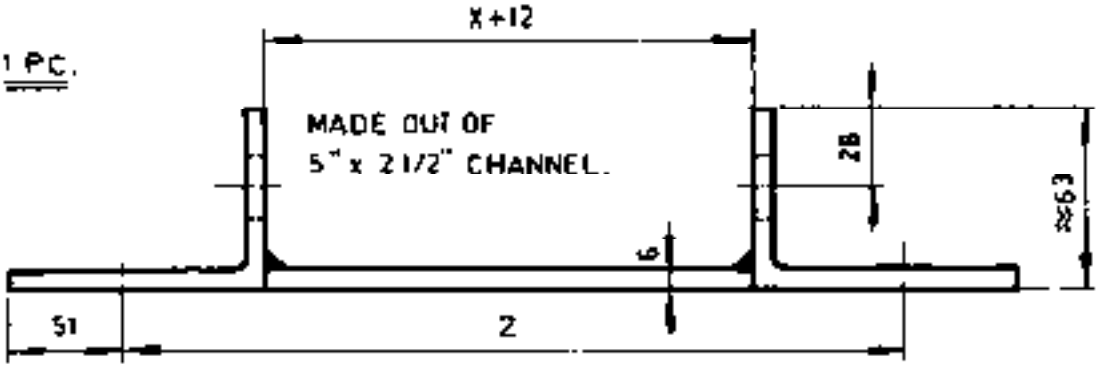
CONSISTING OF

SUPPORT FRONT

PARTS LIST

T1-02.2





1 PC.

HOLE CENTERS

X	Z				
X 70	80		80		
X 100	95		95		
X 150	80	80	80	80	
X 180	90	90	90	90	
X 200	97	96	97		
X 220	78	77	77	78	
X 300	98	97	97	98	
X 360	90	90	90	90	90
X 400	98	98	98	98	98

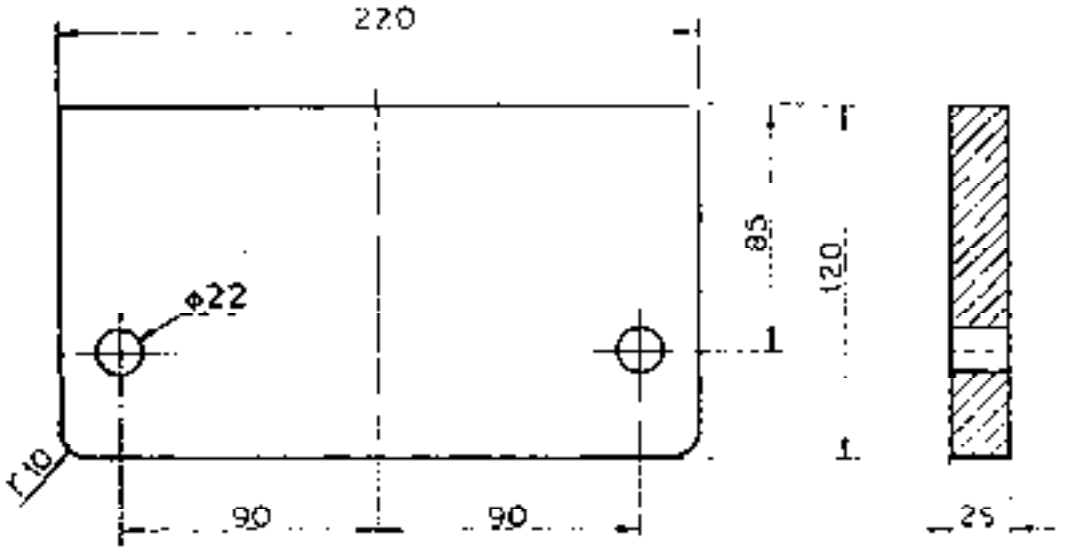
- HOLE (φ 22) SHOULD BE DRILLED BEFORE WELDING.
- DRILL HOLES (φ 12) AFTER WELDING.

4 PC

SUPPORT FRONT

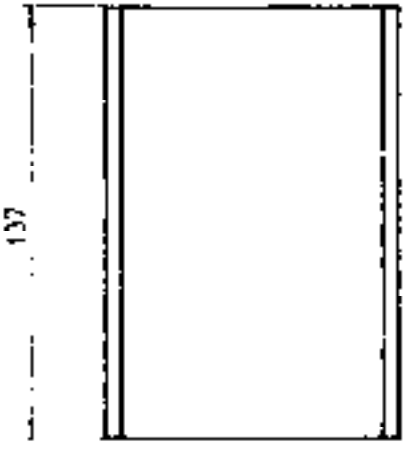
T1-02.2

1 : 2,5



2 PIECES

M.S PLATE 25mm



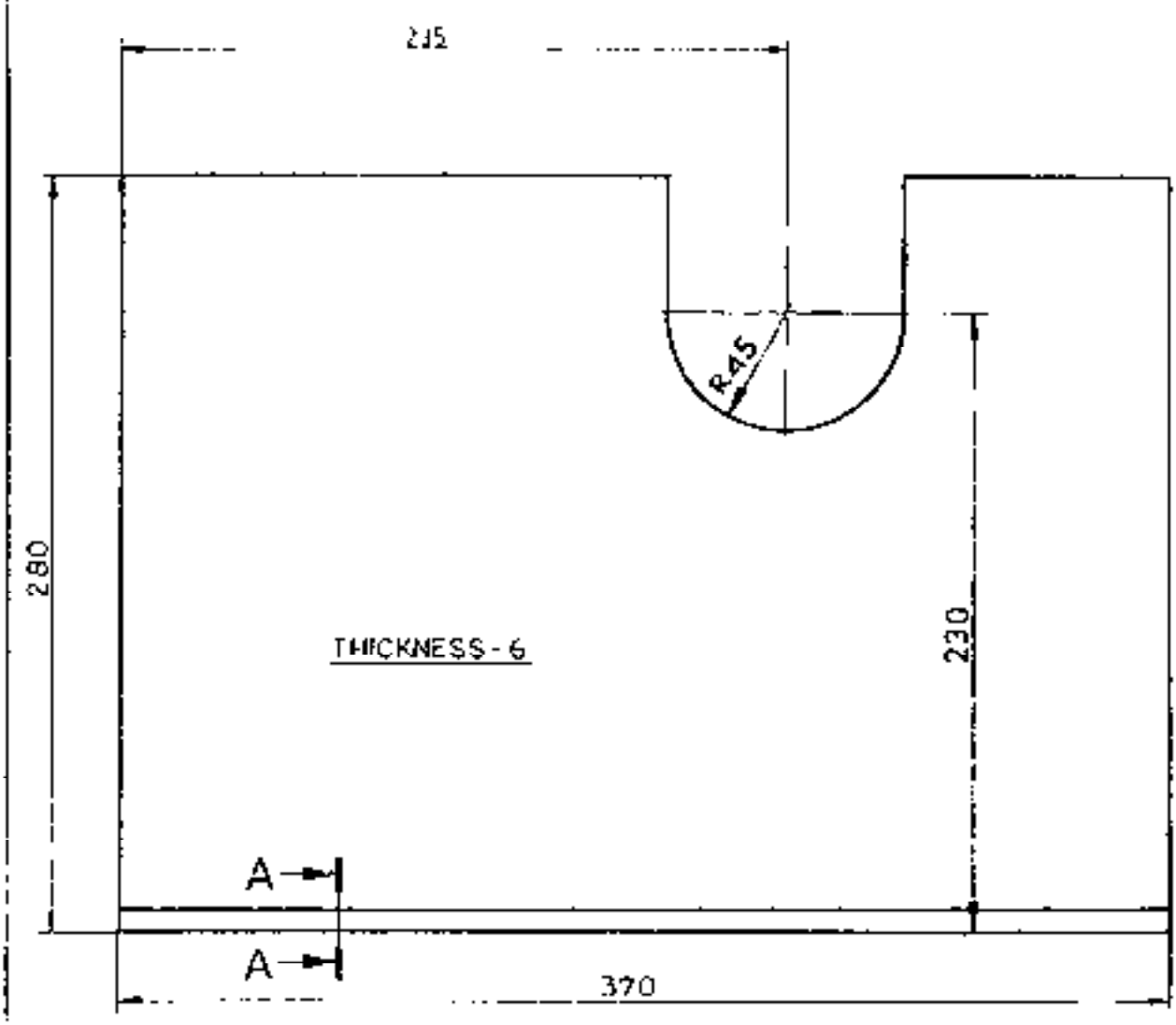
2 PIECES

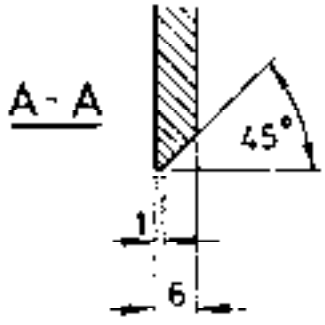
U CHANNEL

SUPPORT MEMBER

T1-02.3

SCALE 1 2 5





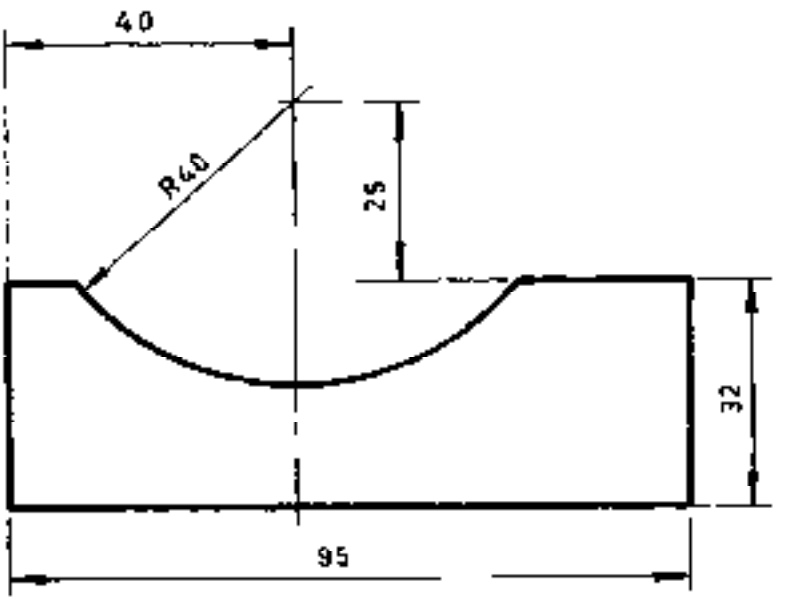
2 PIECES

NB: MAKE CHAMFER ON THE OTHER SIDE OF NEXT SHEET

SUPPORT PANEL

T1-024

SCALE 1 2,5



6.MM FLAT
2.NOS

SEALING PLATE

T1-02,5

POs	ITEMS	ITEM	DRG NO	SPECIFICATIONS	REMARKS
1	1	BAFFLE HOUSING BASE	T1-031	MS Plate 6mm	
2	2	BAFFLE HOUSING PANEL	T1-032	MS Plate 6mm	
3	1	BAFFLE HOUSING TOP	T1-033	MS Plate 6mm	

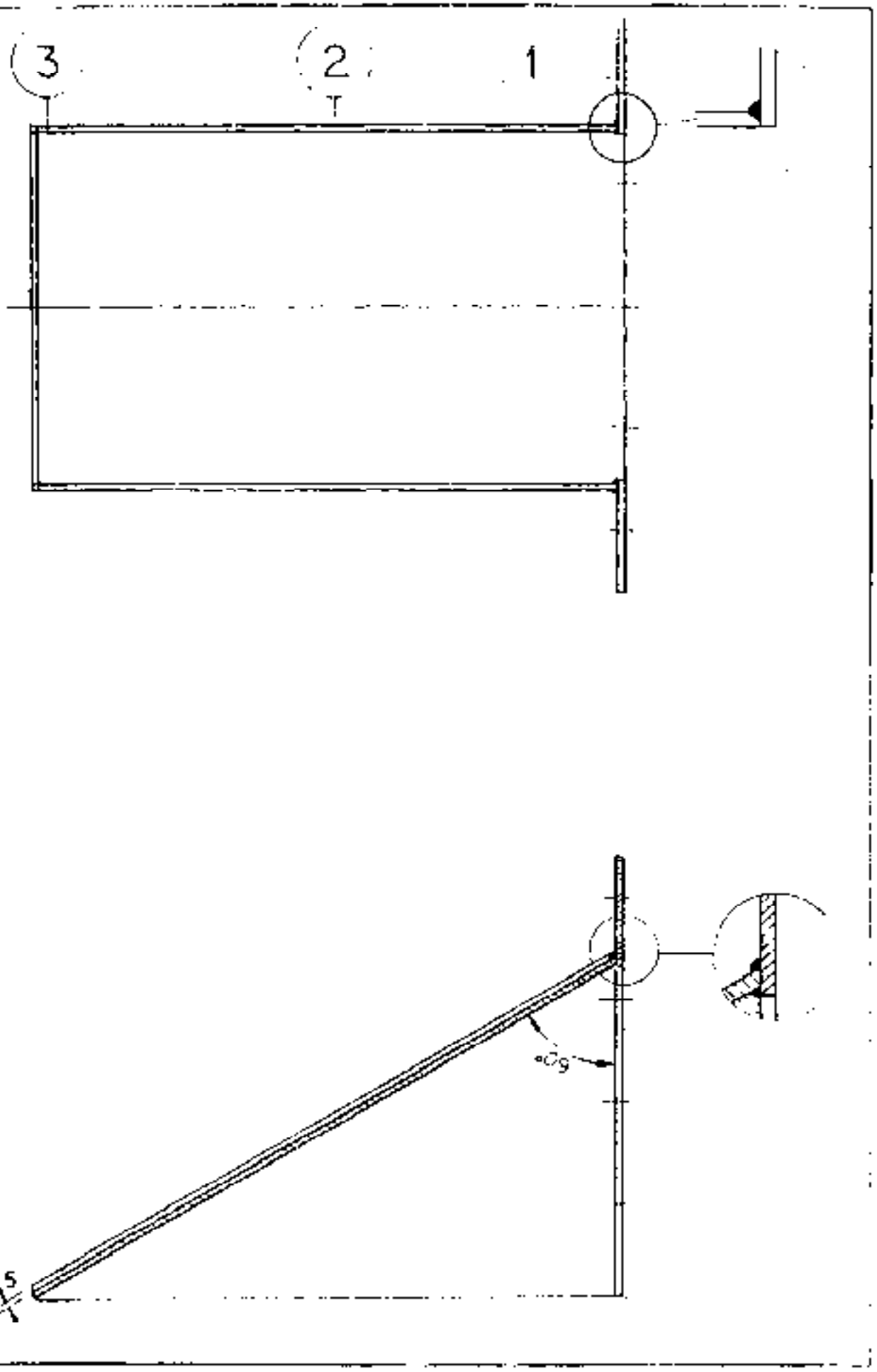
Revised 29.7.96 ak

CONSISTING OF

BAFFLE HOUSING ASSEMBLY

PARTS LIST

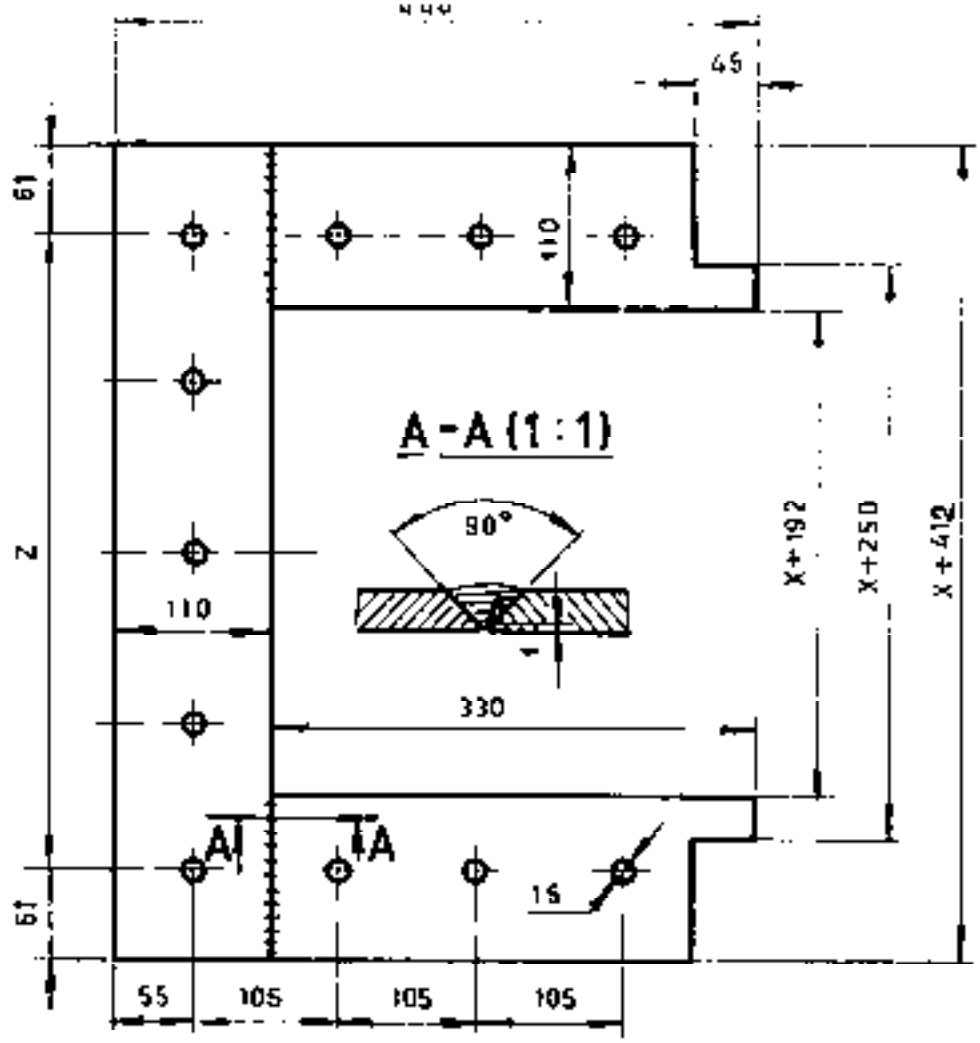
T1-030



BAFFLE HOUSING ASS.

T1-030

SCALE 1:5



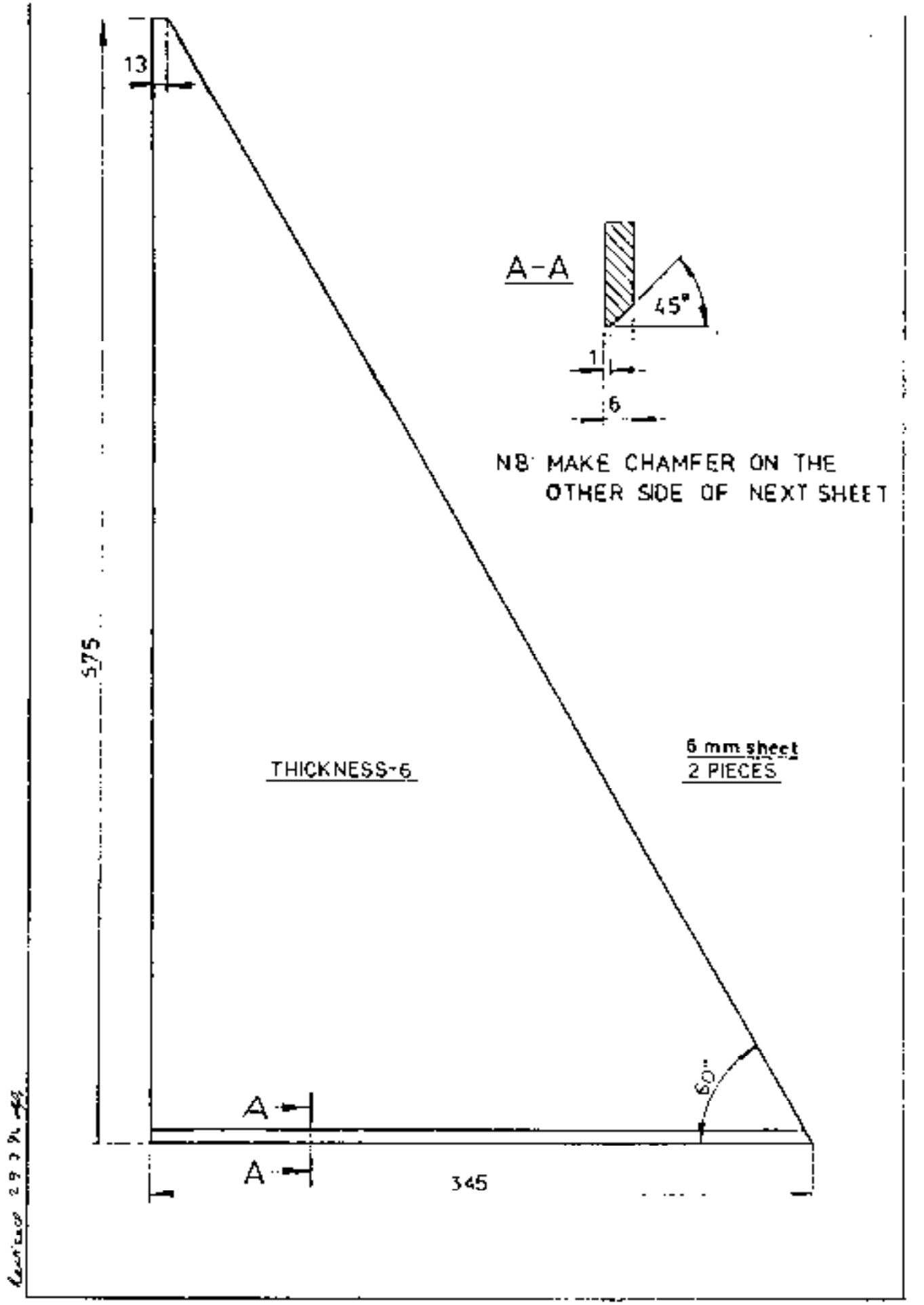
HOLE CENTERS	Z				
X 70	90	90	90	90	
X 100	98	97	97	98	
X 150	88	88	88	88	88
X 180	94	94	94	94	94
X 200	98	98	98	98	98
X 220	102	102	102	102	102
X 300	100	100	95	95	100	100
X 360	109	108	108	108	108	109
X 400	105	125	115	115	125	105

6MM SHEET
1PC

BAFFLE HOUSING BASE

T1-03.1

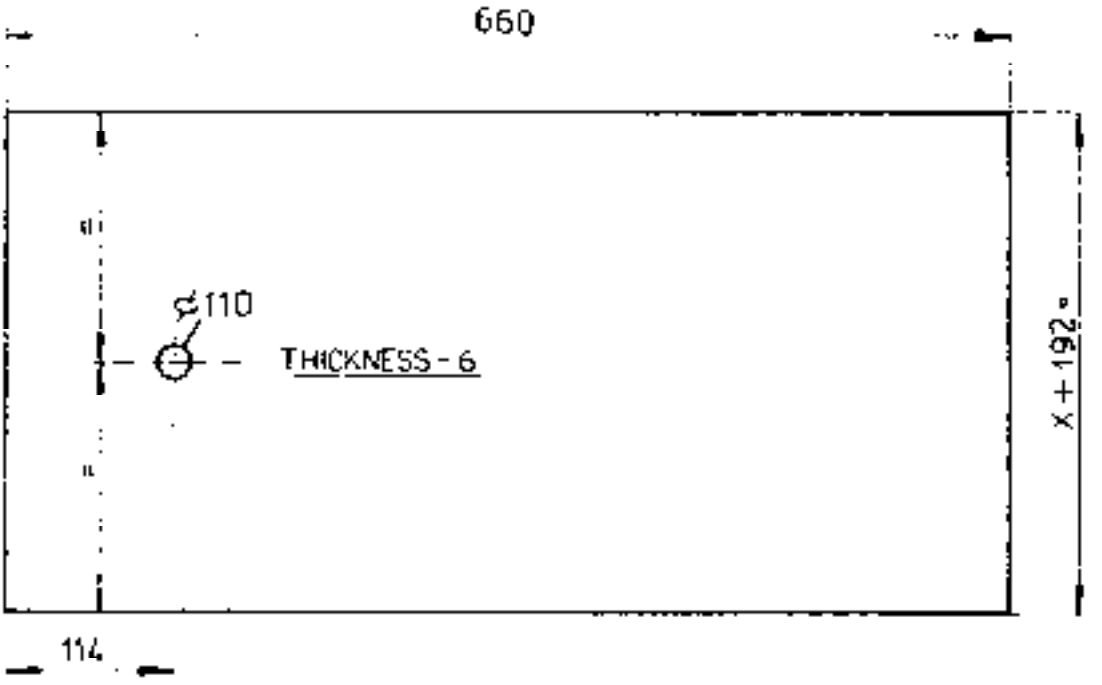
1:5



BAFFLE HOUSING PANEL

T1-032

SCALE 1:2.5



6 mm sheet
1 PC

BAFFLE HOUSING TOP

T1-033

E 15

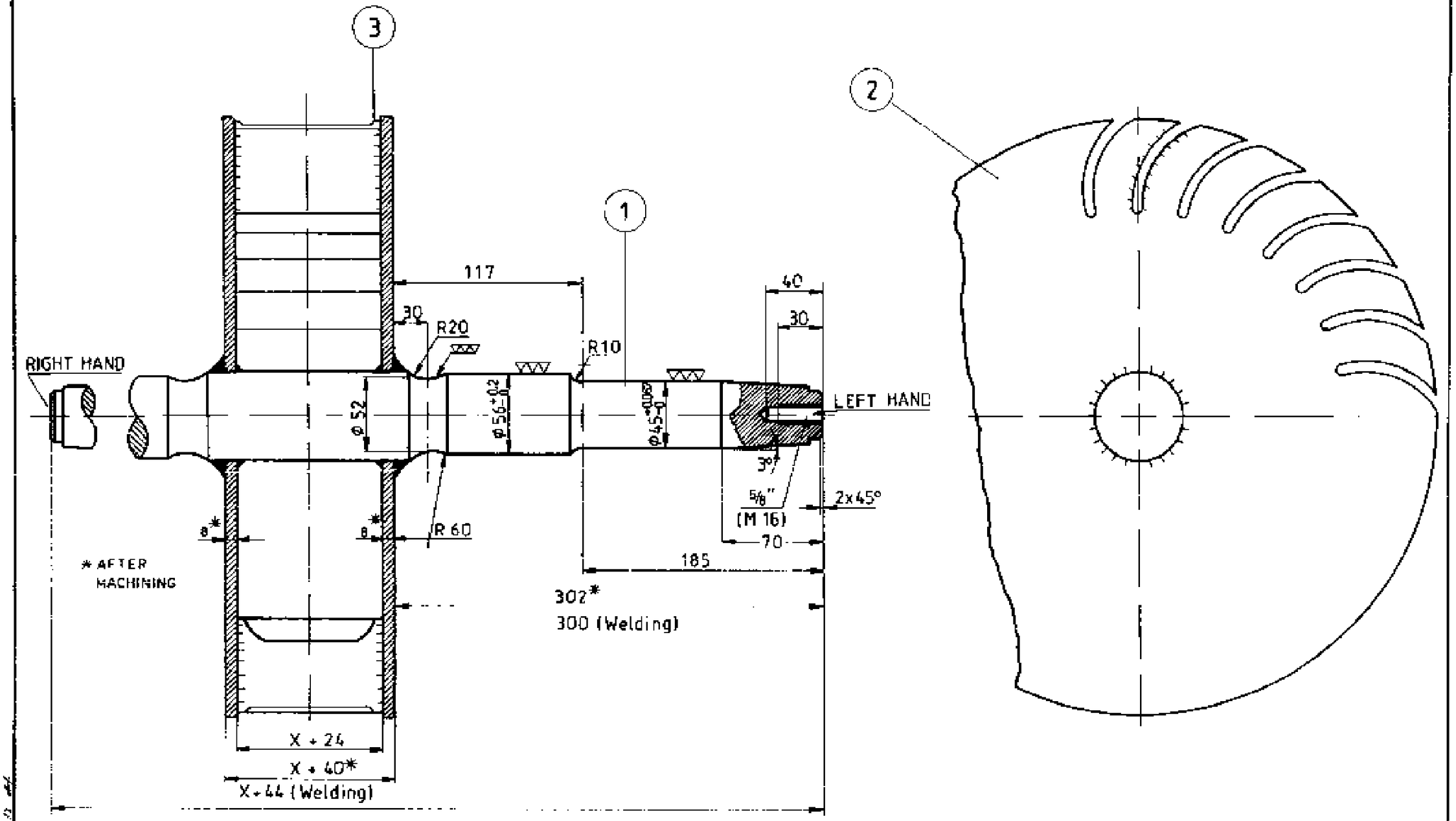
POS	NO OF ITEMS	ITEM	DRAWING NO	SPECIFICATIONS	REMARKS
1	1	ROTOR SHAFT	T1-041	MS Rod ϕ 64	
2	2	ROTOR DISK	T1-042	MS Plate 8mm	
3	28	ROTOR BLADE	T1-043	2,5 MM SHEET	
4*	1	ROTOR INTERMEDIATE DISK	T1-044	M.S Plate 6mm	
		*ONLY REQUIRED FOR TYPES 220, 300, 360 AND 400 FOR TYPE 200 WITH HEAD ABOVE 8mm AND FOR TYPE 180 WITH HEAD ABOVE 11m			

CONSISTING OF

ROTOR SHAFT ASSEMBLY

PARTS LIST

T1-04.0

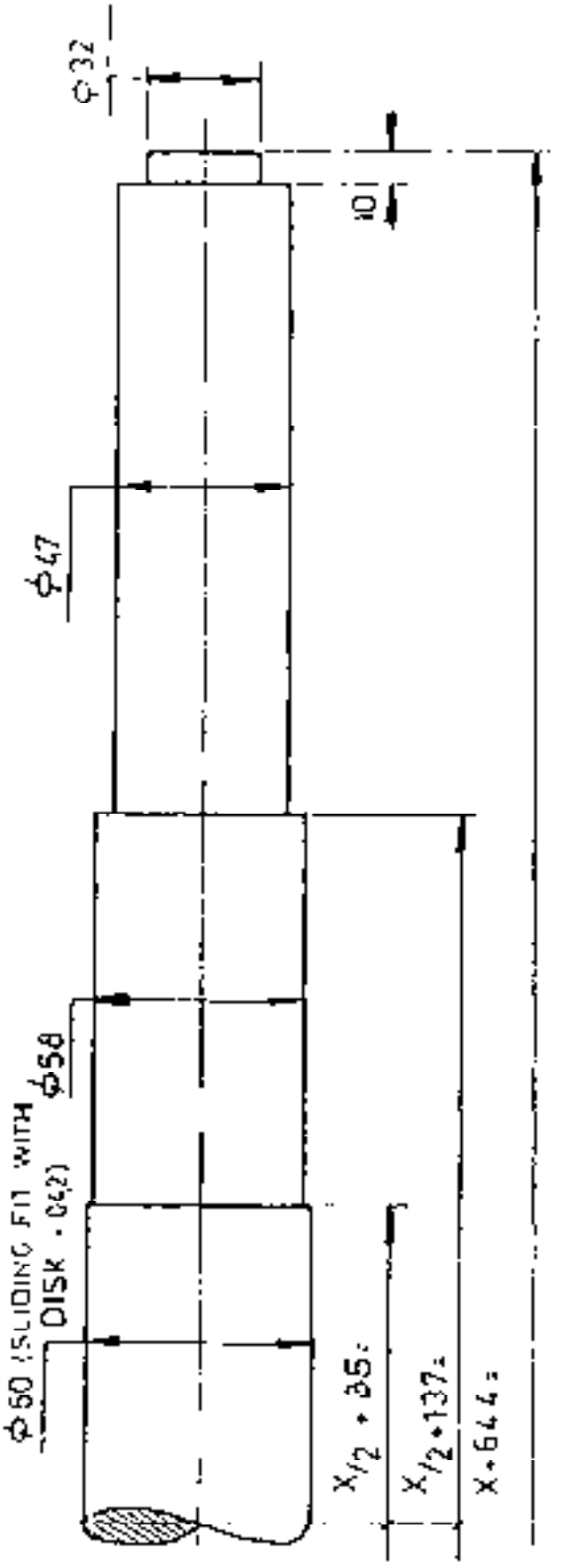


ROTOR SHAFT MACHINED AFTER
FULL WELDING OF ALL PARTS

ROTOR ASSEMBLY

T1-040

SCALE 1 2.5

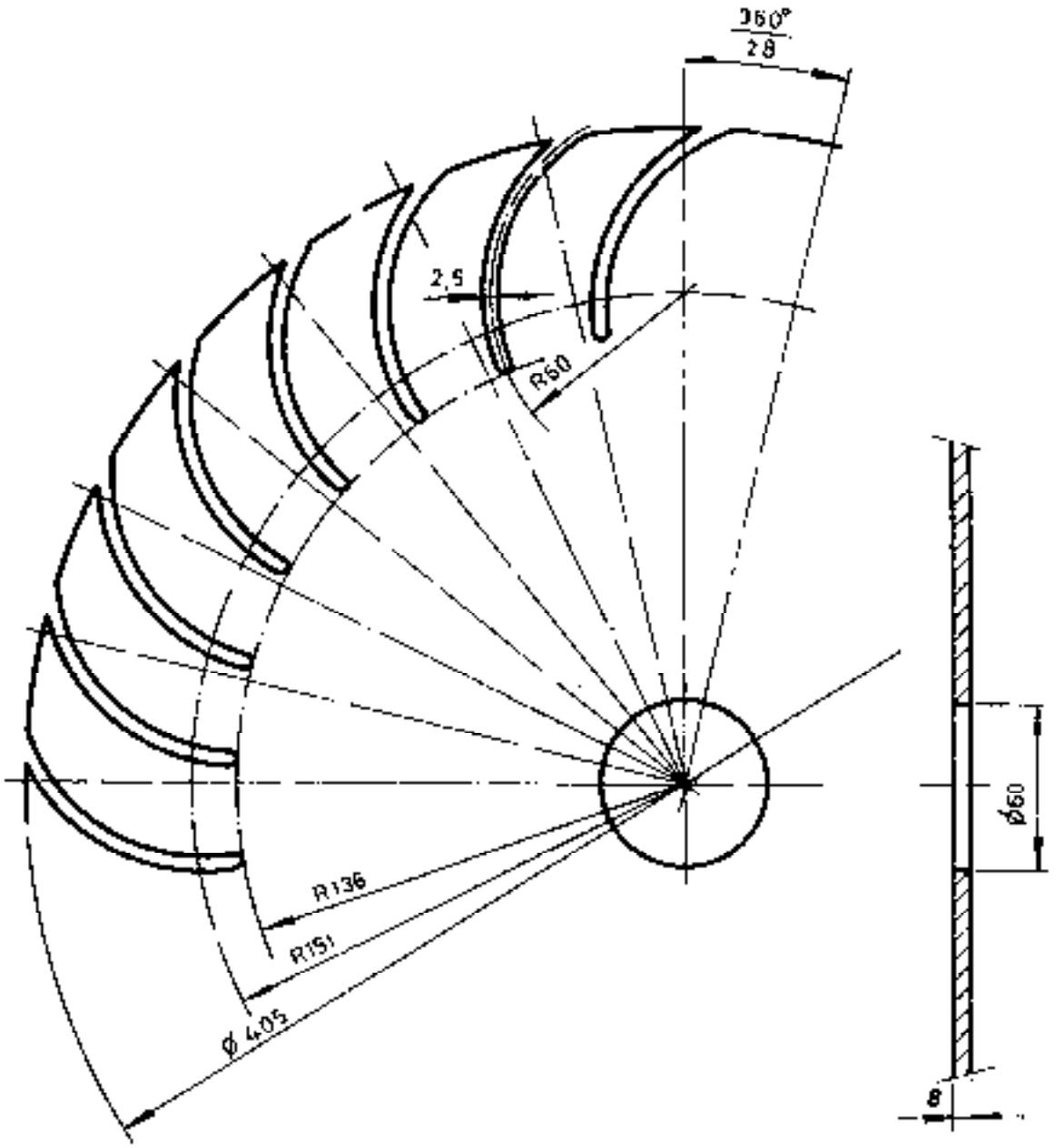


(PREMACHINED)

ROTOR SHAFT

T1-04,1

SCALE 1 : 2



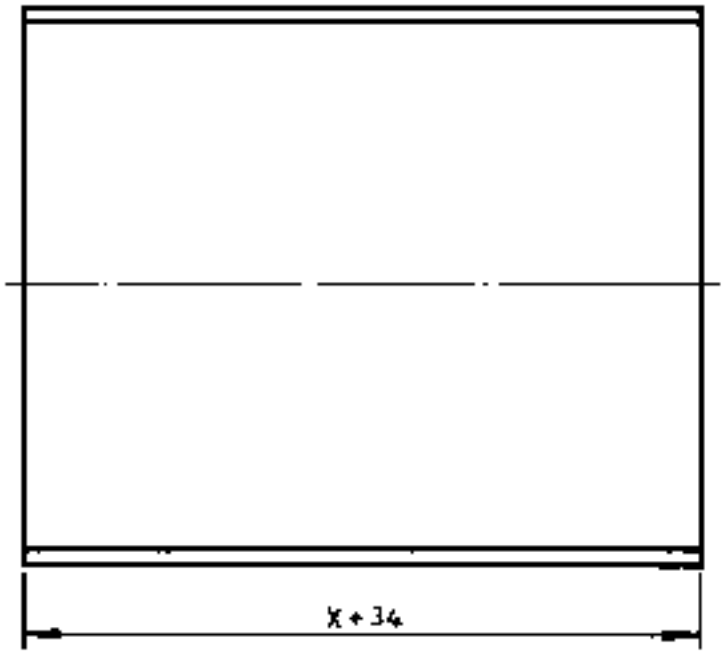
2 PCS

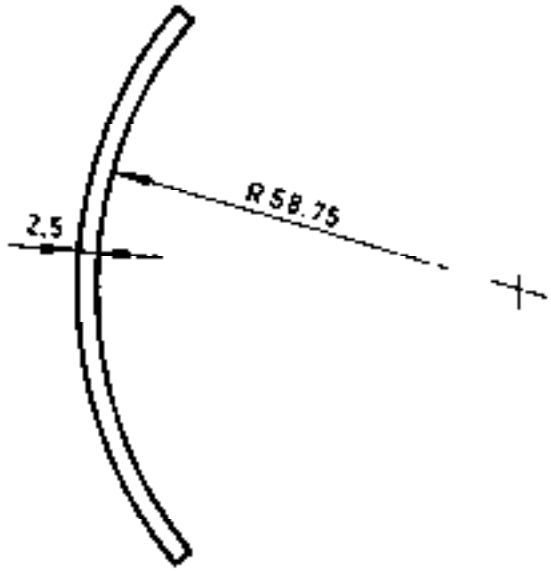
NOTE: $\frac{360^\circ}{28}$ ANGLE SHOULD BE MEASURED BY MILLING MACHINE

ROTOR DISK

T1-04.2

SCALE 1:2





STRAIGHT LENGTH = 84

EDGE PROFILE (2.5 : 1)

MAKE ON ONLY ONE EDGE OF THE BLADE.

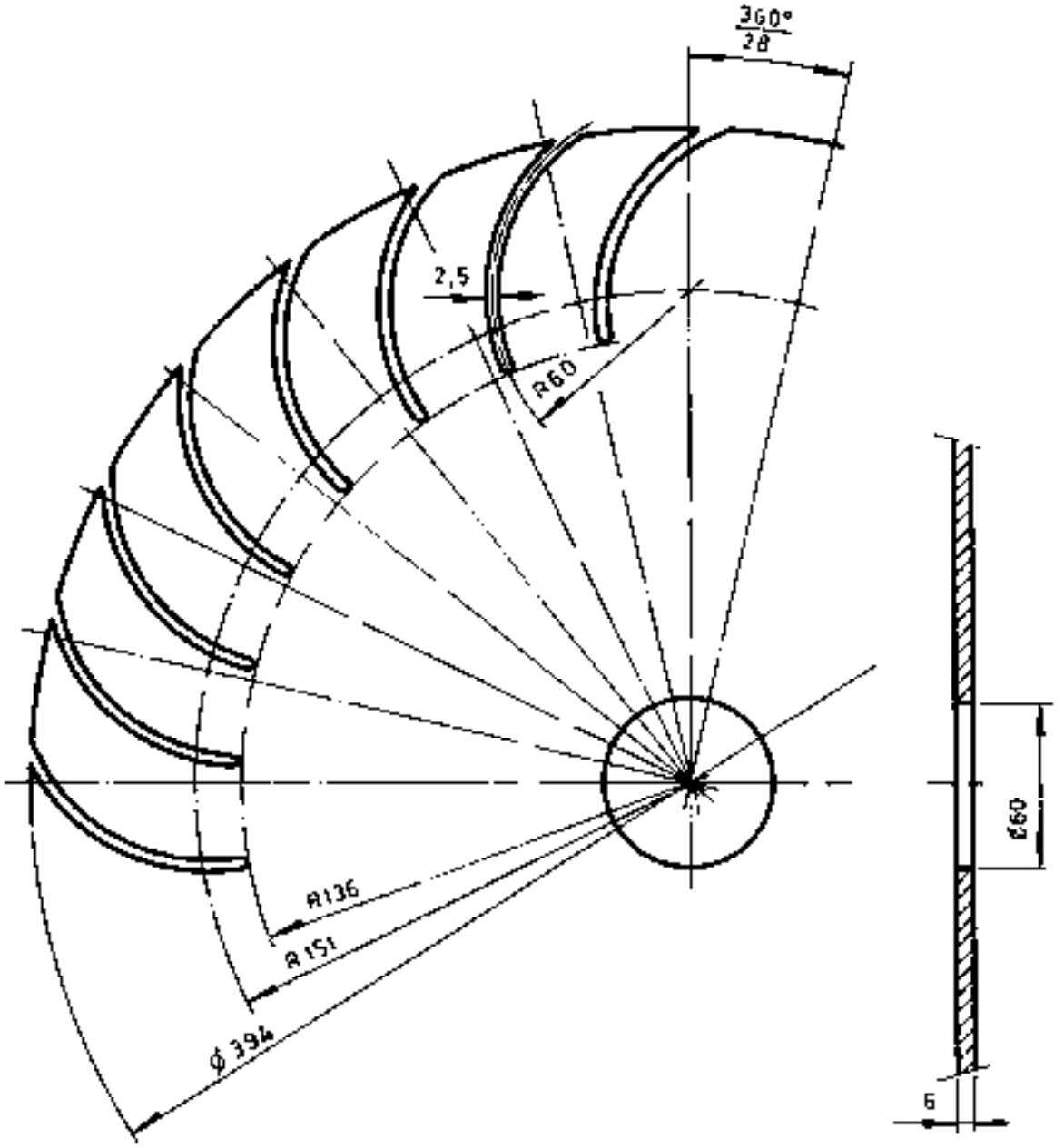
M.S SHEET
28 PCS

Revised 9 a 92 4'

ROTOR BLADE

T1-04,3

1:1 (2.5:1)



NOTE : $\frac{360°}{28}$ ANGLE SHOULD BE MEASURED BY MILLING MACHINE

USE ACCORDING TO STRENGTH REQUIREMENTS AS PER DIAGRAM.

ROTOR INTERMEDIATE DISK T1-04.4

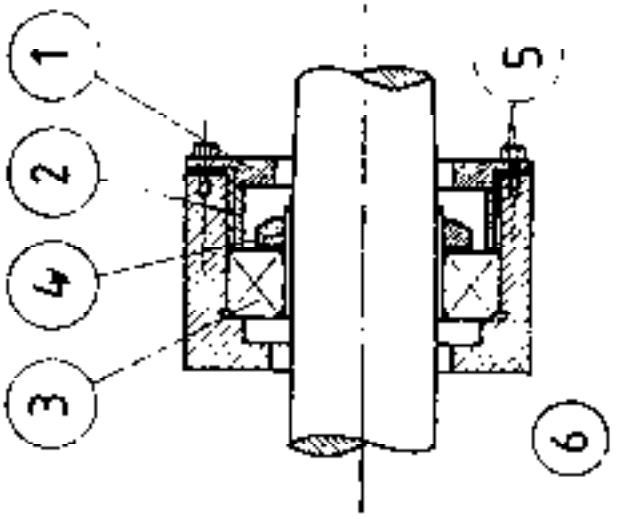
SCALE 1:2

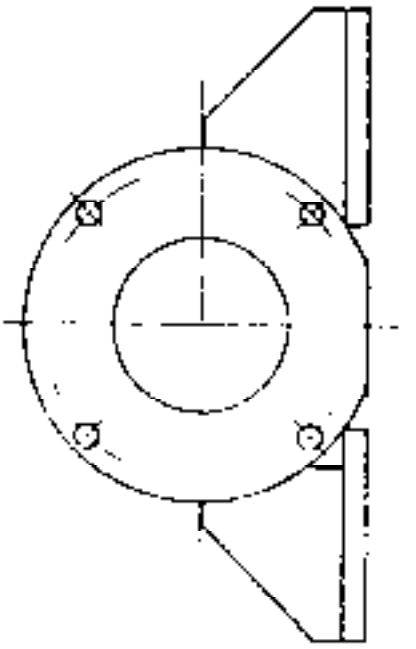
POS	NO OF ITEMS	ITEM	DRAWING NO	SPECIFICATIONS	REMARKS
1	2	BEARING HOUSING LID	[illegible]	M.S.R00 [illegible]	
2	1	SPACER RING	T1 05.2	BLACK PIPE [illegible]	
3	2	SELF ALIGNING ROLL.BEARING		FAG 22210	
4	2	MOUNTING SLEEVE		FAG KM10	
5	8	HEXAGON HEAD BOLT		W 1/2" x 5/8"	
6	2	BEARING HOUSING ASSEMBLY	T1 05.6		

CONSISTING OF

MAIN BEARING ASSEMBLY

PARTS LIST T1-05.0

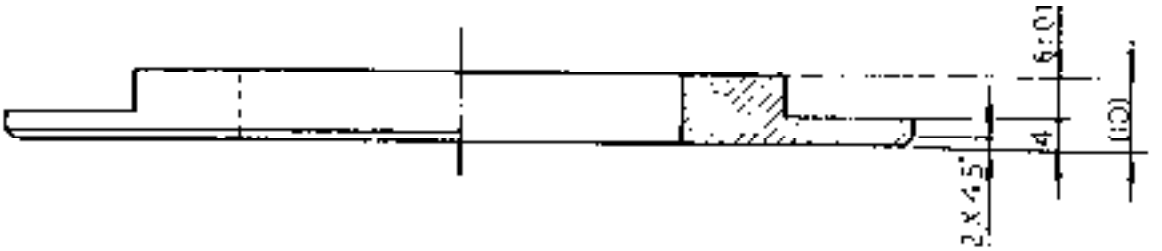


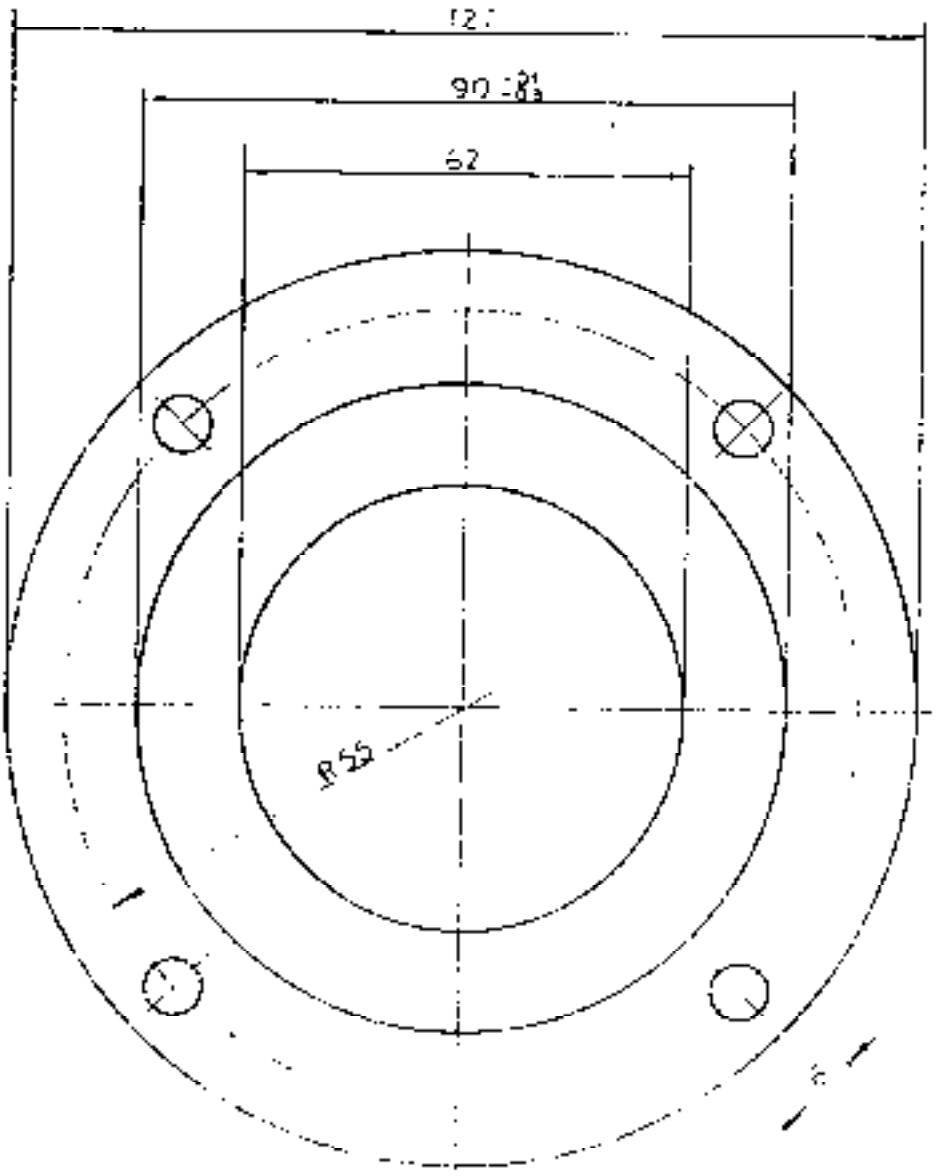


MAIN BEARING ASSEMBLY

T1-05 C

SCALE 1:2

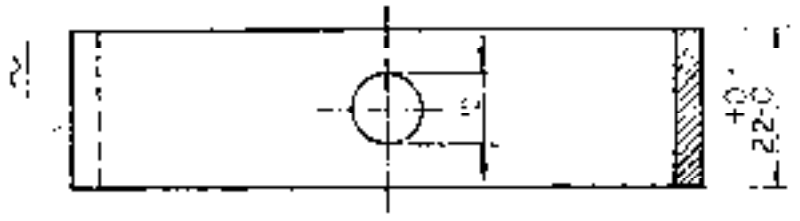


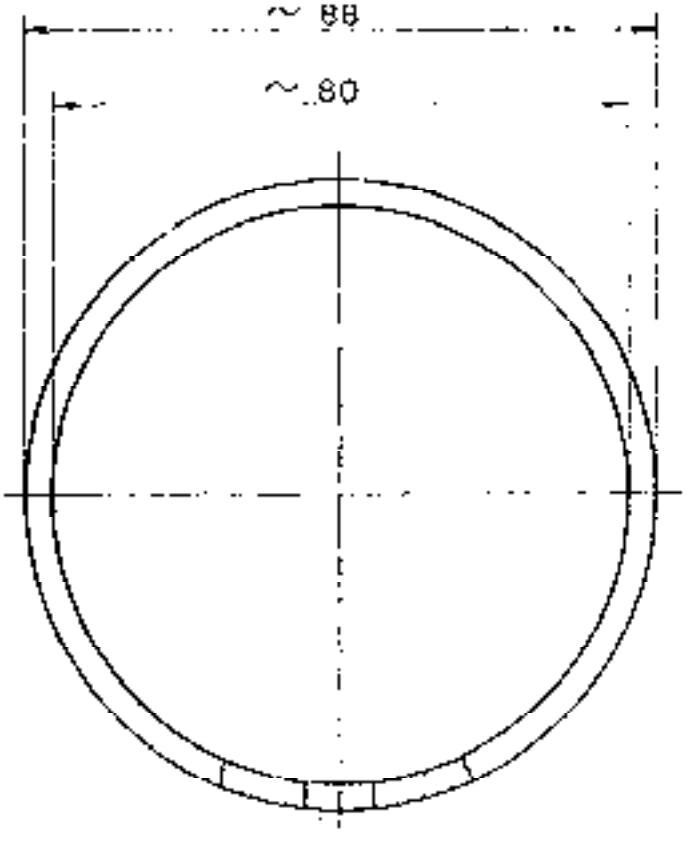


BEARING HOUSING LID

T1-05.1

SCALE 1:1





NO
BLACK PIPE

SPACER RING

T1--05.2

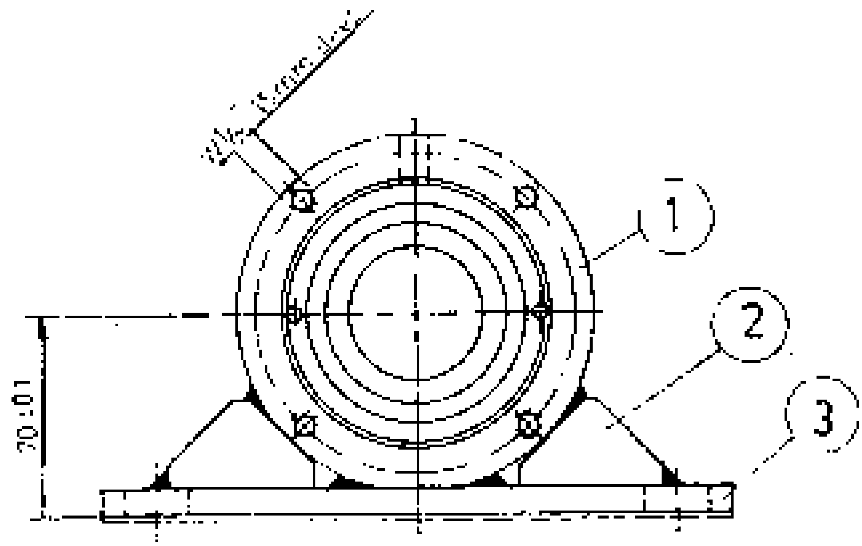
POS	NO. OF ITEMS	ITEM	DRAWING NO	SPECIFICATIONS	REMARKS
1	2	BEARING BODY	T1 - 05.6	MS Rod d 127	
2	8	BEARING BRACE	T1 - 05.2	MS Flat 6 X 50	
3	4	BEARING BASE	T1 - 05.3	MS Plate 12 X 75	

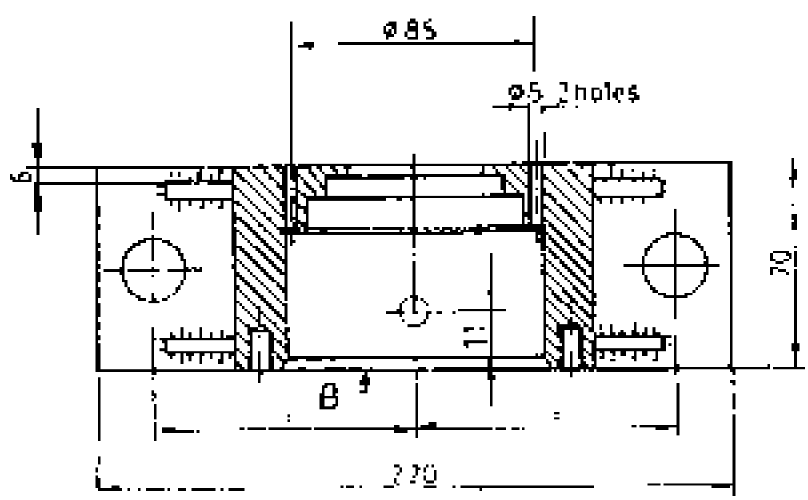
CONSISTING OF

MAIN BEARING HOUSING ASSEMBLY

PARTS LIST

T1-05.6

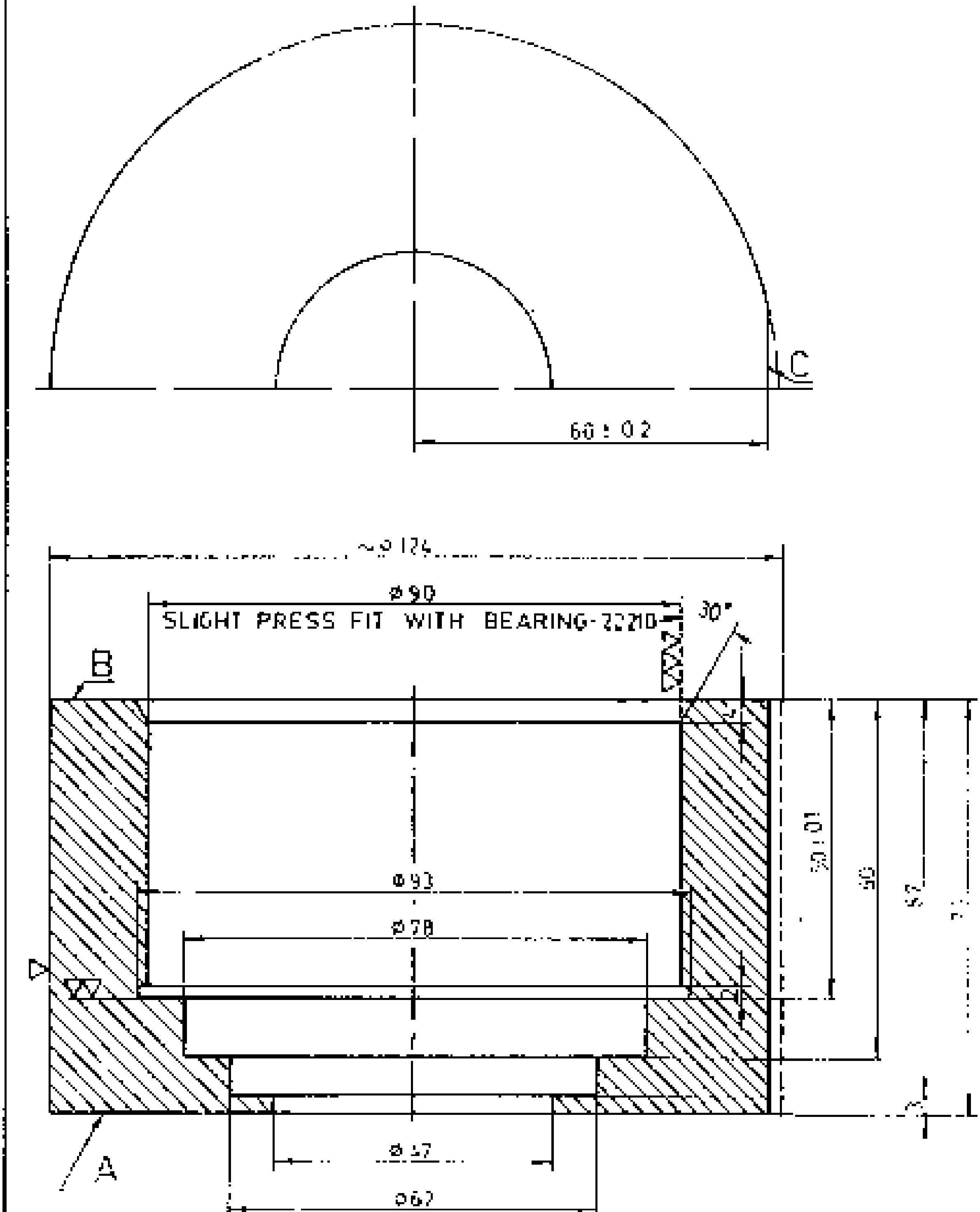




1 WELD THE BASE PLATE AND BRACES TO PART 05 6
2 MILL SUPPORTING SURFACE [illegible] TO SIDE B TO A CENTRE [illegible] OF 30 [illegible]
3 [illegible] ø5 [illegible] US [illegible]
[illegible]

BEARING HOUSING ASSEMBLY [illegible]

[illegible] 1:2.5



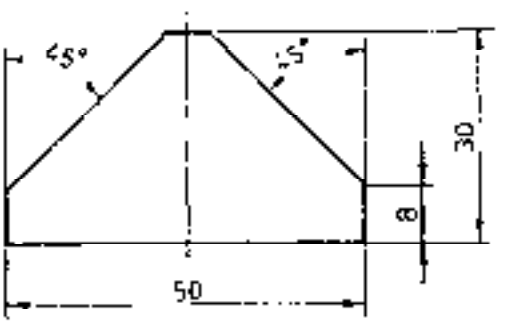
SEQUENCE

1. MACHINE [illegible] DIA AND SIDE A
2. RECLAMP [illegible] TO MACHINE FROM SIDE A
3. FACE [illegible] TO 70mm CENTRE BORE
4. BORE [illegible] DEPTH [illegible] ø90 TO [illegible]
5. MACHINE [illegible] B

BEARING BODY

T1 05.6/1

SCALE 1:1

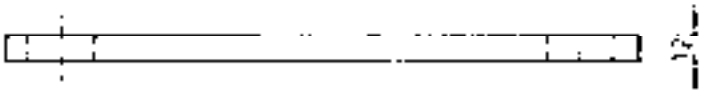


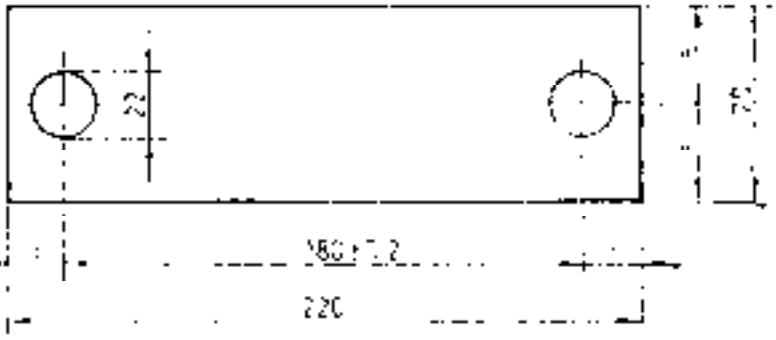
8-NOS
M.S FLAT 1/4"X 2"

BEARING BRACE

T1-05.6/2

SCALE 1 :





BEARING BASE

T1- 05.6/3

SCALE 1:2

POS	NO. OF ITEMS	ITEM	DRAWING NO.	SPECIFICATIONS	REMARKS
1	1	REGULATOR WING SHAFT	T1 - 06.1	M.S Rod ϕ 50	
2	1	REGULATOR WING CROSS BAR	T1 - 06.2	M.S.Plate 20mm	
3	2	REGULATOR WING ARM	T1 - 06.3	———	SUB. ASSEMBLY
4	1	REGULATOR WING BLADE	T1 - 06.4	———	
5	X	ROUND HEAD RIVET	T1 – 06.5	ϕ12 X 60	
*6	1	REINFORCING PLATE	T1 – 06.6	M.S.Plate 10mm	

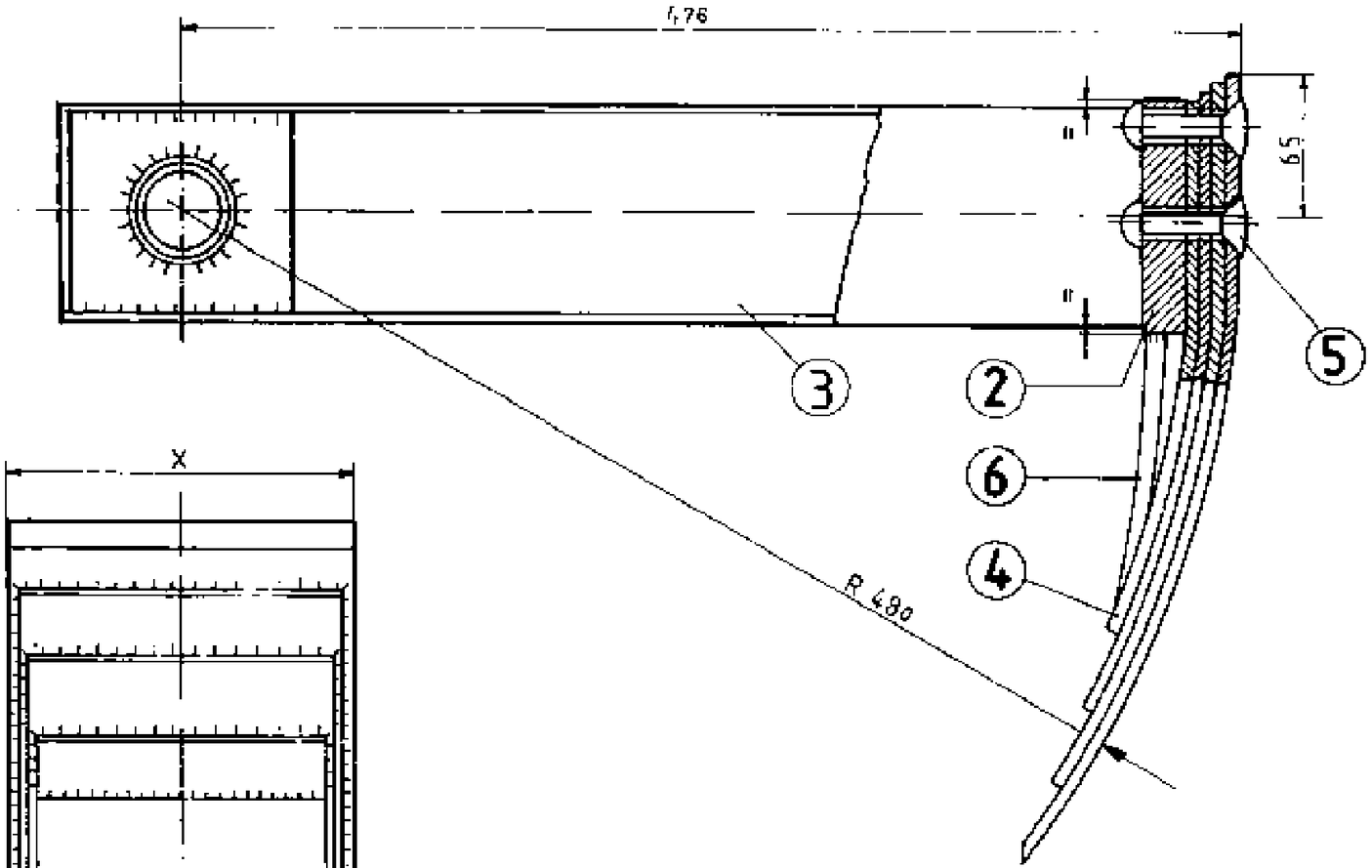
* ONLY REQUIRED FOR HEADS ABOVE 10 m.

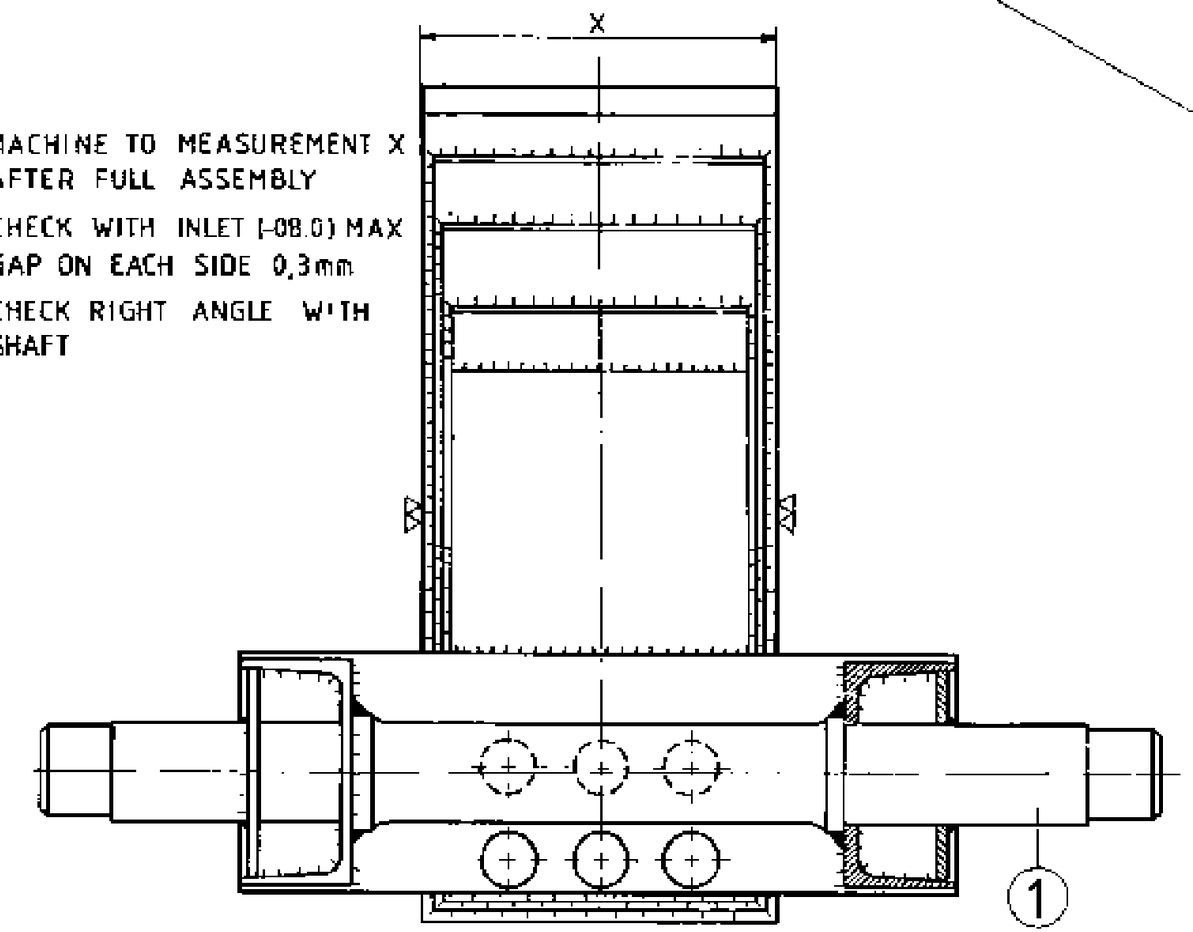
CONSISTING OF

REGULATOR WING ASSEMBLY

PARTS LIST

T1-06.0



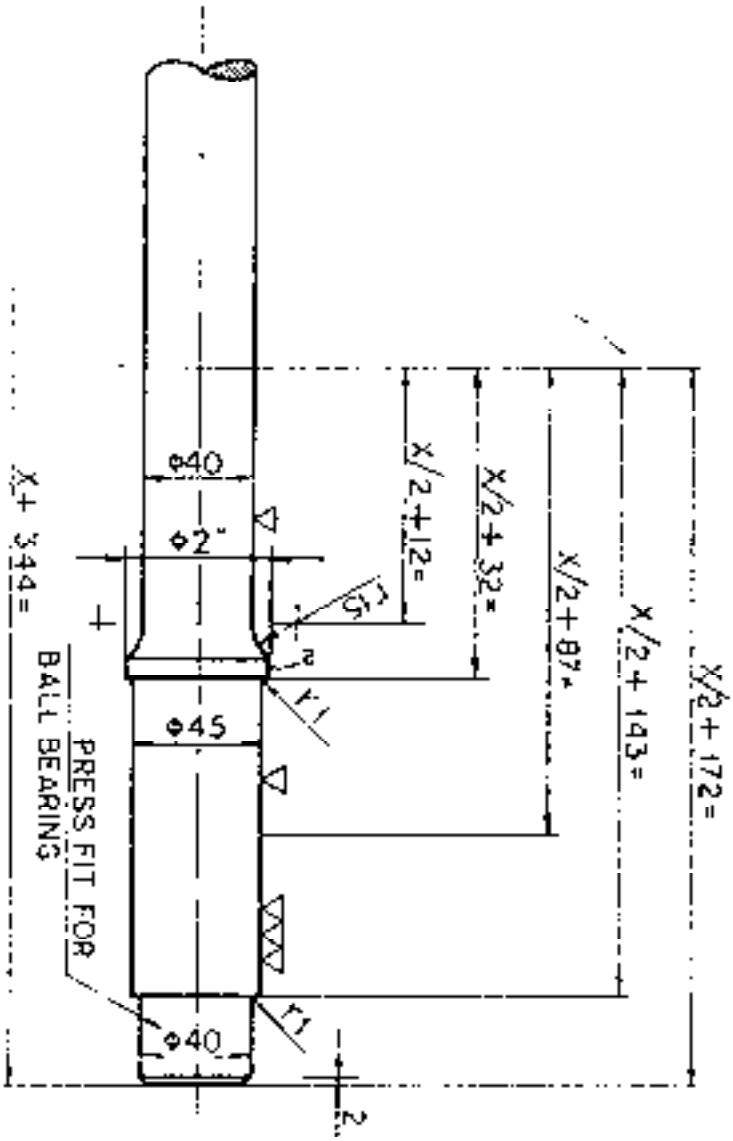


MACHINE TO MEASUREMENT X AFTER FULL ASSEMBLY

- CHECK WITH INLET (-08.0) MAX GAP ON EACH SIDE 0,3mm
- CHECK RIGHT ANGLE WITH SHAFT

REGULATOR WING ASSEMBLY T1-06.0

SCALE 1 : 25

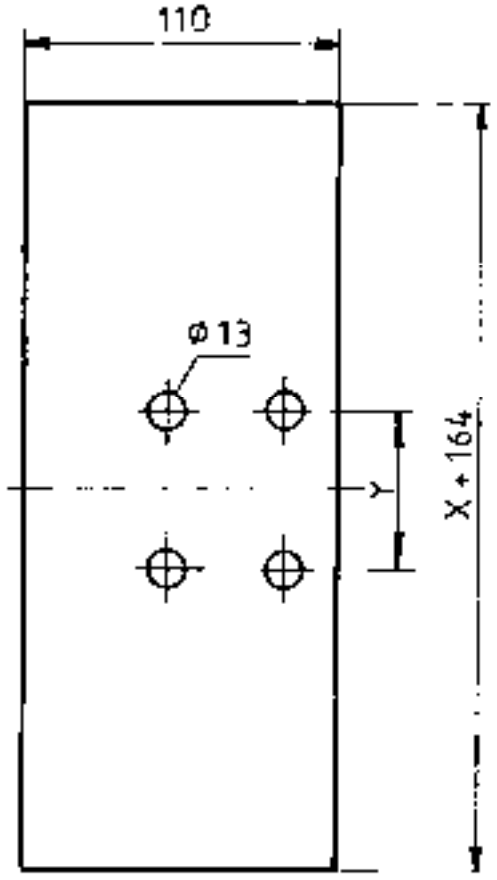


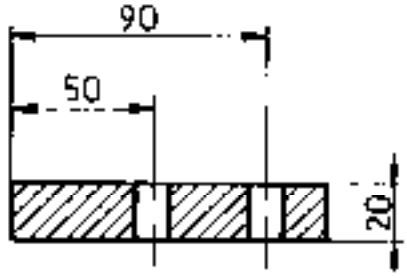
REGULATOR WING SHAFT

T1-06.1

SCALE 2:-

	X 70	X 100
Y	32	56

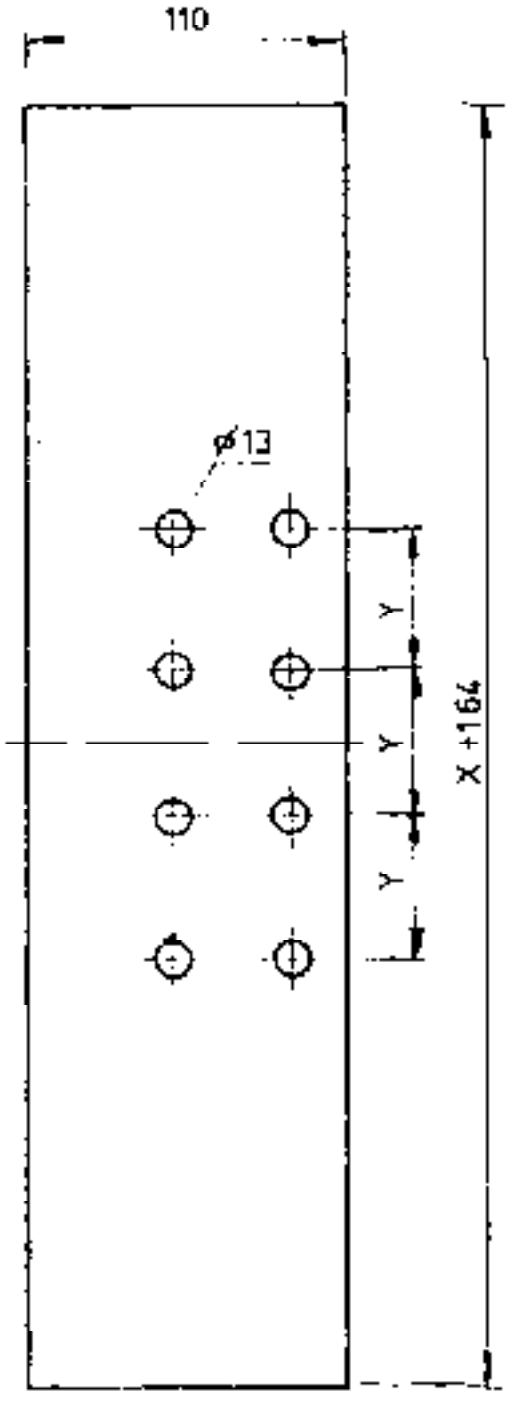


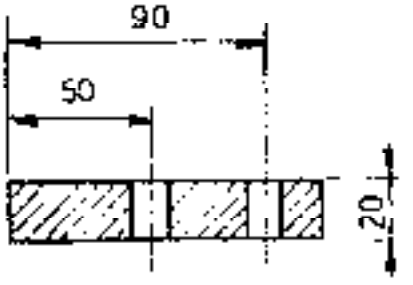


REGULATOR WING CROSS BAR
X 70 , X 100

T1 - 06.2/1

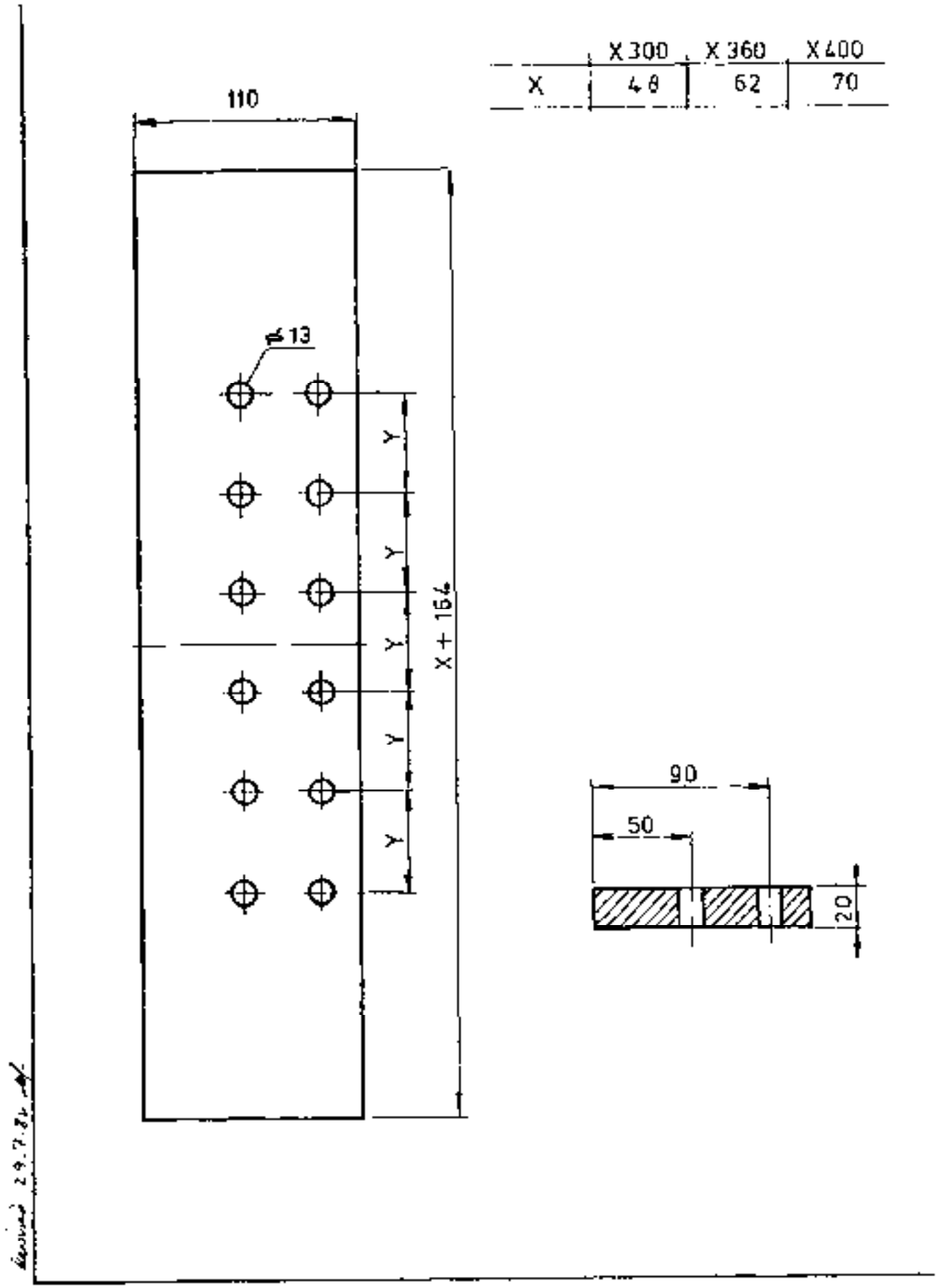
	X 150	X 180	X 200	X 220
Y	35	40	51	57





REGULATOR WING CROSS BAR
X 150, X 180, X 200 X 220

T1-06.2/2



REGULATOR WING CROSS BAR
X 300, X360, X 400

T1-06.2/3

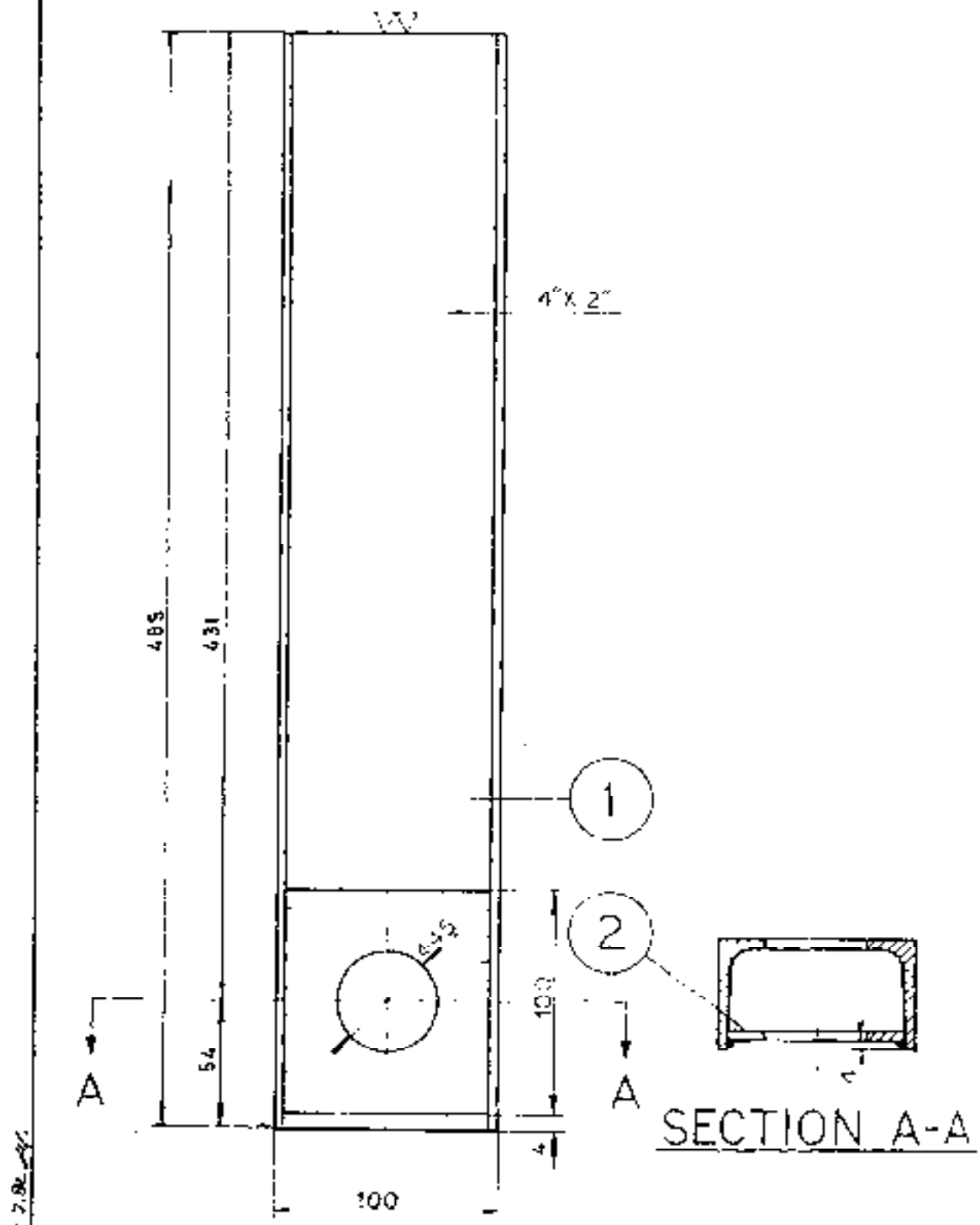
POS	NO. OF ITEMS	ITEM	DRAWING NO.	SPECIFICATIONS	REMARKS
1	2	M S U. CHANNEL LENGTH 485	T1-05 3	100x50 x 6	A4
2	2	M.S. PLATE	T1-06.3	100 x 85	A4

CONSISTING OF

REGULATOR WING ARM

PARTS LIST

T1-06.3



REGULATOR WING ARM

Ti-063

SCALE 1:2

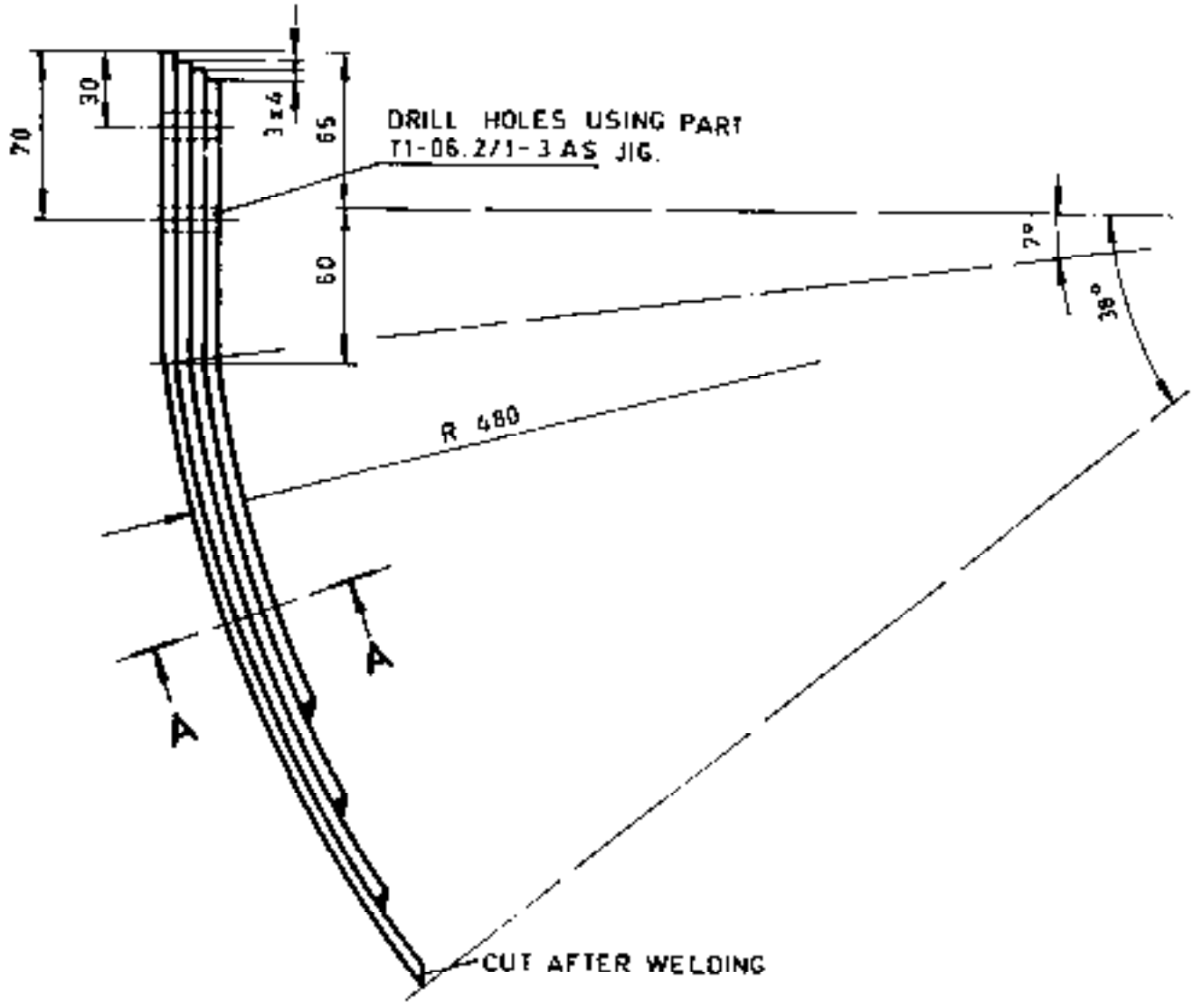
POS	NO OF ITEMS	ITEM	DRAWING	SPECIFICATIONS	REMARKS
1	1	M S PLATE 6mm	T1-06.4	(X-5)X 394	A4
2	1	" " "	"	(X-81)X 346	"
3	1	" " "	"	(X-161)X 298	"
4	1	" " "	"	(X-24)X 243	"

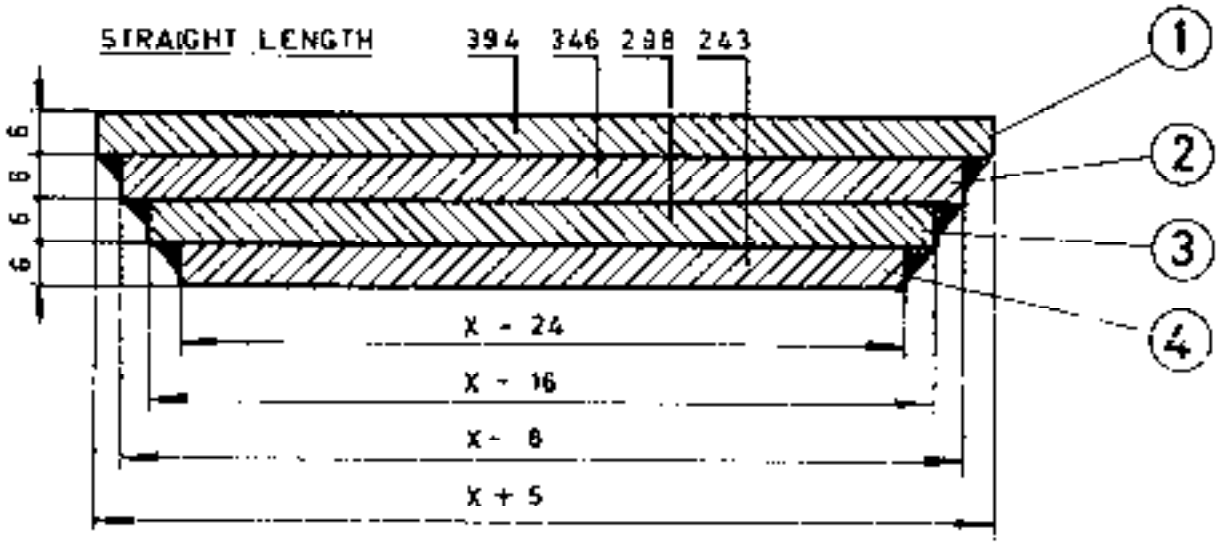
CONSISTING OF

REGULATOR WING

PARTS LIST

T1-06.4





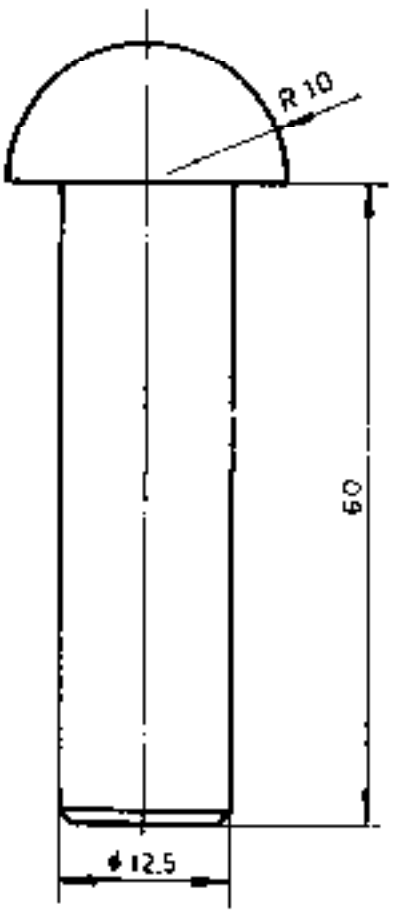
SECTION A–A (1 : 1)

1 PC

REGULATOR WING

T1-06.4

1:2.5 (1:1)

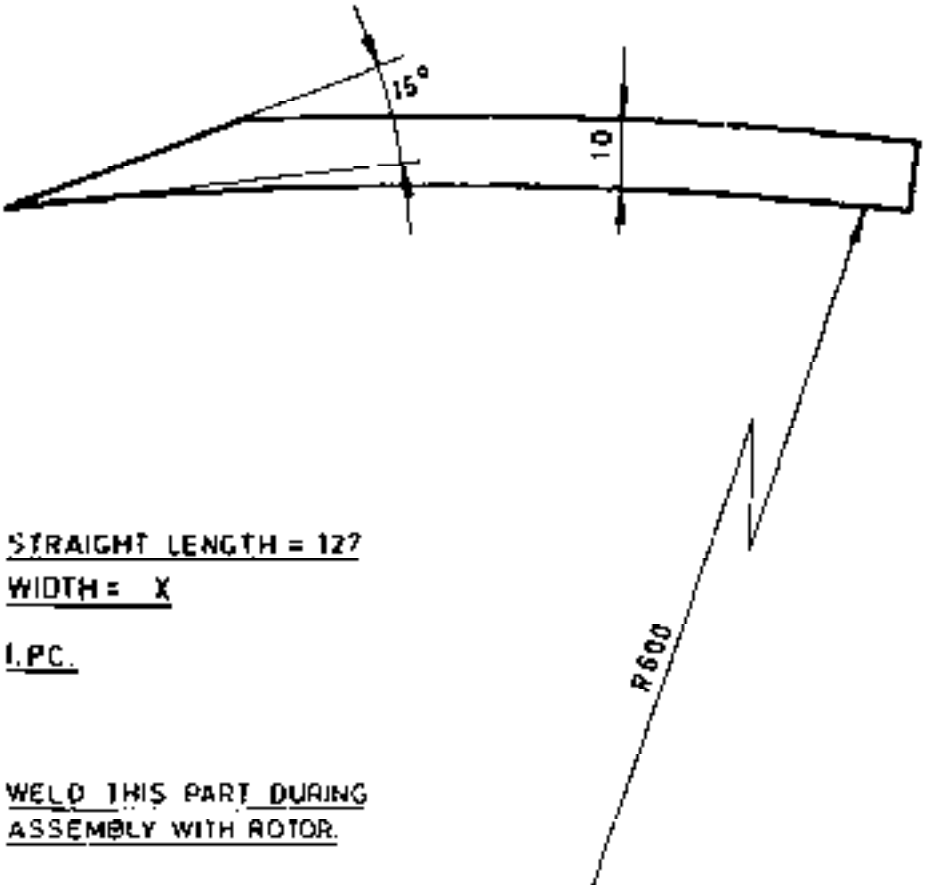


X 70	X100	X 150	X180	X 200	X 220	X 300	X 360	X 400
4	4	8	8	8	8	12	12	12

HALF ROUND HEAD RIVET

T1-06,5

2 : 1



STRAIGHT LENGTH = 127

WIDTH = X

1 PC.

WELD THIS PART DURING ASSEMBLY WITH ROTOR.

REINFORCING PLATE

T1-06,6

1:1

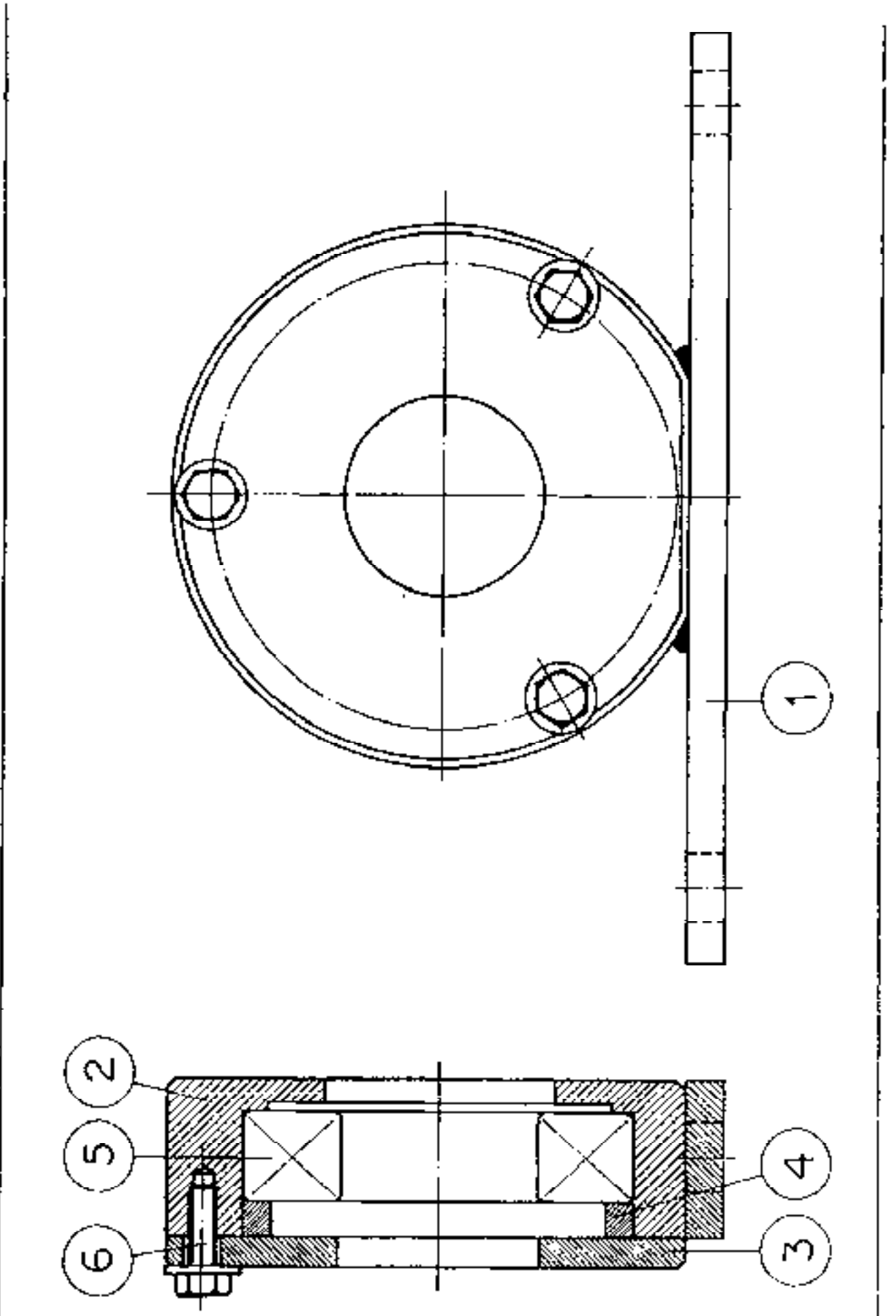
POS	NO OF ITEMS	ITEM	DRAWING NO	SPECIFICATIONS	REMARKS
1	2	HOUSING BASE PLATE	T1-07.1	M.S Flat 8 X 35	
2	2	BEARING HOUSING	T1.07.2	M.S Rod ϕ 115	
3	2	HOUSING LID	T1-07.3	M.S. Rod ϕ 115	
4	1	SPACER RING	T1-07.4	Black pipe 75	
5	2	BALL BEARING		SKF 6280	
6	6	HEXAGONAL BOLT		W1/4"X5/8"	

CONSISTING OF

R.W. BEARING HOUSING ASSEMBLY

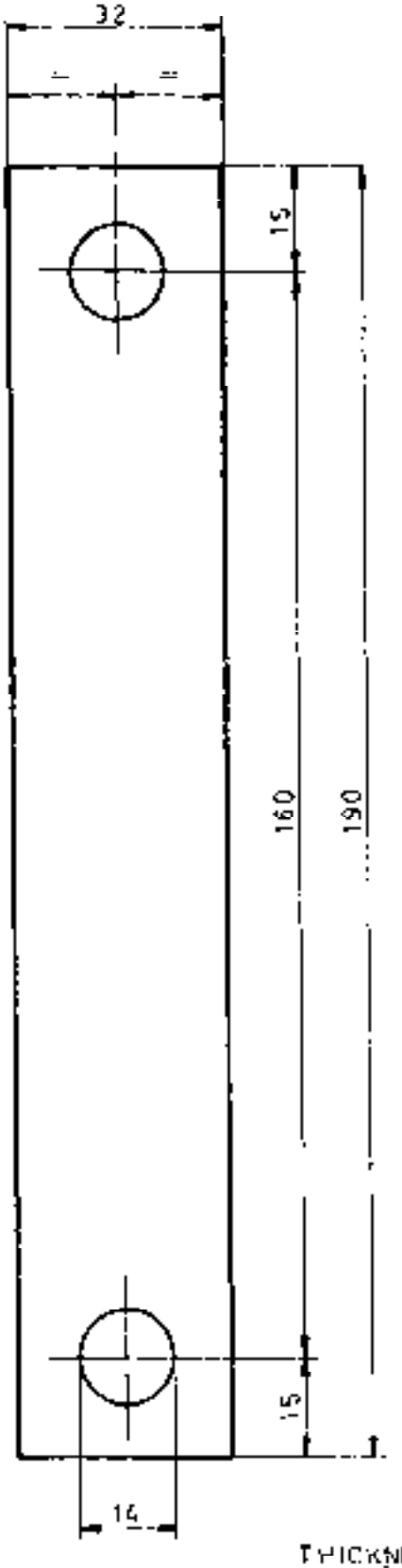
PARTS LIST

T1-07.0



R.W.BEARING HOUSING ASSEMBLY T1-07.0

SCALE 1:1



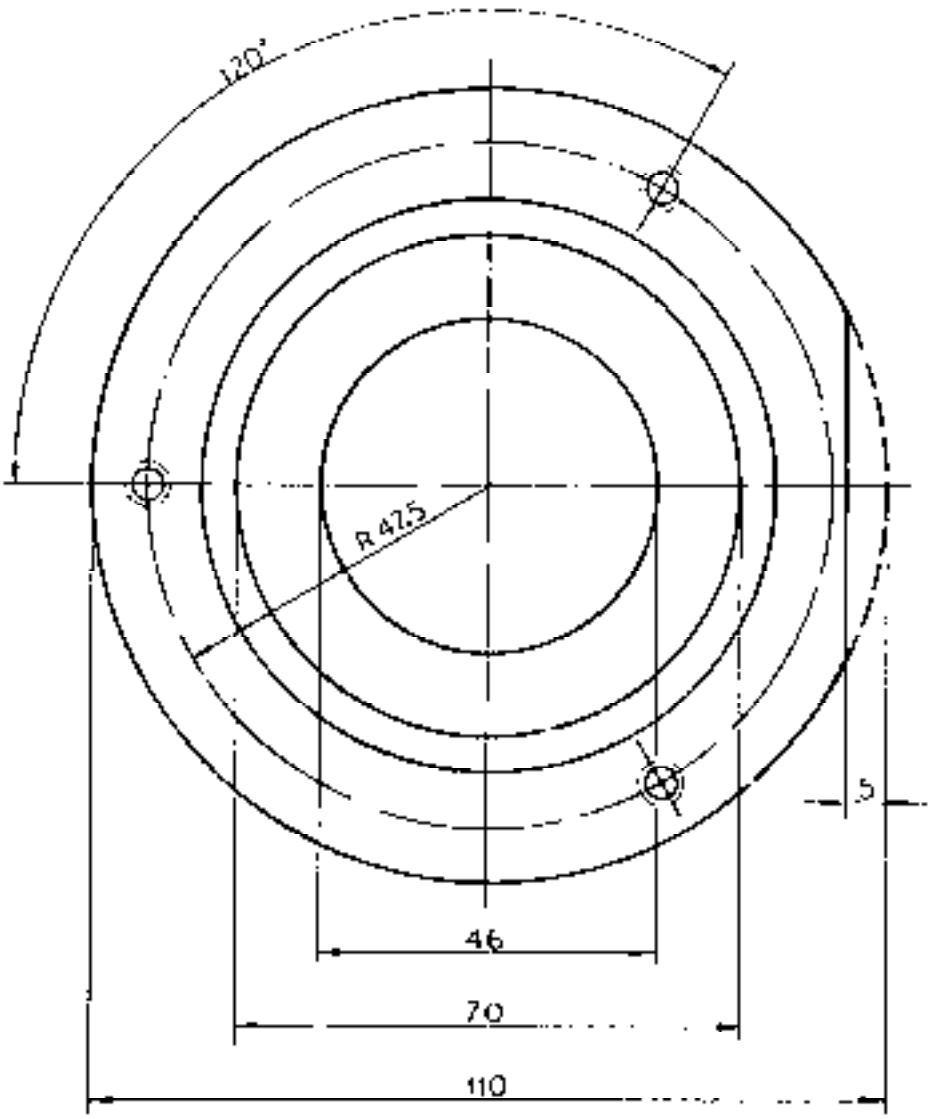
THICKNESS 8 MM

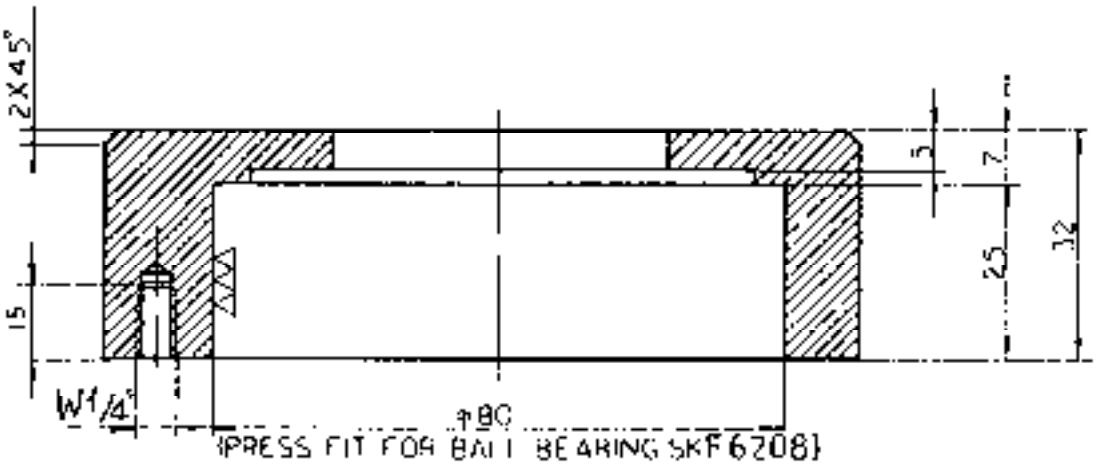
2 PIECES

HOUSING BASE PLATE

T1-07.1

SCALE 1:1



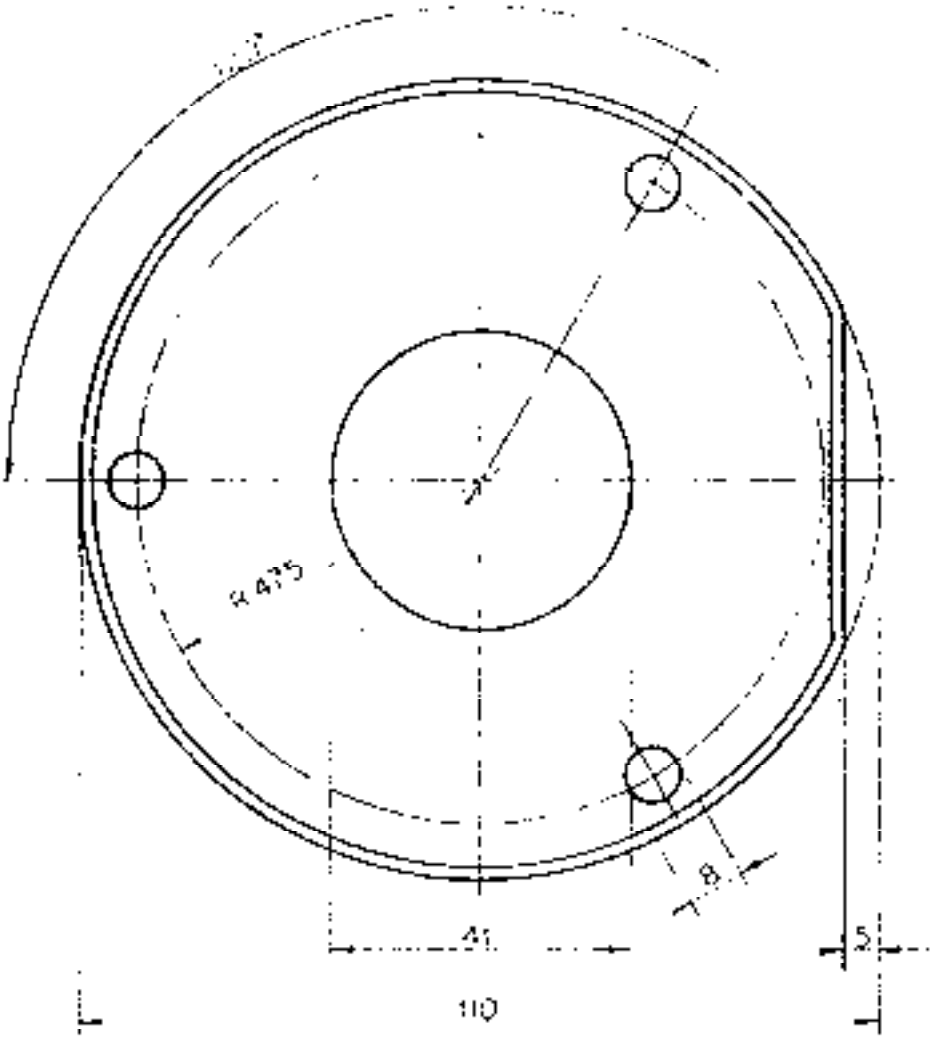


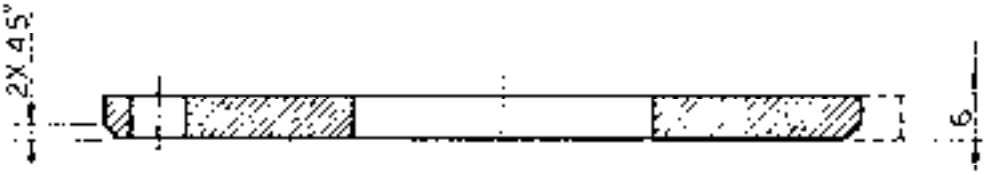
2 PIECES

BEARING HOUSING

T1-072

SCALE 1:1





HOUSING LID

T1-07.3

SPACER RING

T1--074

POS	NOOF ITEMS	ITEM	DRAWING NO.	SPECIFICATIONS	REMARKS
1	1	INLET BOTTOM GUIDE	T1-08.1	MS.PLATE 6MM	
2	1	INLET TOP GUIDE	T1-08 2	MS.PLATE 6MM	
3	2	INLET SIDE PANEL	T1-08.3	MS.PLATE 6MM	
4	2	COVER SHEET FRAME 'A'	T1-08.4	MS SHEET/STRIP	
5	2	COVER SHEET FRAME 'B'	T1-08.5	MS.SHEET/STRIP	
6	1	STRENGTHENING ANGLE	T1-08,6	MS.ANGLE (64x64) 2 1/2" x 2 1/2"	
7	1	SEALING FLAP	T1-08,7	MS.SHEET 3MM	
8	2	SEALING STRIP	T1-08,8	MS.SHEET 3MM	
9	X	INLET CENTRE RIB	T1-08.9	M.S SHEET 6MM	
10	1	INLET SQUARE FLANGE	T1-08.10	MS FLAT 40 x 10	SUB.ASSEMBLY
11		HEX.NUT	T1-08,11	W3/8"	SEE PART LIST T1-13.0 FOR NOS OF NUTS REQUIRED.

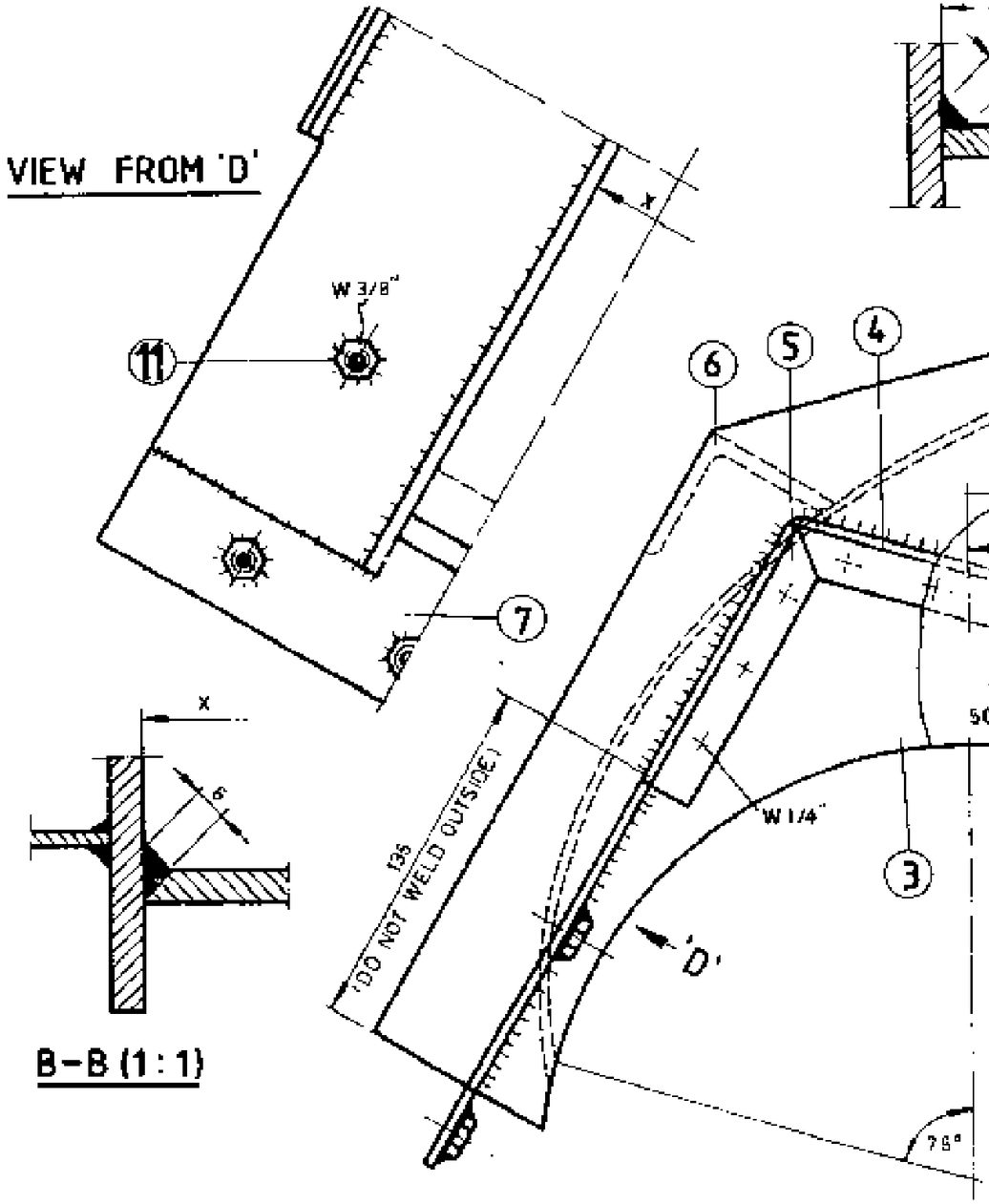
* ONLY REQUIRED FOR TYPES X220.300.360.400 FOR TYPE 200 WITH HEAD ABOVE 8M AND FOR TYPE 180 WITH HEAD ABOVE 11M.

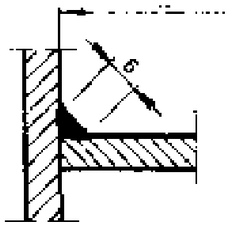
CONSISTING OF

PARTS LIST

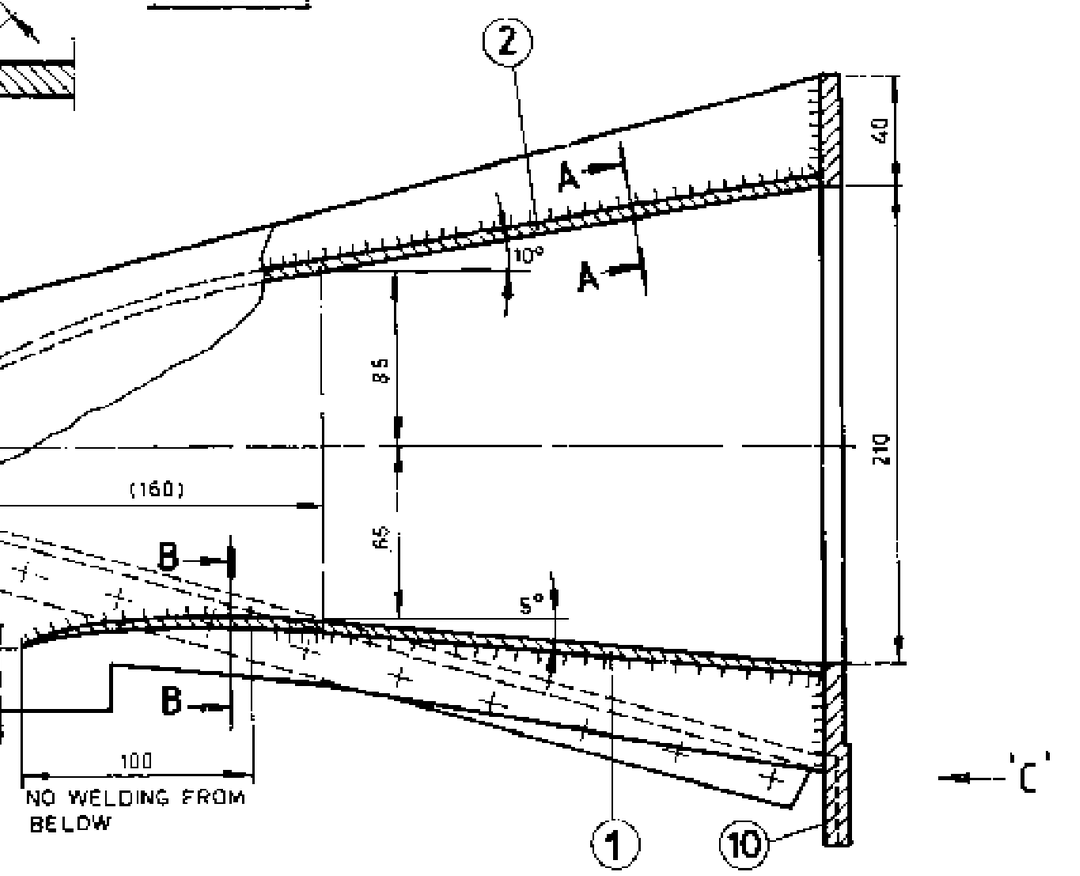
INLET ASSEMBLY

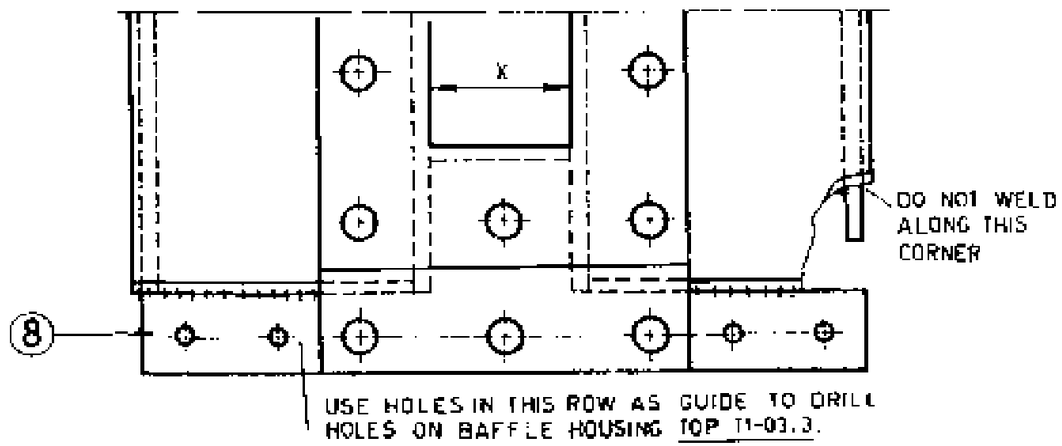
T1-08,0





A-A (1:1)





TO WELD W 3/8" NUT (POS.11)

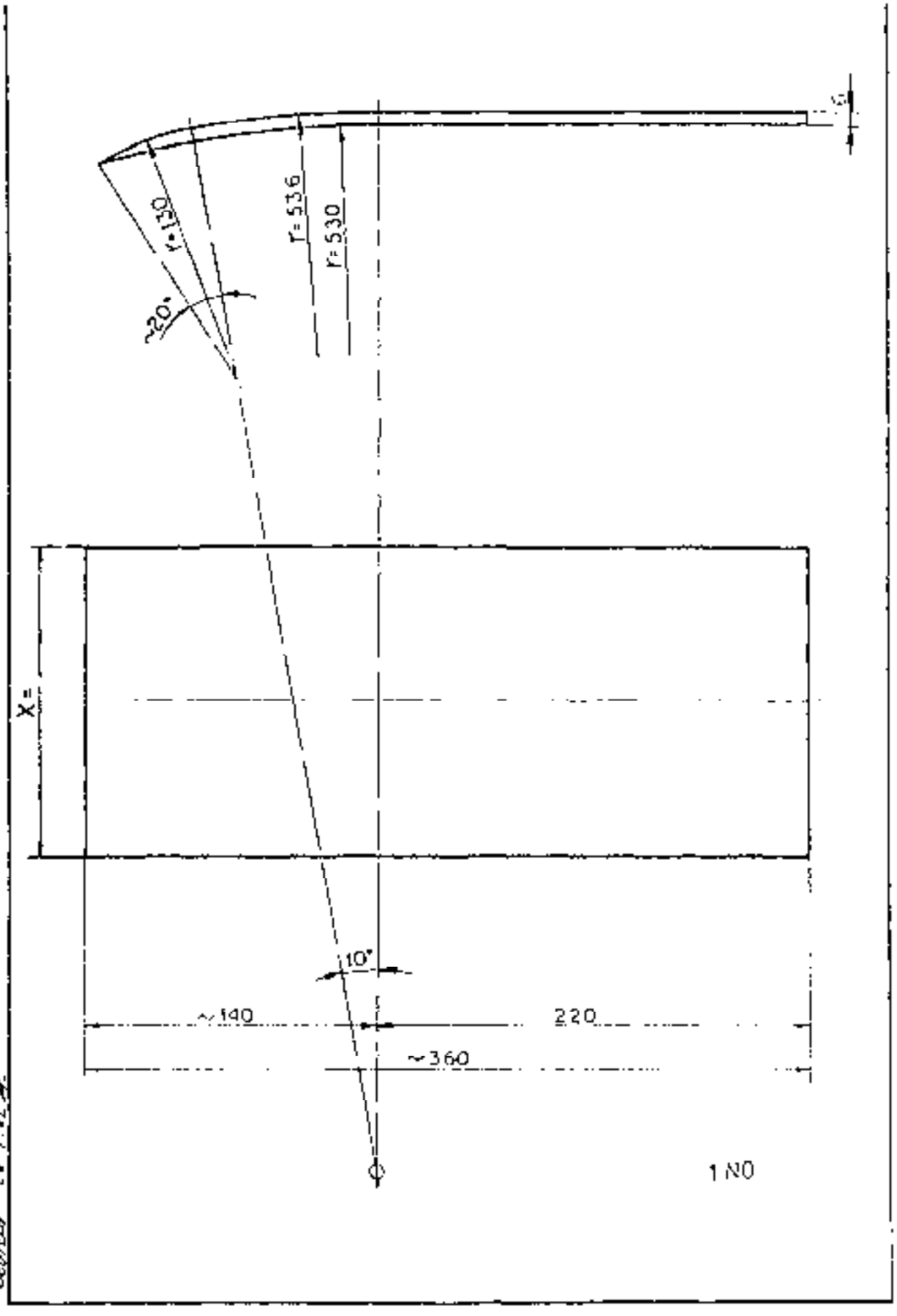
ASSEMBLE INLETASSEMBLY IN POSITION WITH SUPPORT ASSEMBLY T1-02.0 .USE HOLES IN SUPPORT FRONT T1-02.2 AS GUIDE.DRILL HOLE THROUGH RESPECTIVE SHEET.INSERT BOLTS OR A PIECE OF ROD.MOUNT NUT. SELECT POSITION. WELD NUTS.

WELD POS. 7-5-4-1
DURING FINAL ASSEMBLY.

INLET ASSEMBLY

T1-08,0

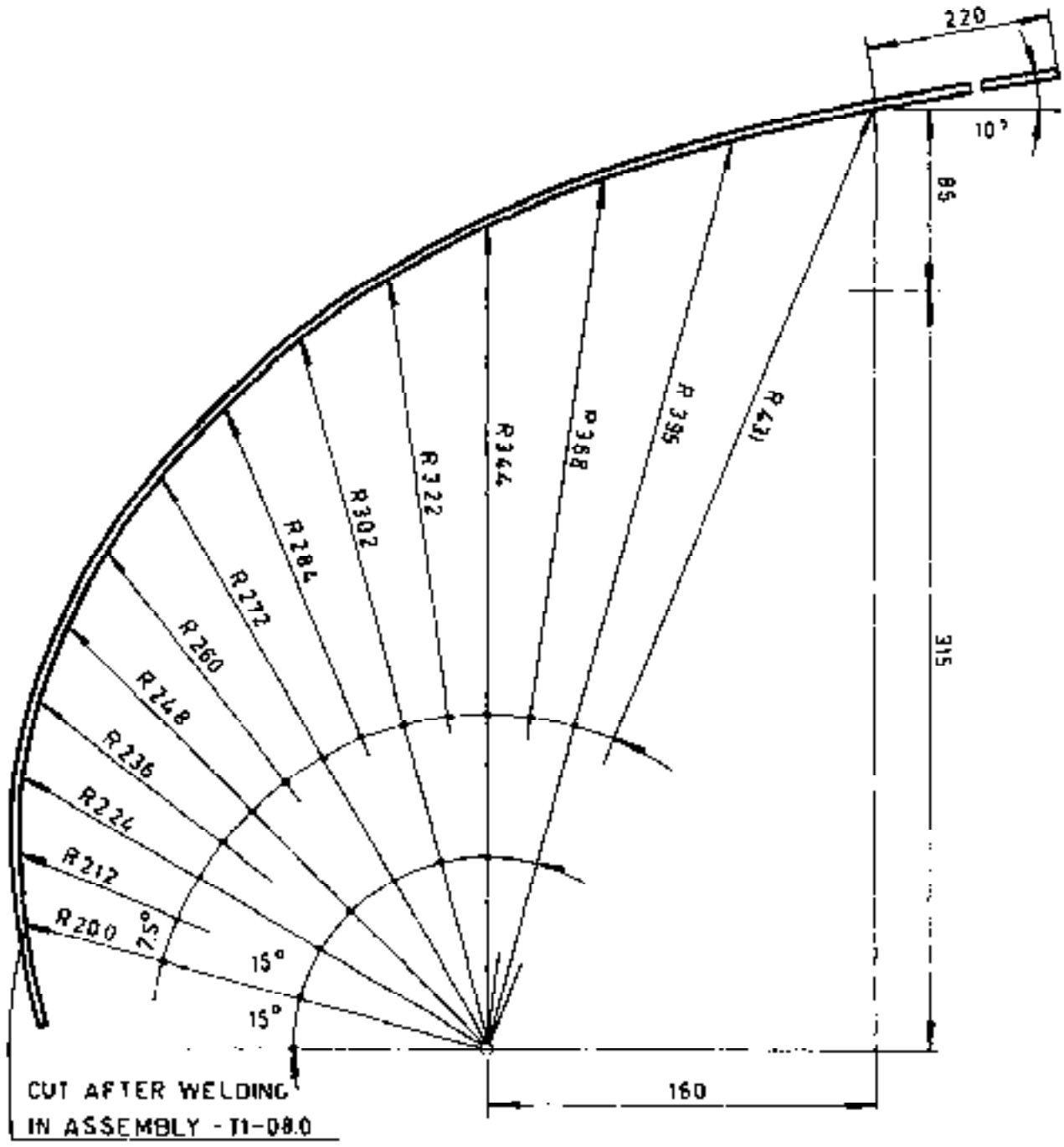
1:2.5



INLET BOTTOM GUIDE

T1-08,1

SCALE 1 2.5



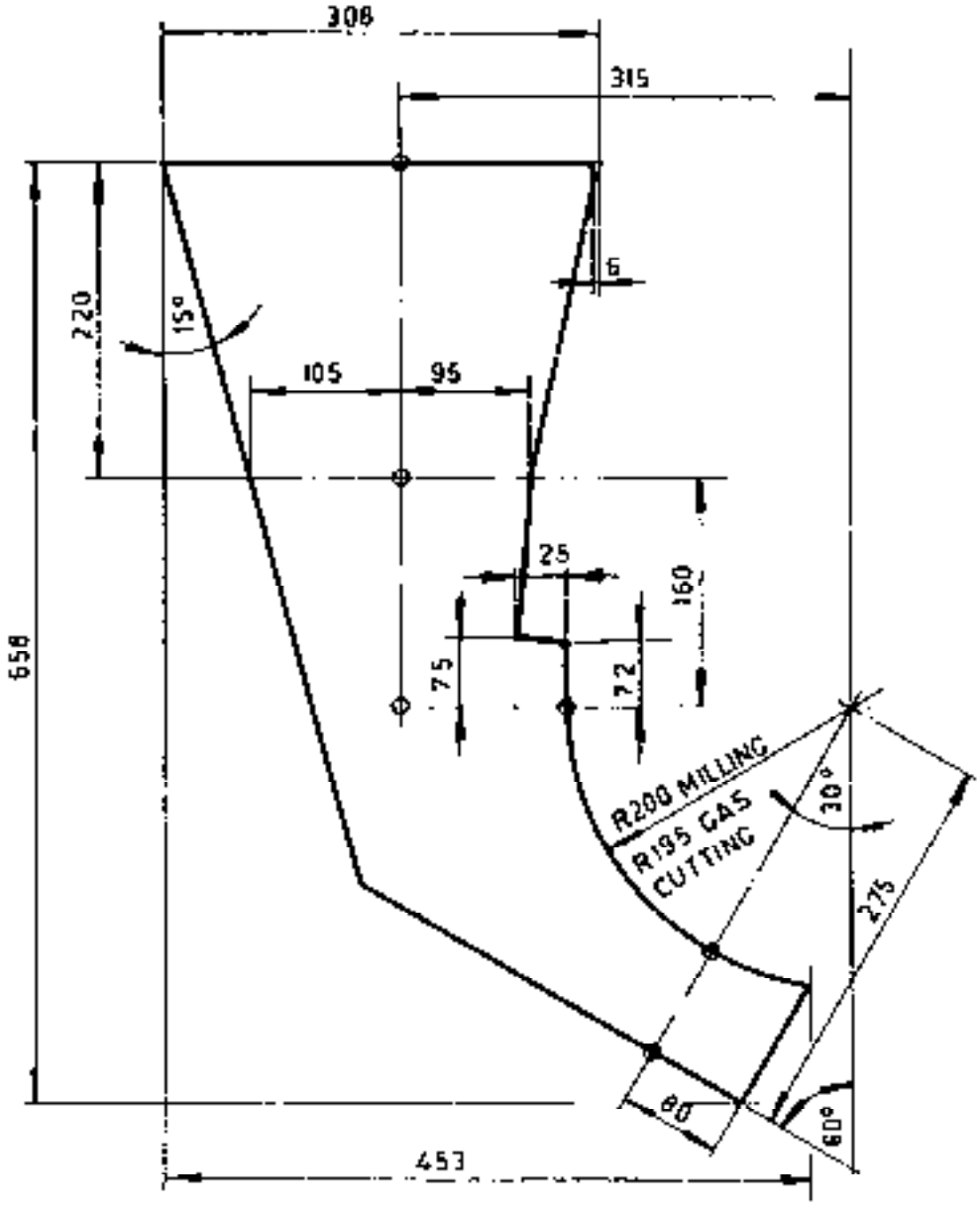
6MM MS. PLATE
WIDTH = X
STRAIGHT LENGTH : 820
1. PC

Revised 28.7.81

INLET TOP GUIDE

T1-08,2

1.2,5



POINTS AND SYM-LINE
MUST BE VISIBLE ON THE PLATE.

6 MM MS PLATE

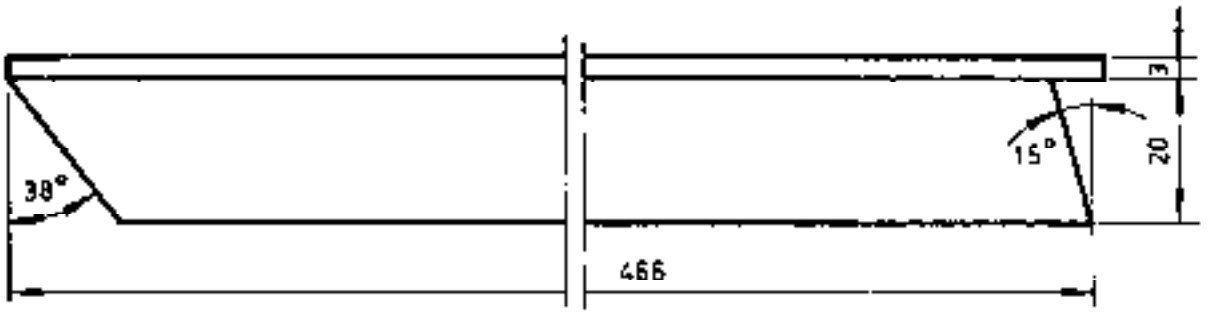
2 PCS

Revised 28.2.82 MC

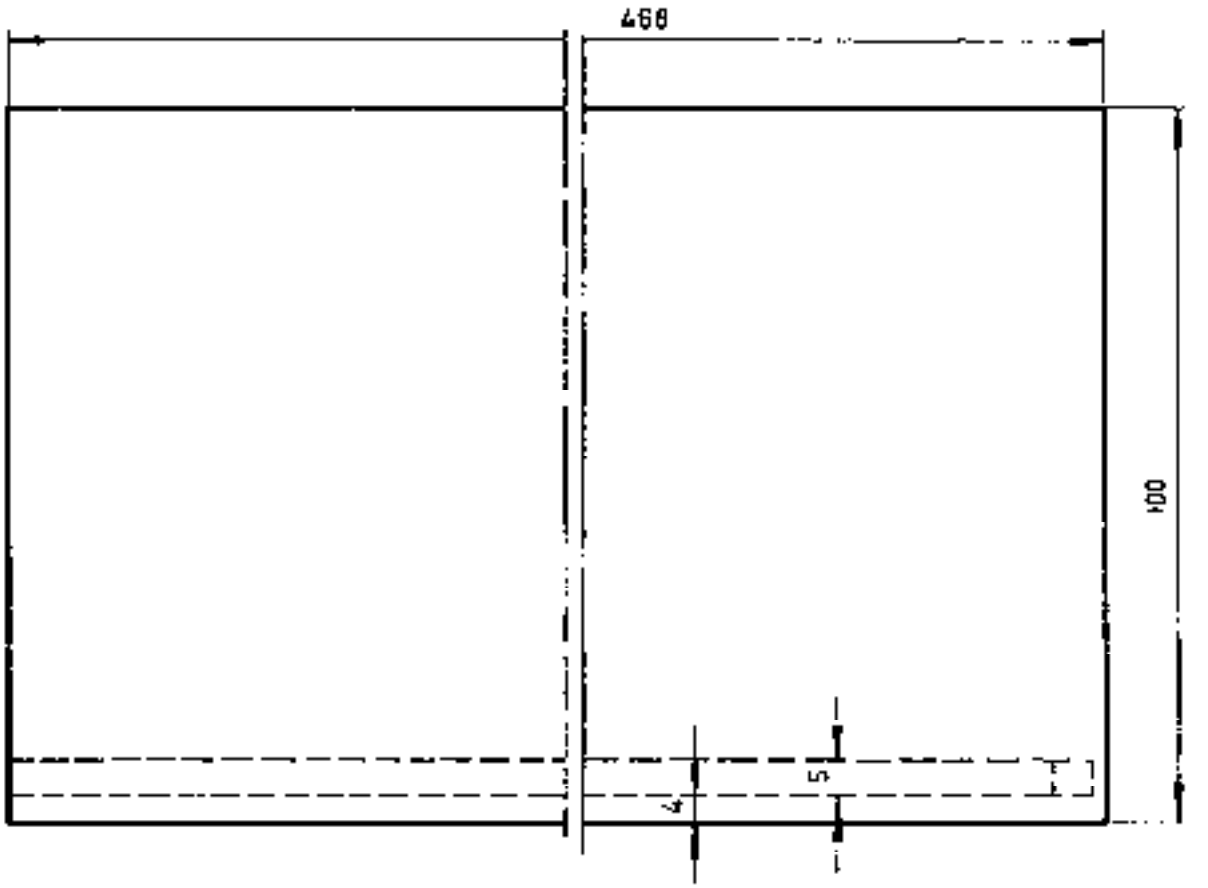
INLET SIDE PANEL

T1-08.3

1:5



2 PCS



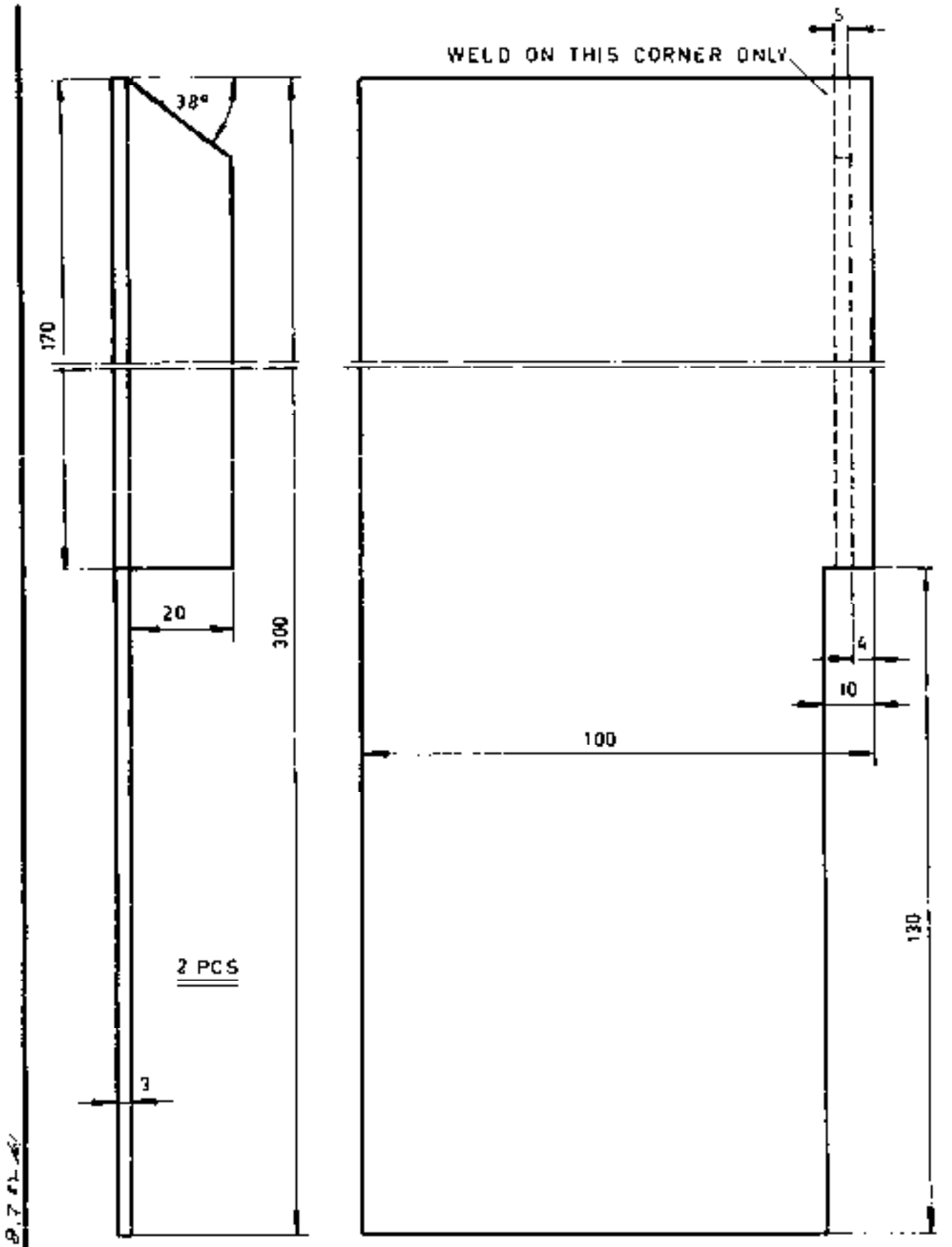
—MAKE ONE SET AS PER DRAWING

—ON THE NEXT SET, WELD 466 x 20 x 5 FLAT ON THE SAME SURFACE BUT NEAR OTHER EDGE. LEAVE MARGIN OF 4MM AS SHOWN

Revised 28.7.11.4

COVER SHEET FRAME 'A'

T1-08,4

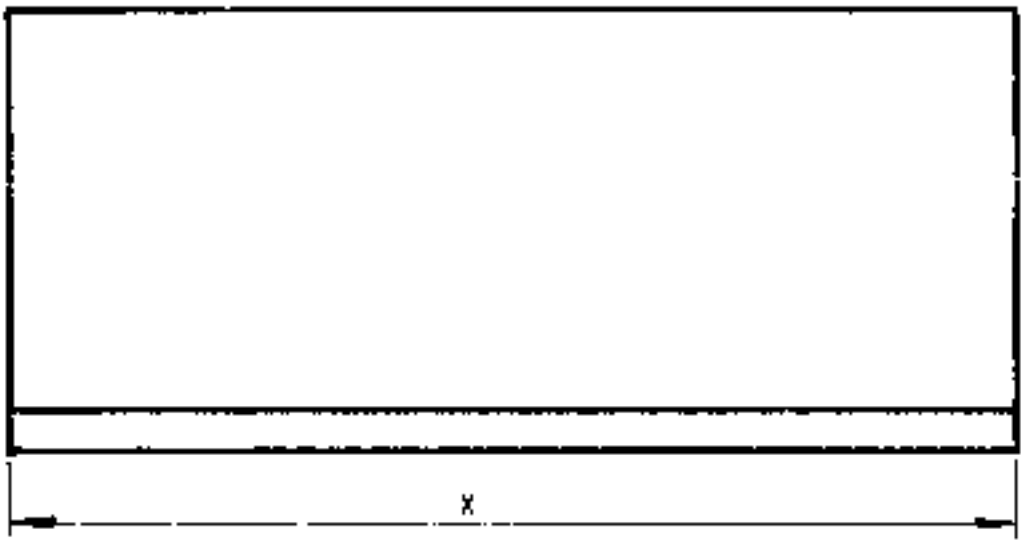


— MAKE ONE SET AS PER DRAWING AND SECOND SET MIRROR INVERTED.

COVER SHEET FRAME 'B'

T1-08,5

1:1

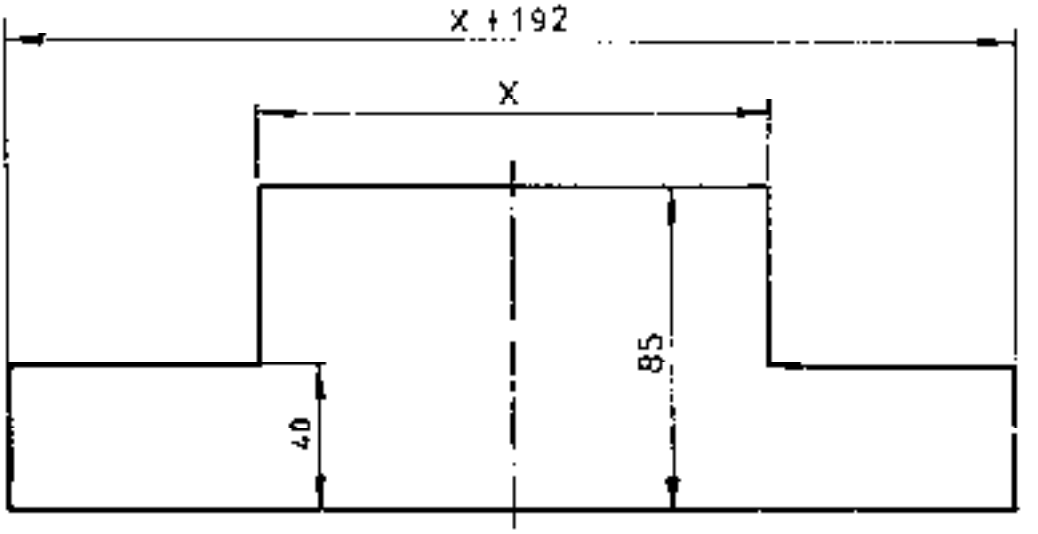


M.S. ANGLE 2 1/2" x 2 1/2" (64 x 64).

1. PC.

STRENGTHENING ANGLE T1-08,6

1:1



3 MM SHEET

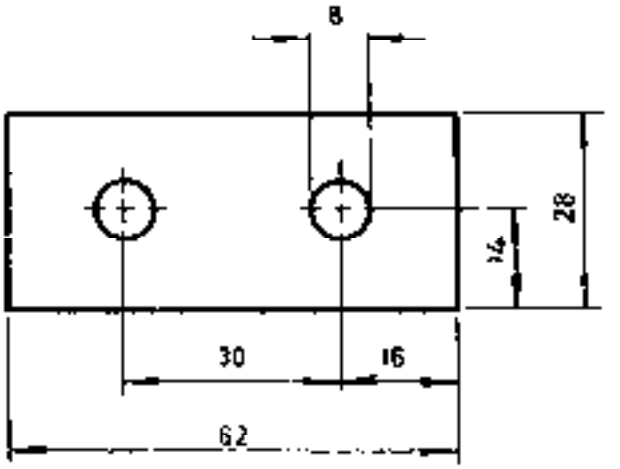
1. NO

WELD TO INLET AFTER COMPLETE ASSEMBLY(-00.1)

SEALING FLAP

T1-08,7

WELD THESE STRIPS TO INLET ASSEMBLY T1-08.0.
USE ø8 HOLES AS GUIDE TO DRILL HOLES REQUIRED
ON BAFFLE HOUSING ASSEMBLY.



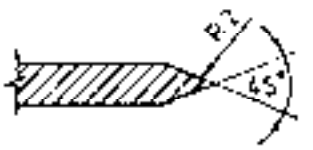
3MM MS.SHEET

2.PCS

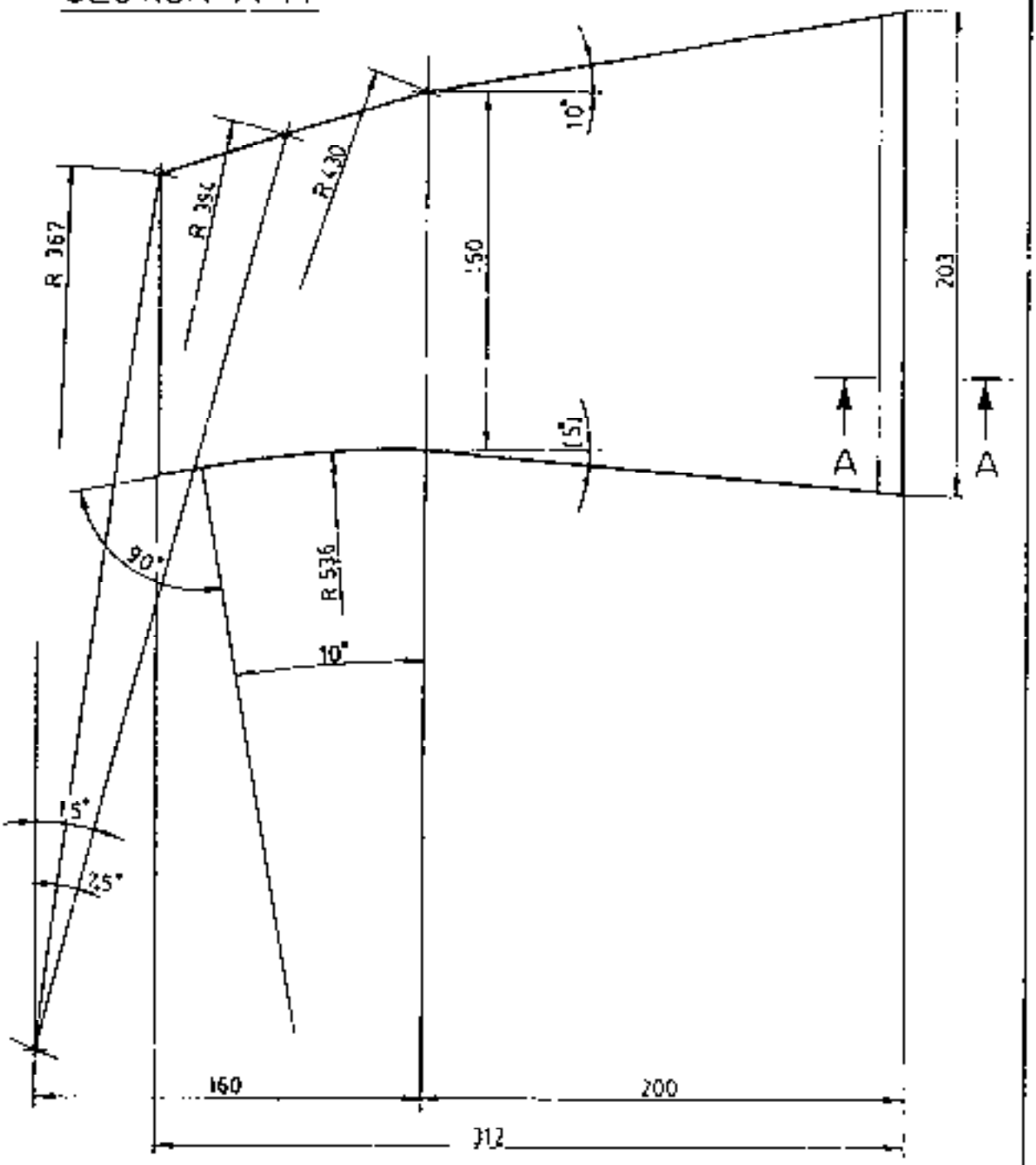
SEALING STRIP

T1-08,8

1:1



SECTION A-A



MEASUREMENTS VERY APPROXIMATE ONLY.
ADJUST TO FIT IN INLET

1 PIECE
6mm M.S Plate

INLET CENTRE RIB

T1-08.9

SCALE 1:2.5

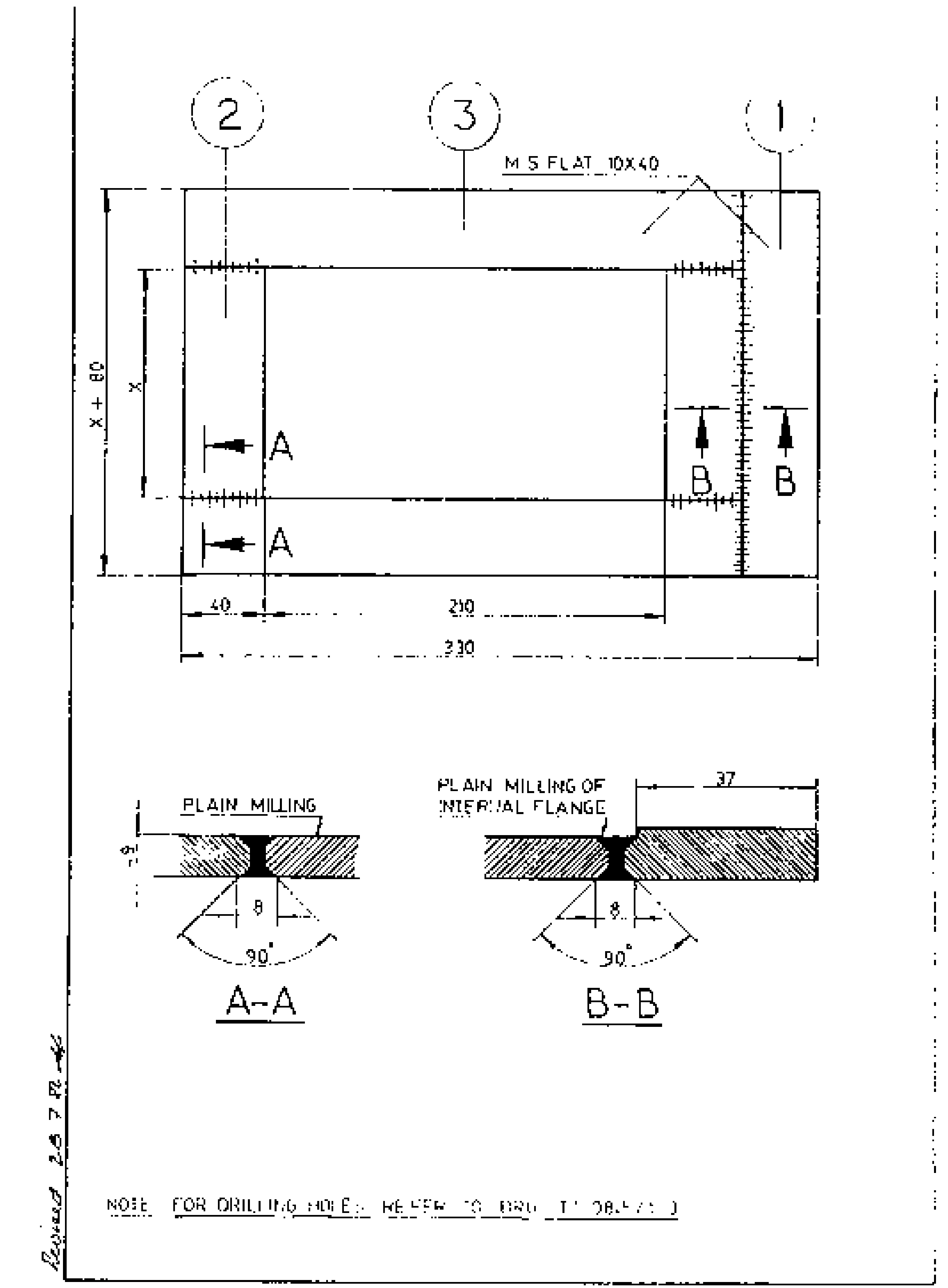
POS	NO OF ITEMS	ITEM	DRAWING NO.	SPECIFICATIONS	REMARKS
1	1	M.S. FLAT LENGTH : X + 80	T1 - 08.10	10 X 40	
2	2	M.S. FLAT LENGTH : X	T1 - 08.10	10 X 40	
3	2	M.S. FLAT LENGTH. 290	T1 - 08.10	10 X 40	
		FLANGE FOR X 70	T1 - 08.10/1		
		FLANGE FOR X 100, X 150, X 180	T1 - 08.10/2		
		FLANGE FOR X 200, X 220	T1 - 08.10/3		
		X 300, X 360, X 400	T1 - 08.10/4		

CONSISTING OF

INLET SQUARE FLANGE

PARTS LIST .

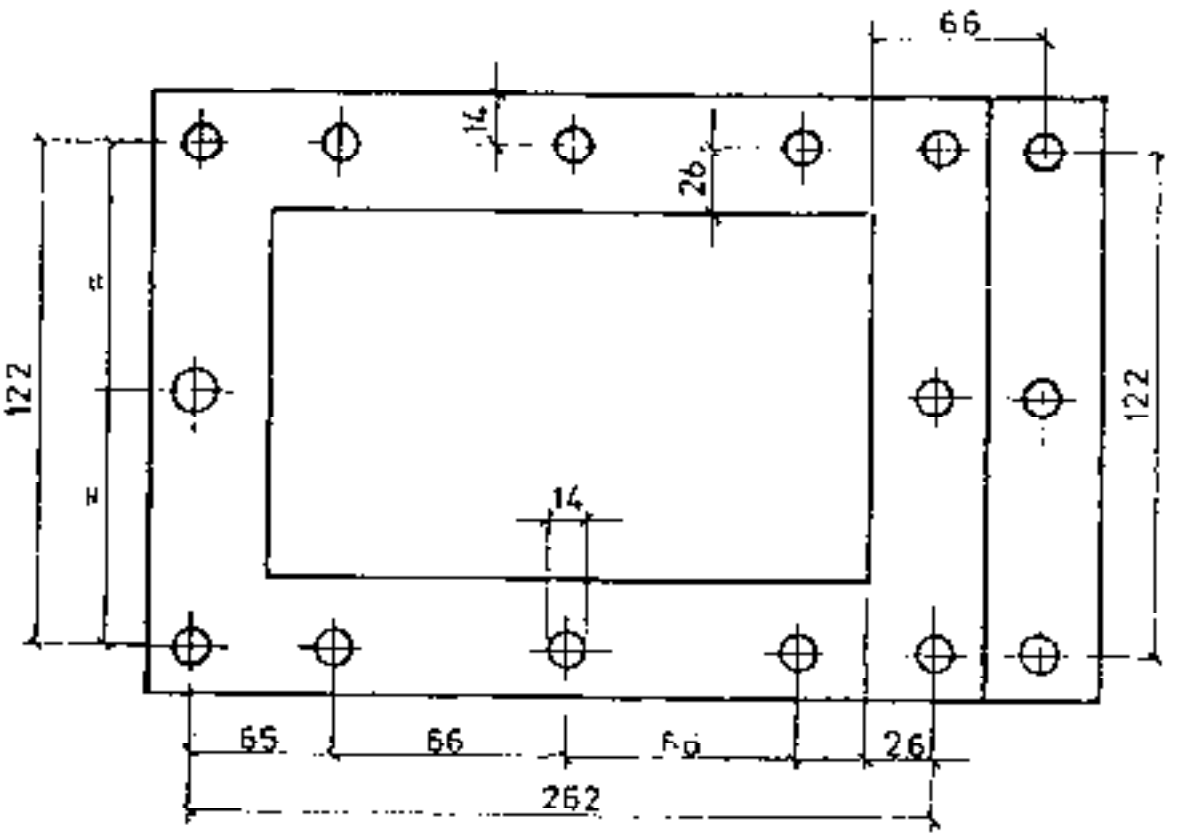
T1-08.10



INLET SQUARE FLANGE

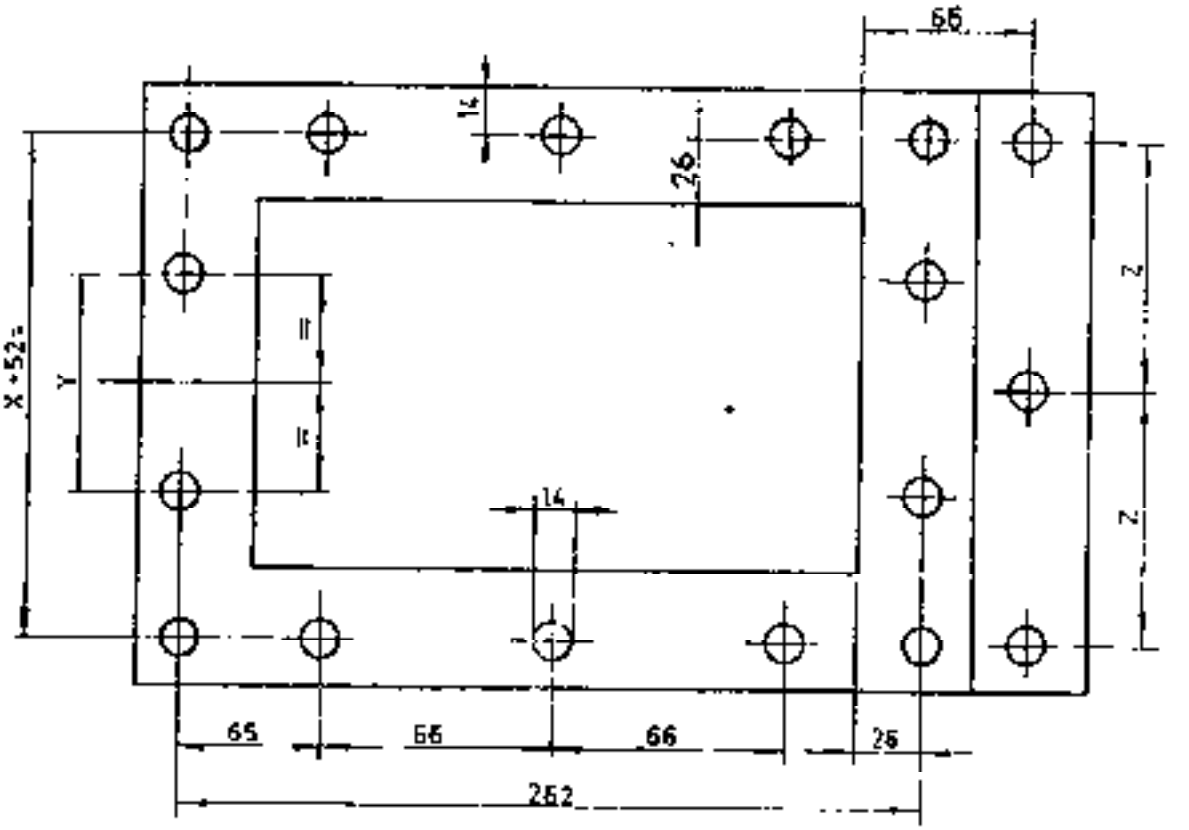
T1-08.10

SCALE 1:25



INLETSQARE FLANGE X 70

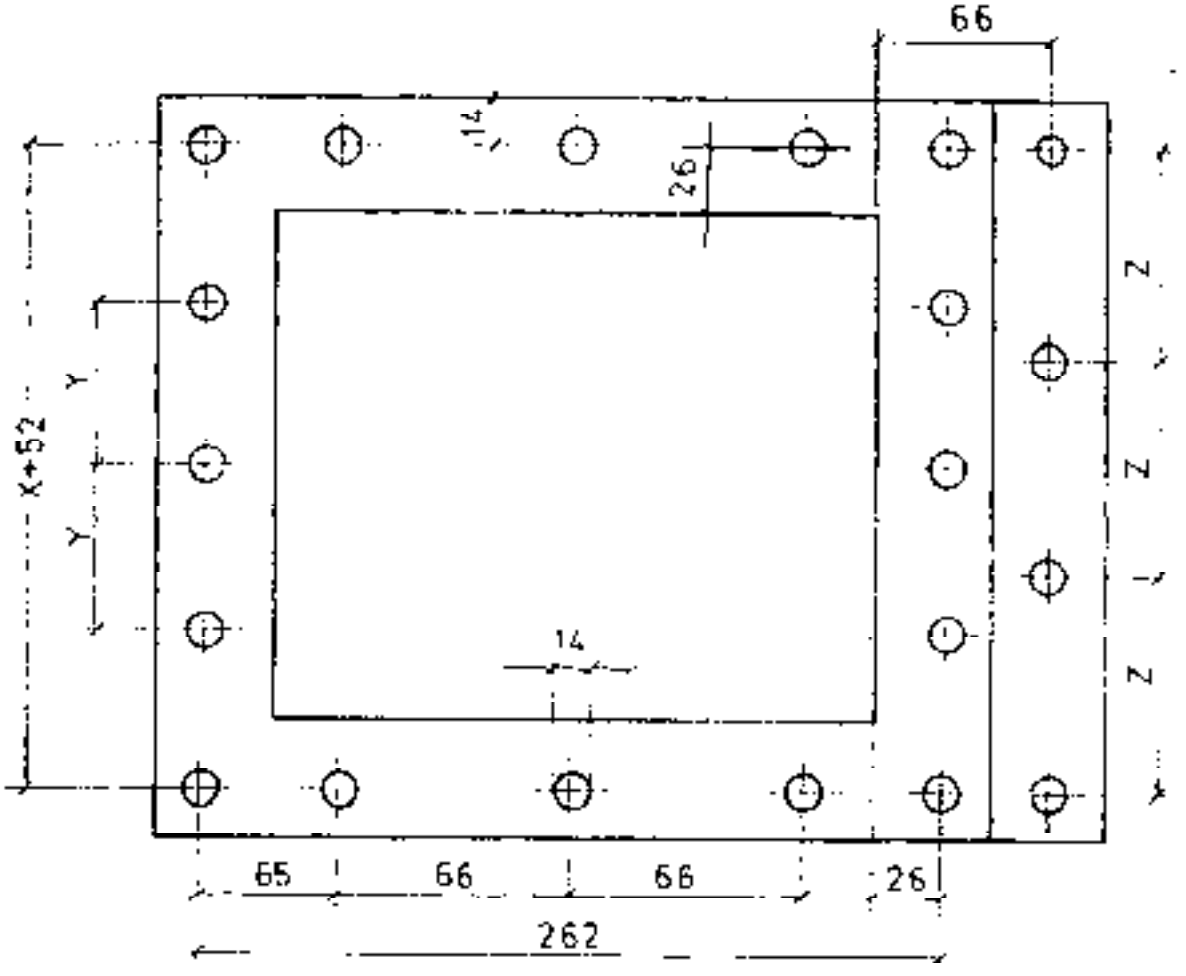
T1-08.10/1



	X 100	X 150	X 180
Y	50	68	80
Z	76	101	116

INLET SQUARE FLANGE (X100, X150, X180) T1 08.10/2

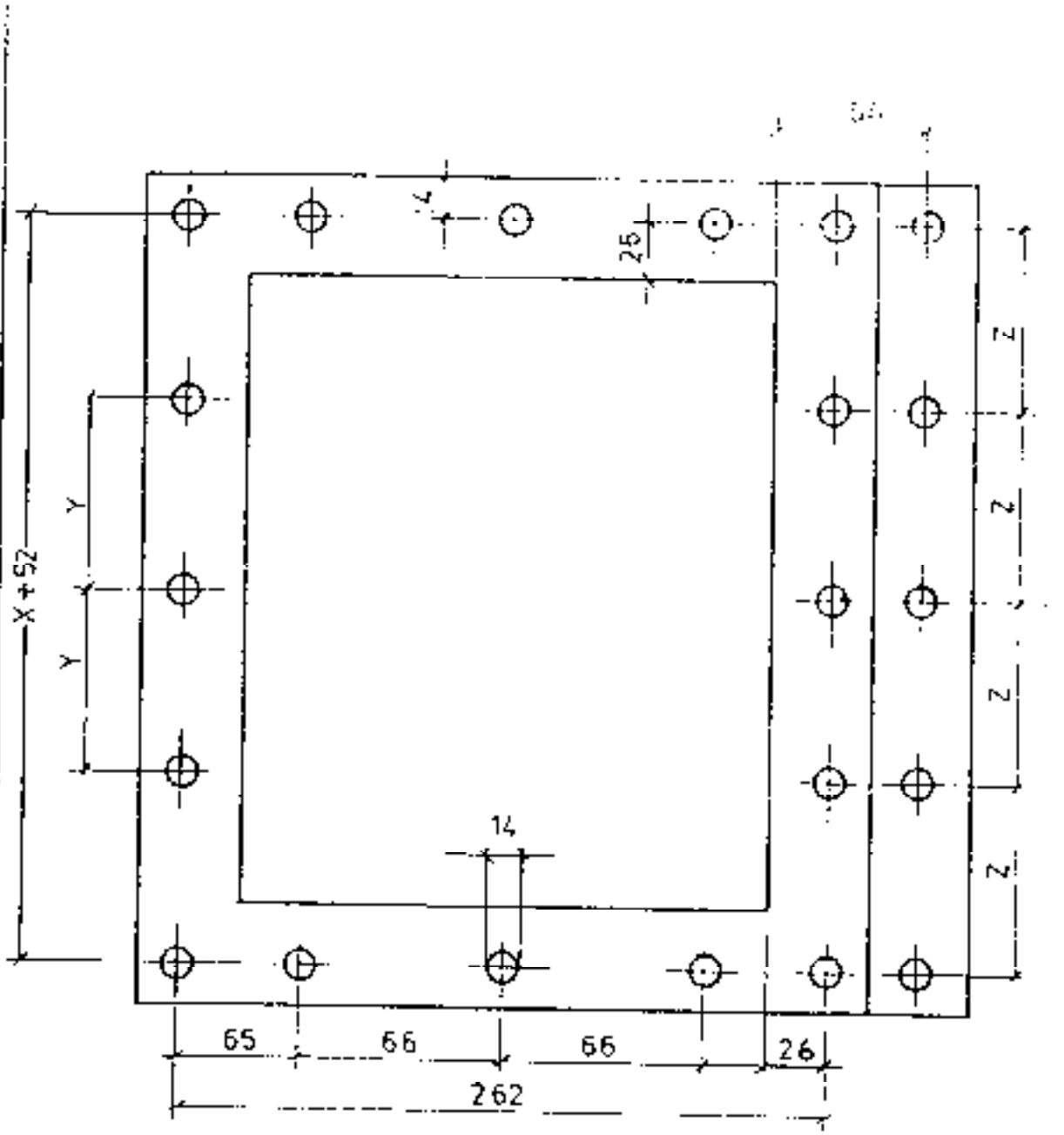
SCALE 1:2



	X 200	X 220
Y	63	68
Z	84	90

INLET SQUARE FLANGE X 200, X 220

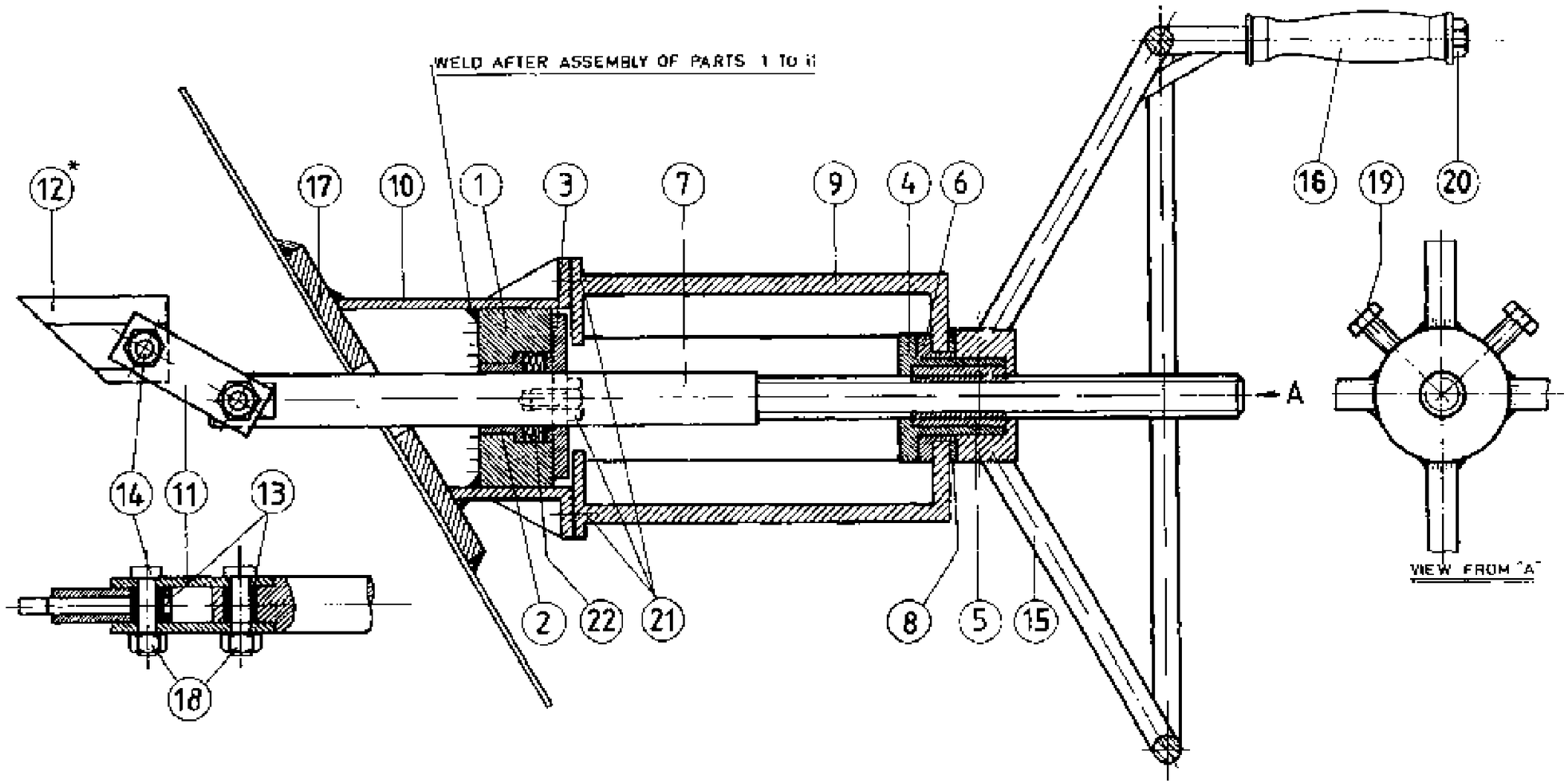
T1-08.10/3



	X 300	X 360	X 400
Y	88	103	113
Z	88	103	113

INLET SQUARE FLANGE X 300, X 360, X 400

T1 [illegible] 10/4

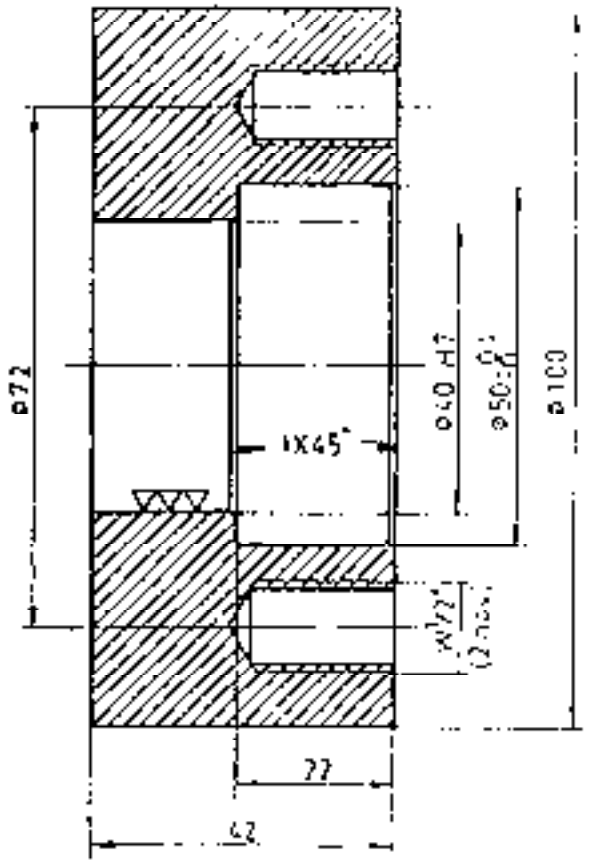


* WELD TO REGULATOR WING ASSEMBLY (T1-06.0)
DURING ASSEMBLY IN OPEN POSITION OF GATE
MAKE SURE THAT FULL CLOSING OF GATE IS
POSSIBLE BEFORE FULL WELDING.

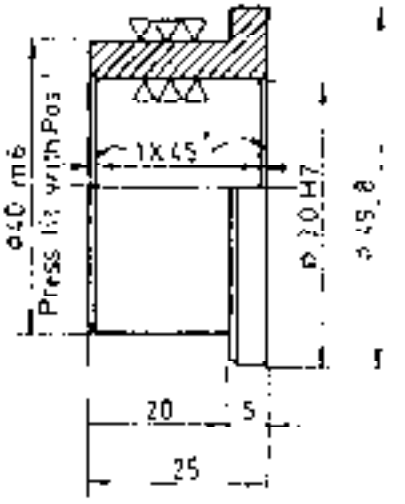
REGULATOR MECHANISM

T1-09.0

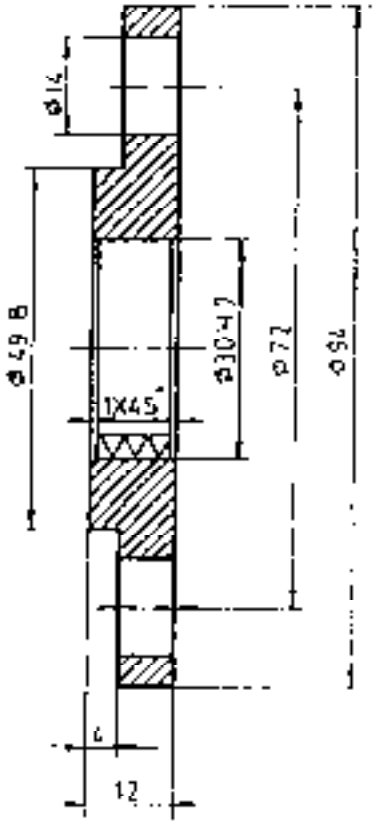
SCALE 1 : 2.5



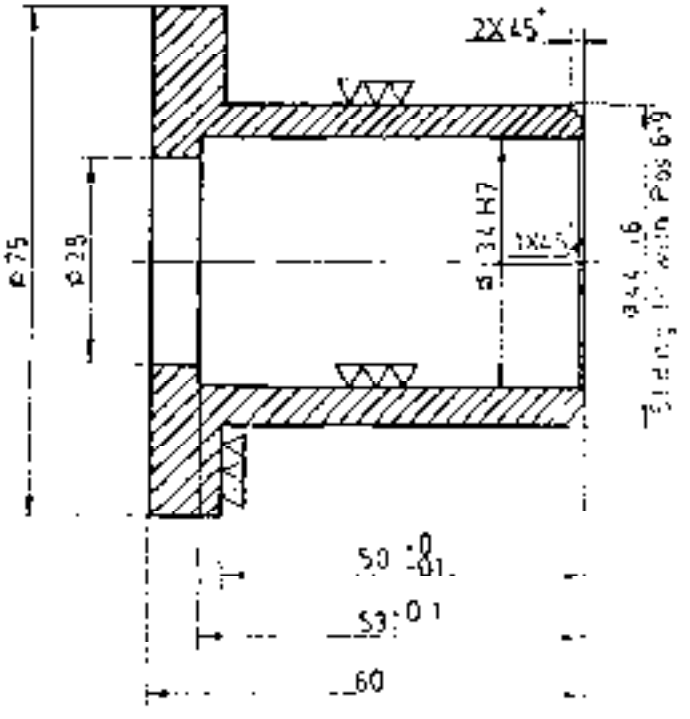
Pos - 1 M S ROD.1Pc



Pos.- 2 BRASS ROD 1Pc



Pos.- 3 M S ROD 1Pc

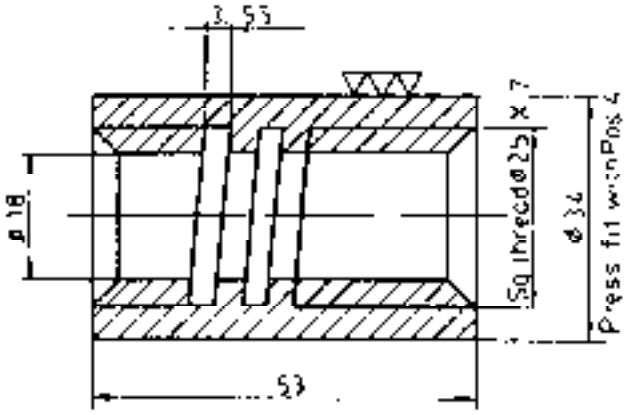


Pos.- 4 M S ROD.M/C 1Pc

REGULATOR MECHANISM PARTS

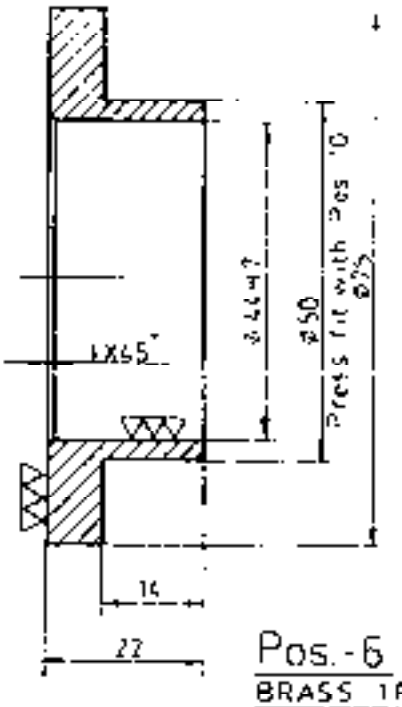
T1-09.1-4

SCALE 1:1

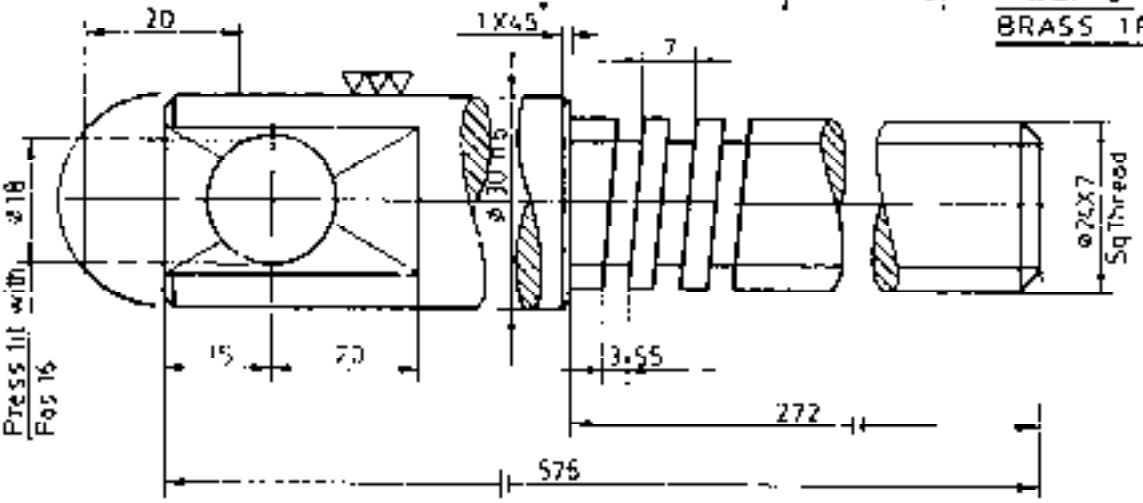


Pos - 5 BRASS 1 Pc.

CUT THREAD AFTER ASSEMBLY WITH POS 4



Pos. - 6
BRASS 1 Pc



Pos - 7 M S ROD ø 1½" 1 Pc.

Pos - 8 BRASS 1 Pc.

REGULATOR MECHANISM PARTS T1-0.9.5-8

SCALE 1 : 1

POS	NO.OF ITEM	ITEM	DRAWING NUMBER	SPECIFICATION	REMARKS
1	1	BEARING PLATE	T1-09.9	M.S PLATE 6 MM X ϕ75	
2	1	SUPPORT PLATE	T1-09.9	M S.PLATE 10 MM 100 X 140	
3	2	ANGLE	T1-09 9	50 X 50 X 196	
4	2	FLANGE	T1-09 9	M S.PLATE 6 MM 50 X 75	

PART LIST

ANGLE FRAME

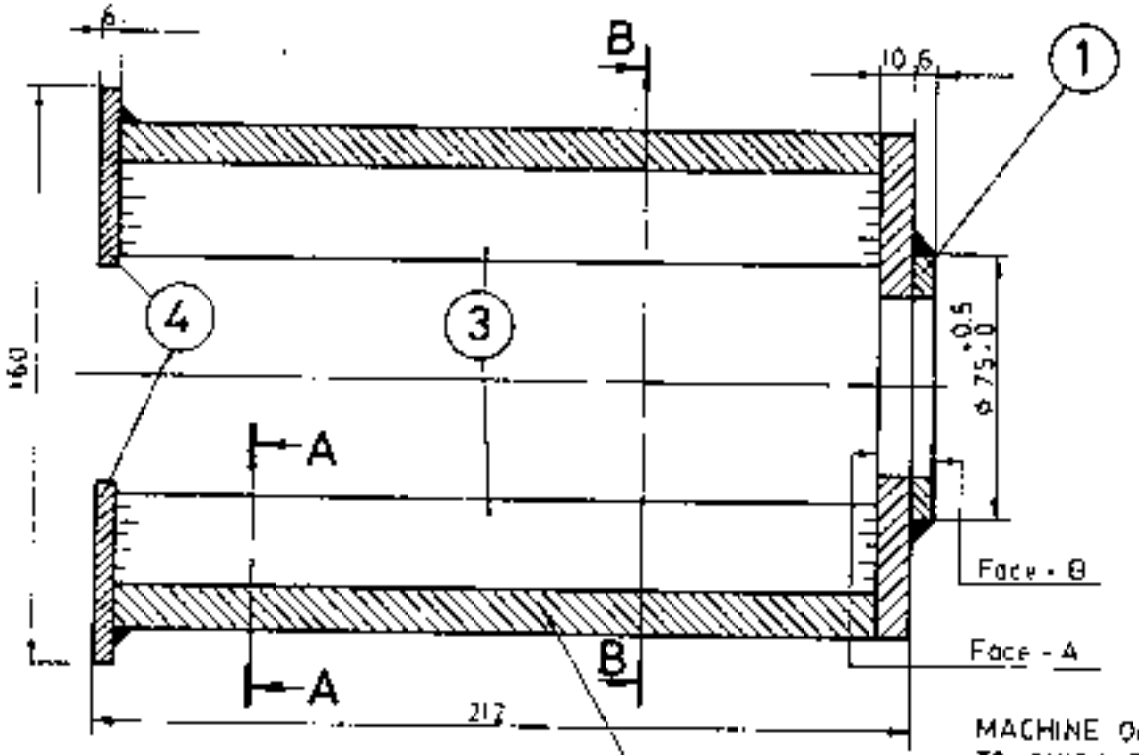
T1-09.9

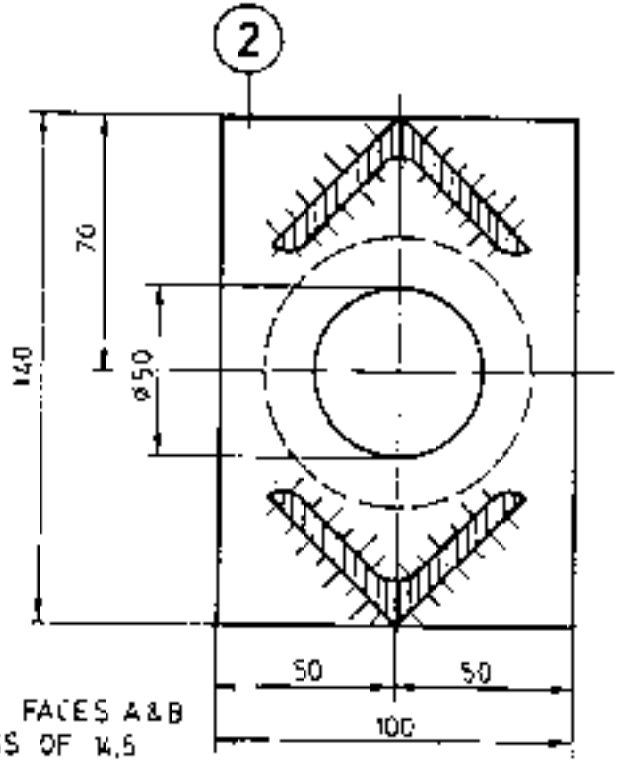
Revised 29.7.82 AL

ANGLE FRAME

SCALE 1:2

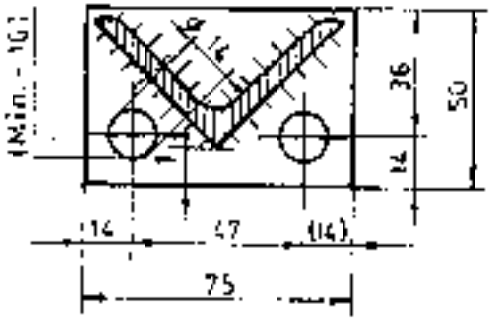
T1-09,9





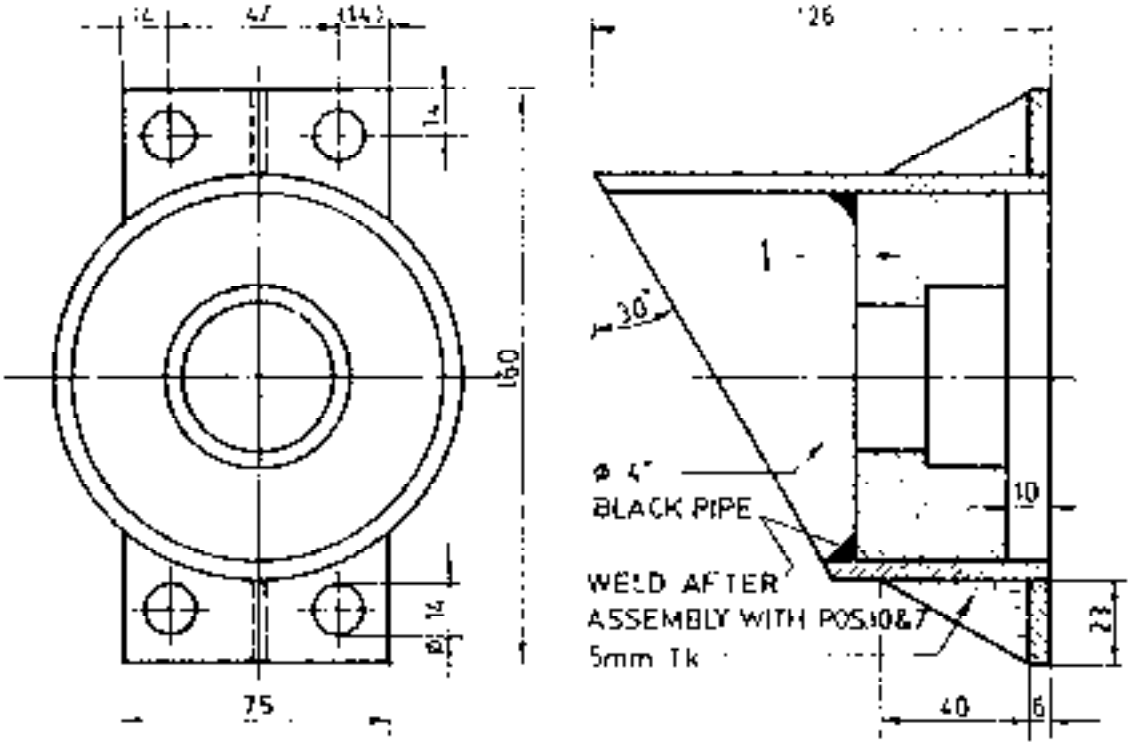
MACHINE ON FACES A&B
TO THICKNESS OF 14.5

C.SECTION - B-B

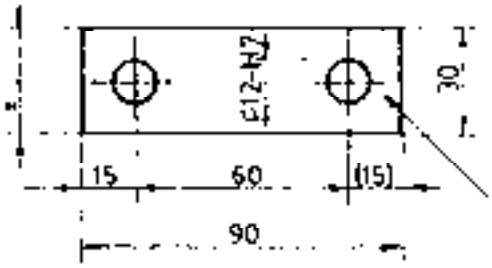


C.SECTION - A-A

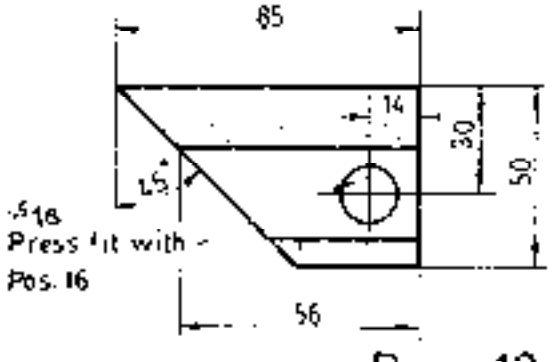
WELDING OF ANGLE SHALL BE
DONE IN COMPLETE ASSEMBLY
OF MECHANISM



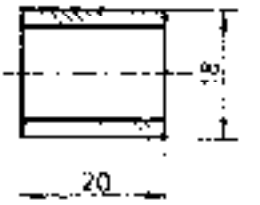
Pos -10 1NO ASSEMBLY



Pos.11 2Pcs.



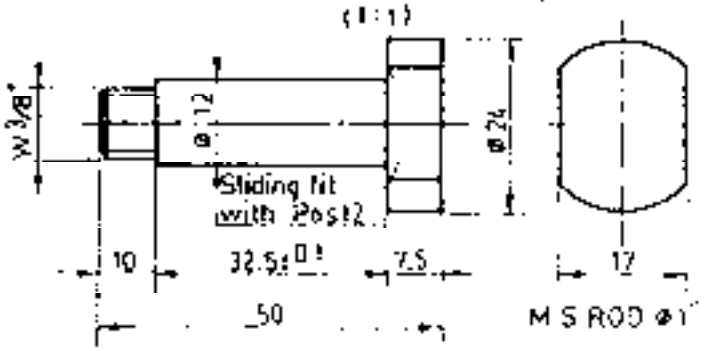
Pos. - 12 2Pc



PVC PIPE ø12

Pos. - 13 2Pcs

SCALE 1:1



Pos. -14 2Pcs

Revised 29.7.82

REGULATOR MECHANISM PARTS

T1-09.10—14

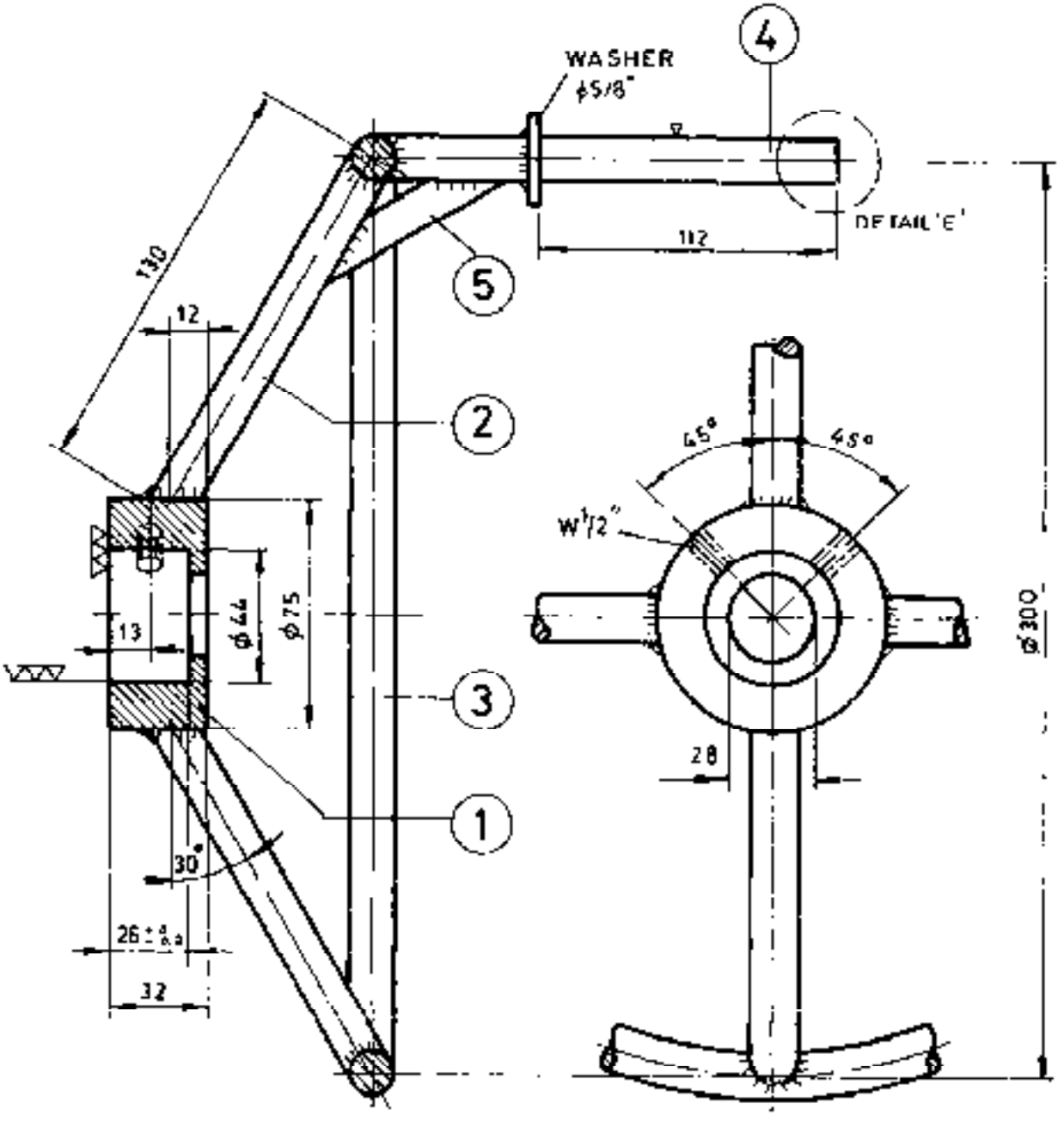
1.2 (1:1)

POS	NOOF ITEM	ITEM	DRAWING NUMBER	SPECIFICATION	REMARK
1	1	HUB	T1-09 15	M S.ROD ϕ3"x32	
2	4	SPOKE	T1-09 15	M S ROD ϕ5/8" X130	
3	1	RIM	T1-09 15	M S ROD ϕ5/8"X940	
4	1	HANDLE	T1-09 15	M S.ROD ϕ5/8X180	
5	1	RIB	T1-09.15	M S FLAT 6 X12 X62	

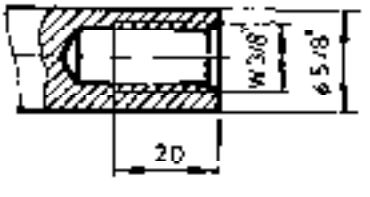
PART LIST

HAND WHEEL

T1-09,15



1 PC

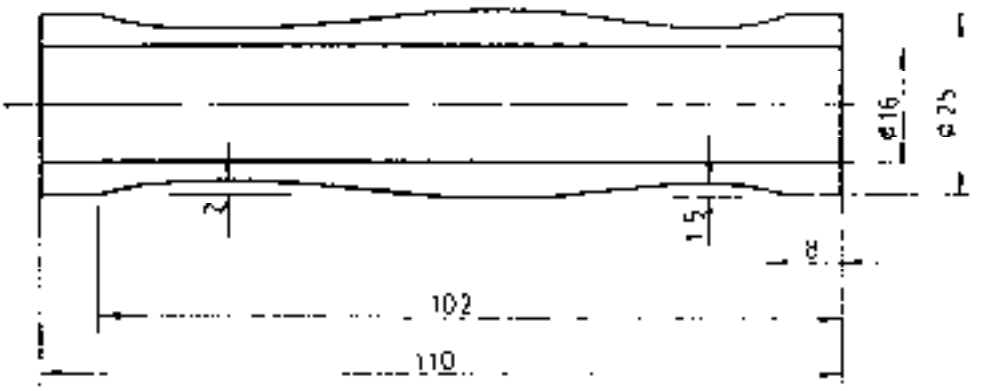


DETAIL 'E' (1:1)

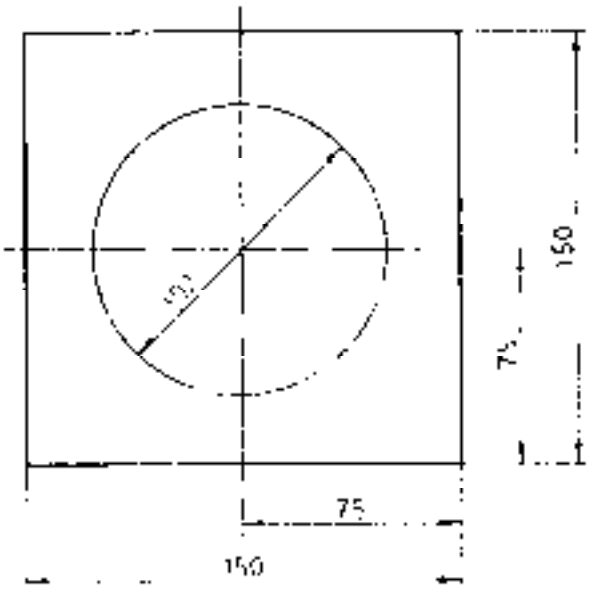
HAND WHEEL

T1-09,15

1:2(1:1)



POS.16(1 N)
SEASONED WOOD
1 NO

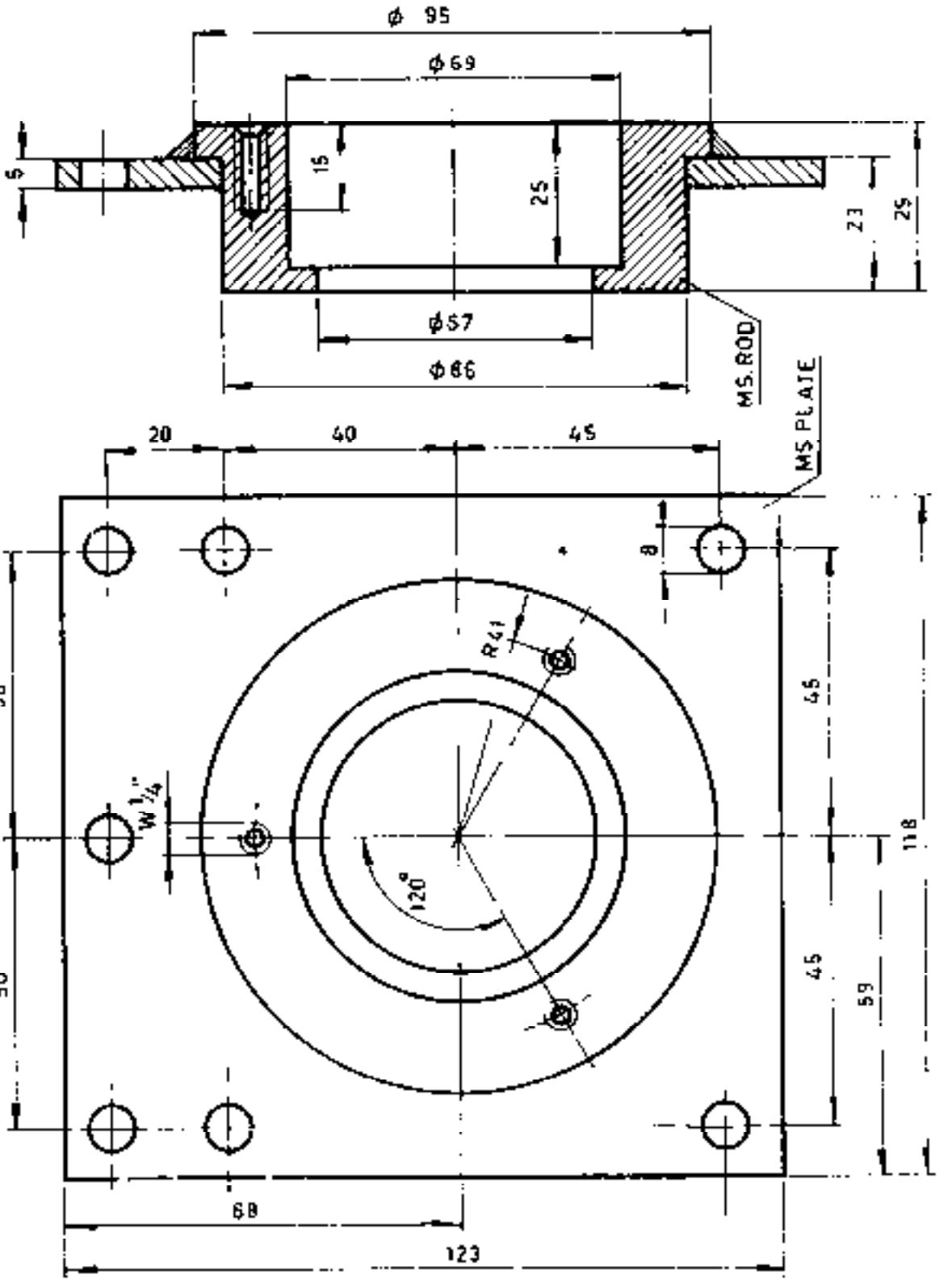


POS.17 (1.2 S'
M S PLATE 6 MM
1 NO

REGULATOR MECHANISM PART

T1-09.16-17

SCALE 1:1 / 1:2.5



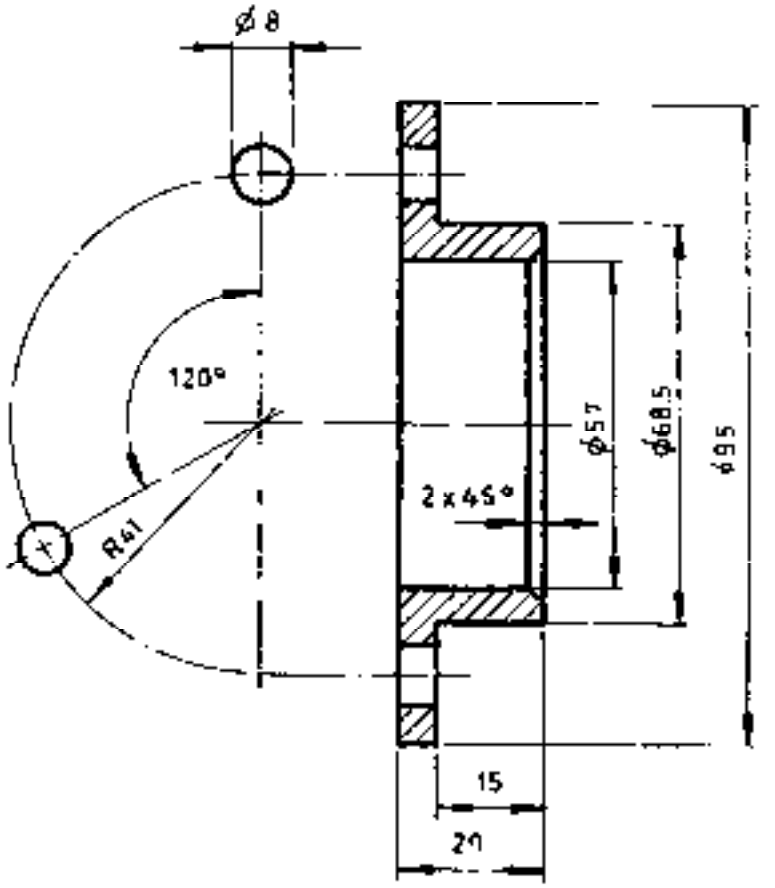
USE STUFFING BOX AS JIG TO DRILL HOLES FOR W 1/4" THREADS ON SUPPORT BASE ASSEMBLY (T1-02.0) AND SEALING PLATE 'A' (T1-12 9).

2. PCS

STUFFING BOX

T1-12.1

1:1



M.S ROD

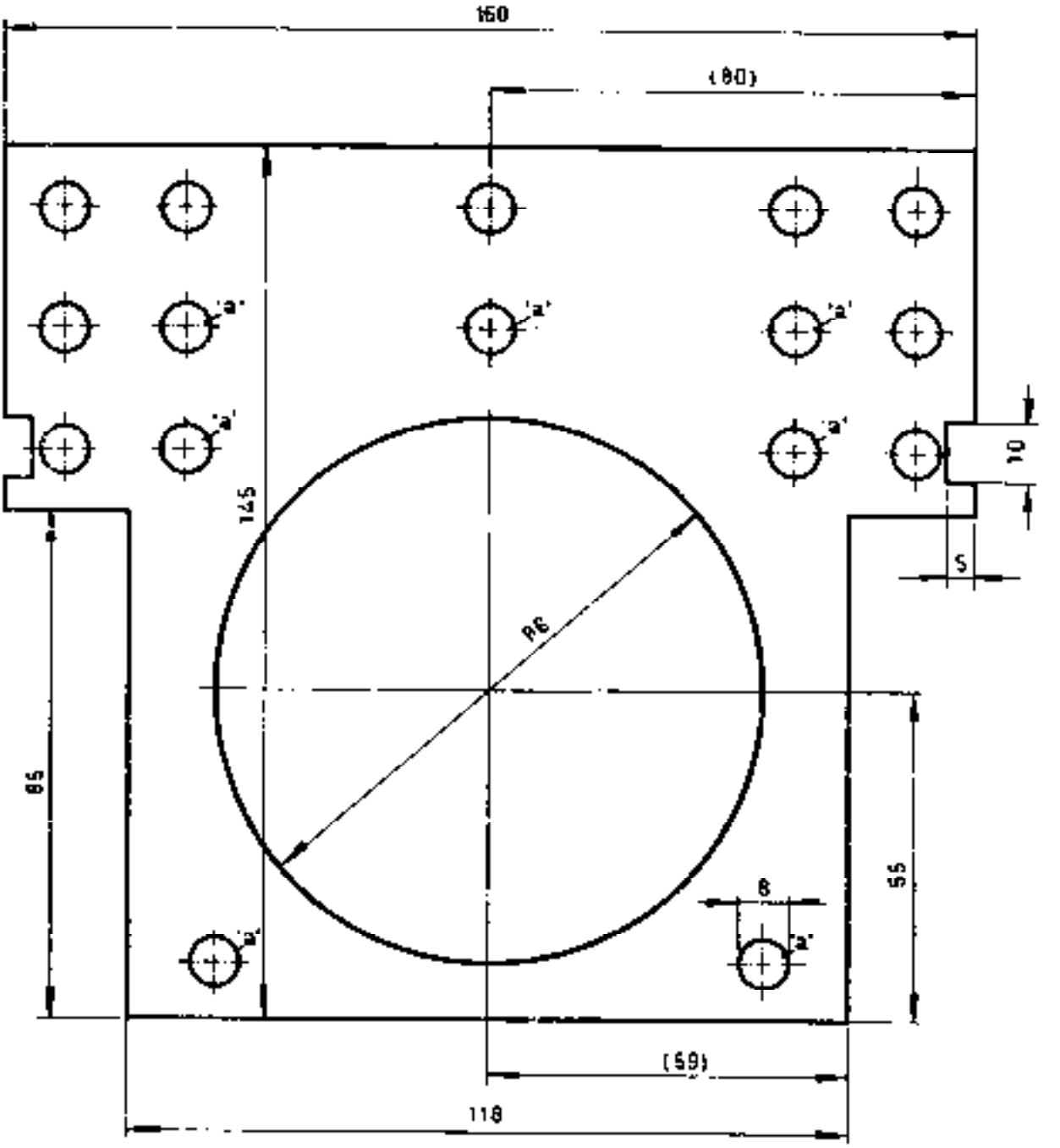
2.PCS

STUFFING BOX LID

T1-12.2

3MM RUBBER

2 PCS



—USE STUFFING BOX (T1-12.1) AS JIG TO MARK THE CENTRES OF THE HOLES INDICATED BY 'a'.

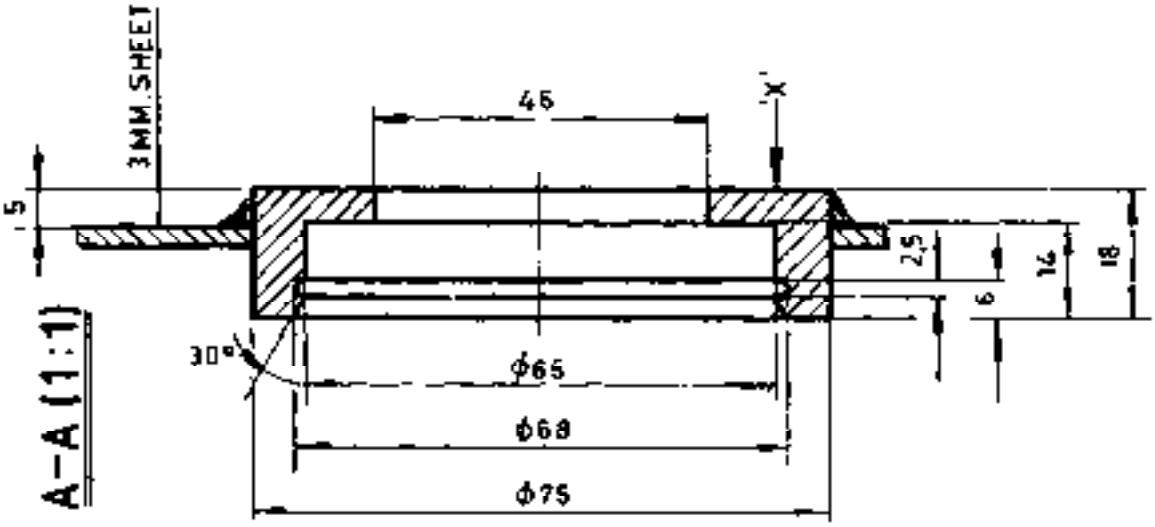
—REST OF THE HOLE CENTRES CAN BE MARKED BY USING COVER SHEET (T1-12.7) AS JIG.

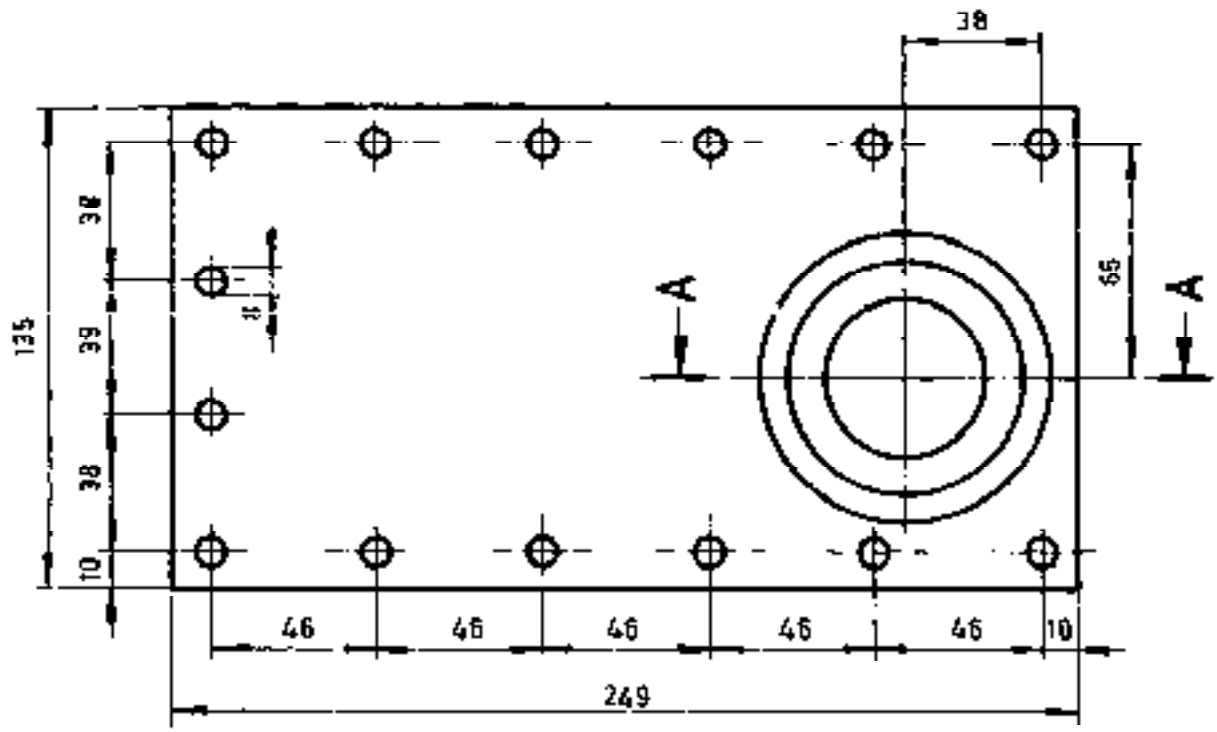
STUFFING BOX GASKET

T1-12.3

1:1

USE THIS PART AS JIG TO DRILL HOLES
FOR W 1/4" THREAD REQUIRED ON. T1-2.4, T1-03.2, T1-02.6
T1-12.9





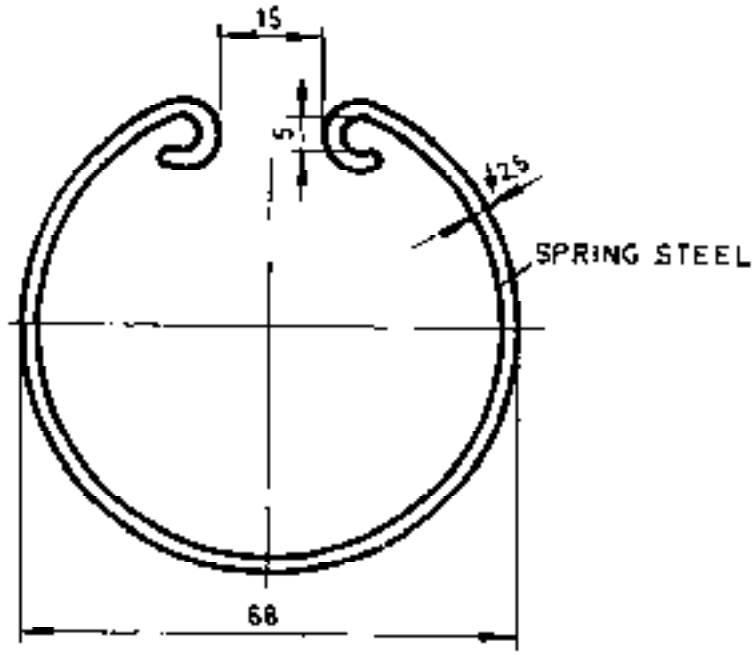
- MAKE ONE SET AS PER DRAWING.
- TURN THE FACE 'X' OF THE :SH ONLY ON THE NEXT SET AND WELD

2 PCS

OIL SEAL HOUSING

T1-12.4

1 : 2 (1-1)

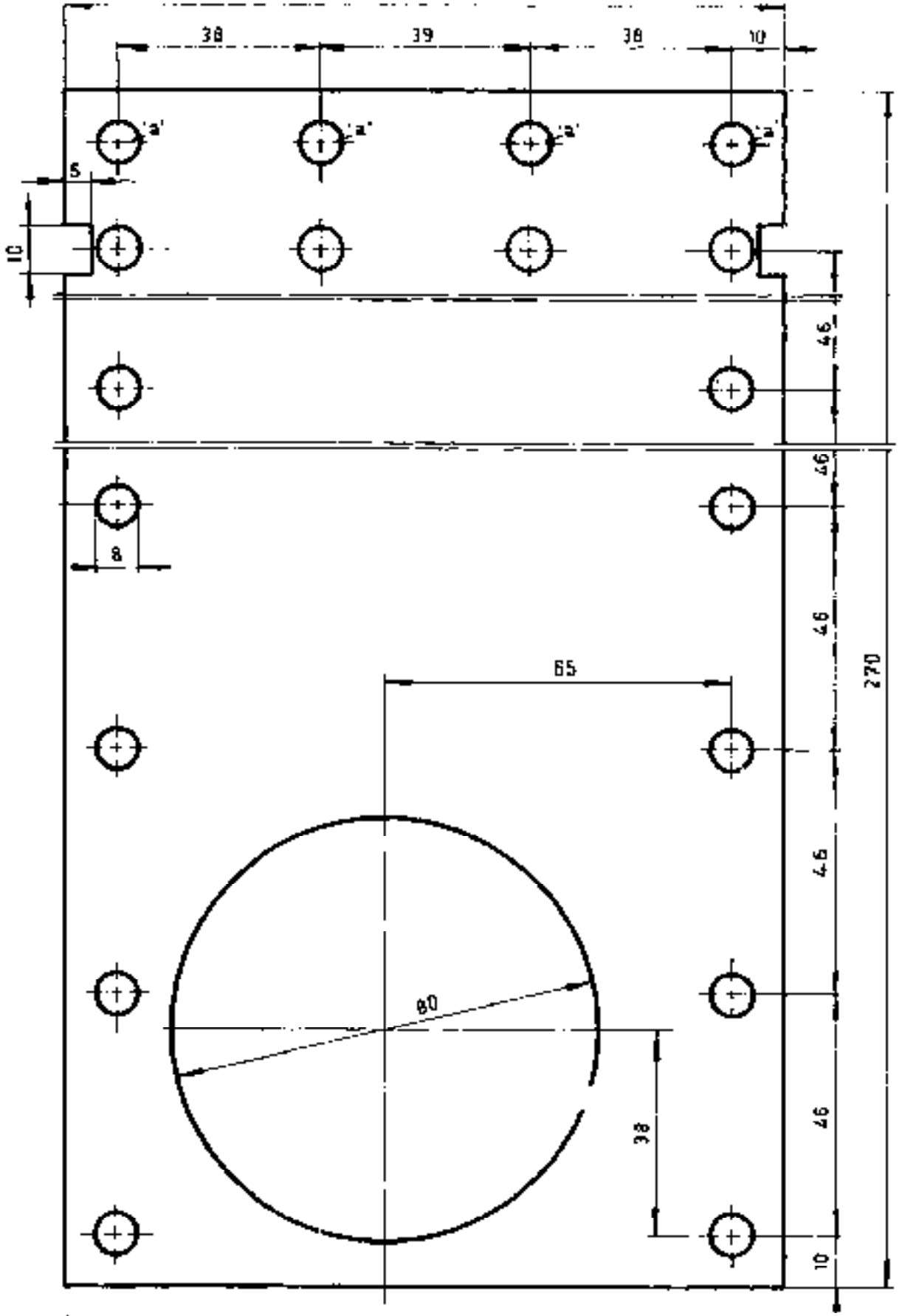


2 PC

LOCK SPRING

1 : 1

T1-12,5



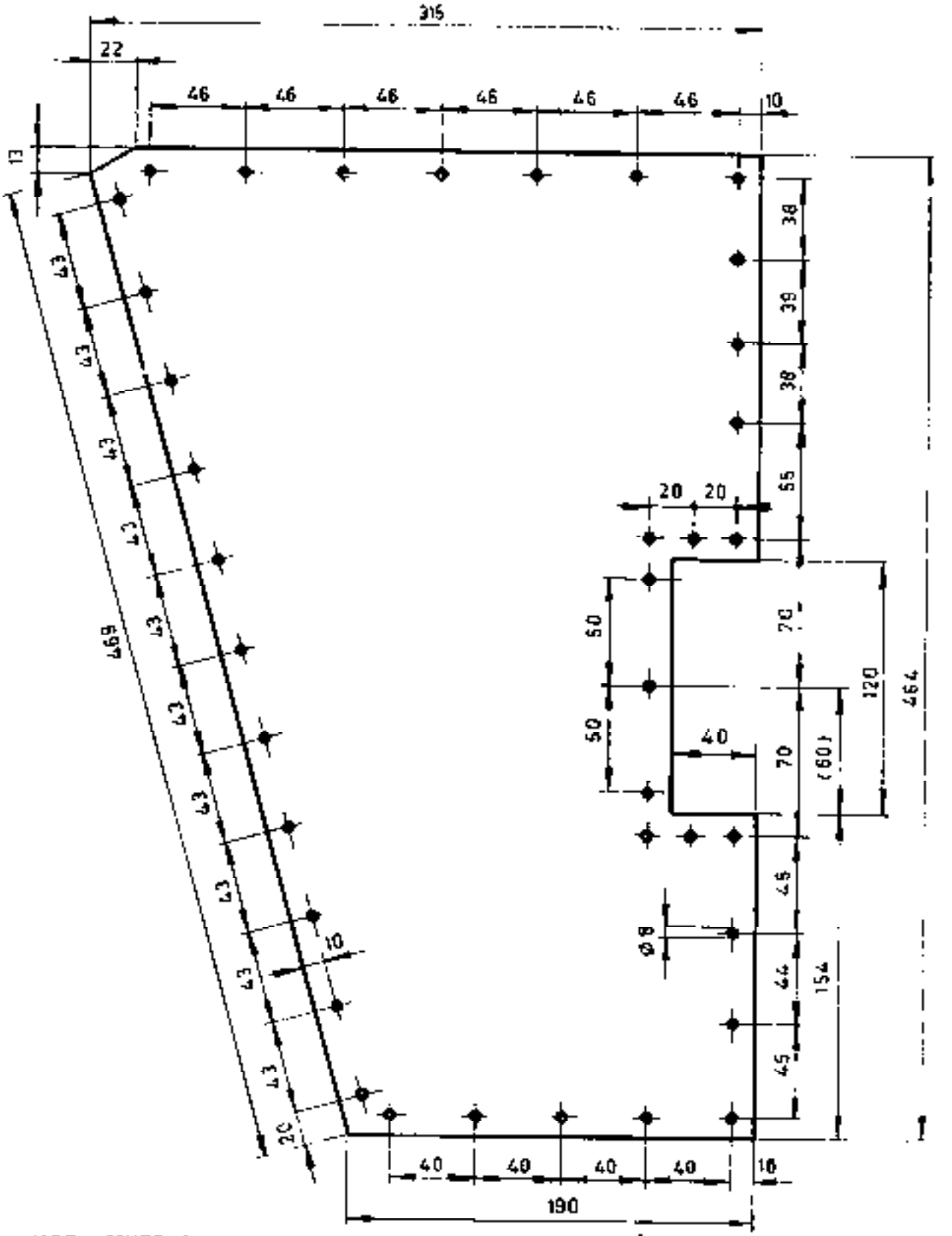
3 MM. RUBBER
2 PCS

USE COVER SHEET (T1-10.3) AS JIG TO MARK CENTRES OF THE HOLES INDICATED BY 'a'.

OIL SEAL HOUSING GASKET

T1-12.6

1 : 1



USE COVER SHEET AS JIG TO DRILL HOLES FOR W¼" THREADS ON FOLLOWING PARTS:-
SUPPORT ASSEMEBLY (T1-02.0)
BAFFLE HOUSING ASSEMBLY (T1-03.0)
COVER SHEET FRAMES (T1-8.4-5)
SEALING PLATE (T1-12.9, T1-12.10)

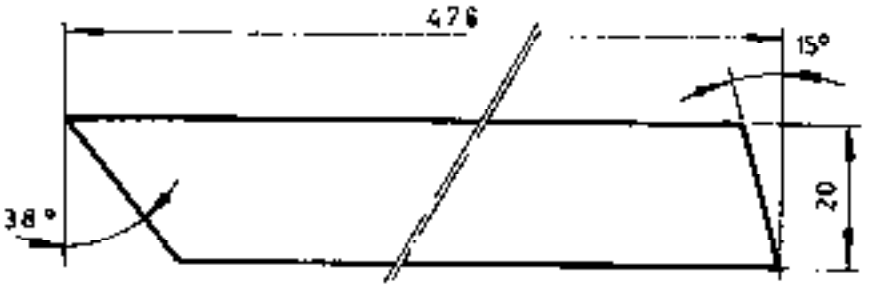
COVER SHEET

T1-12,7

SCALE 1:2.5

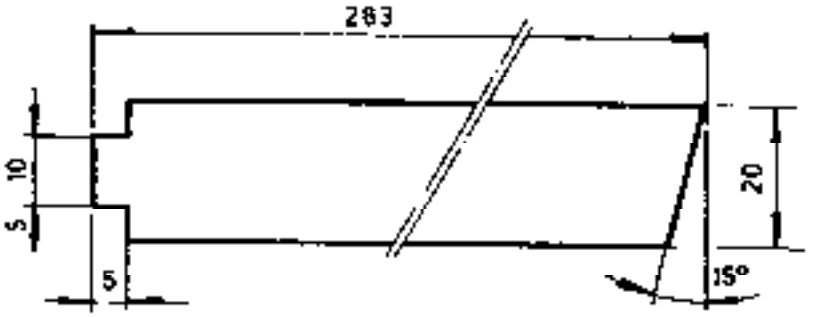
SHEET COVER GASKETS

T1-12.8



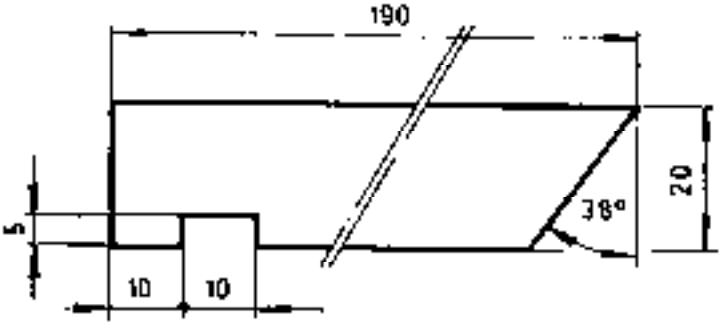
POS 1

2 PCS



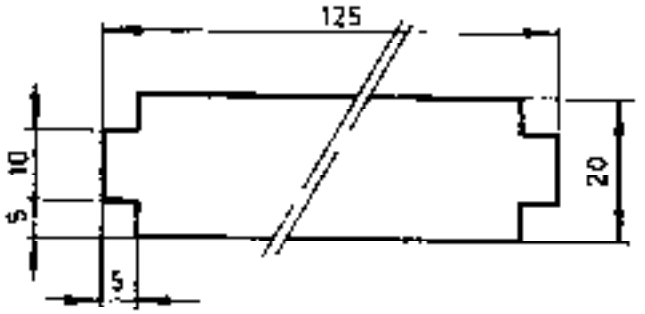
POS 2

2 PCS



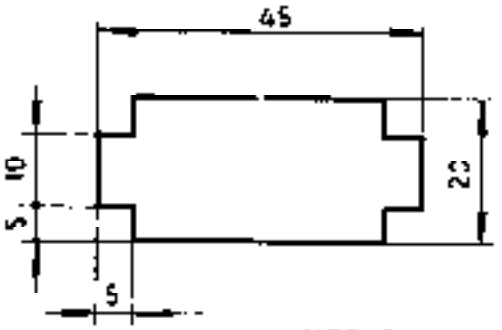
POS 3

2 PCS



POS 4

2 PCS



POS 5

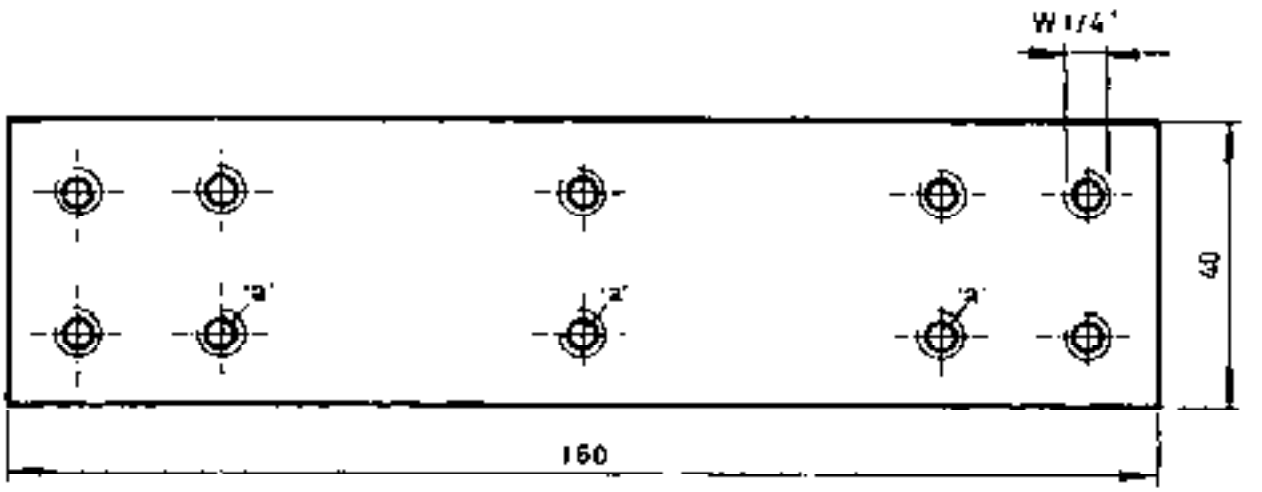
2 PCS

USE 3MM THICK RUBBER FOR ALL POSITIONS

COVER SHEET GASKET

T1-12.8/1-5

1:1



A. USE STUFFING BOX (T1-12.1) AS JIG TO DRILL HOLES FOR THE THREADS INDICATED BY 'a'.

B. USE COVER SHEET (T1-12.7) AS JIG TO DRILL HOLES REQUIRED FOR REST OF THE THREADS

C. ABOVE MENTIONED OPERATIONS SHOULD BE CARRIED OUT DURING ASSEMBLY WORK.

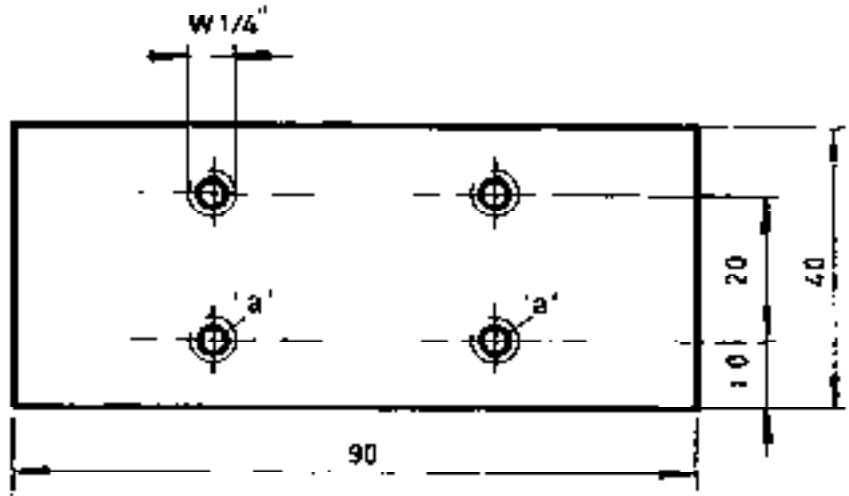
6.MM PLATE

2.PCS

SEALING PLATE 'A'

T1-12-9

1:1



5. MM PLATE

2. PCS

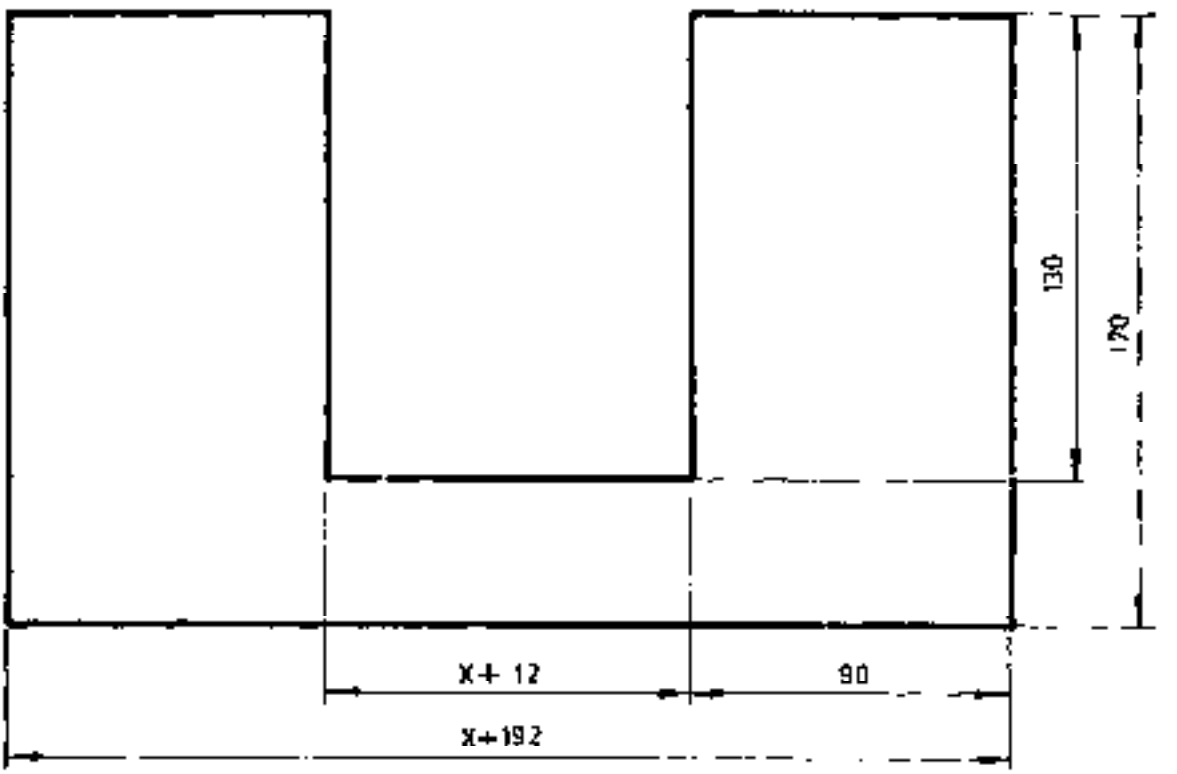
-THREADS INDICATED BY 'a' SHOULD BE MADE FIRST. USE OIL SEAL HOUSING (T1-12.4) AS JIG TO MARK HOLE CENTER FOR THREADS.

-USE COVER SHEET (T1-12.7) AS JIG TO MARK HOLE CENTERS FOR REST OF THE TREADS.

SEALING PLATE 'B'

T1-12.10

1:1



3 MM RUBBER

1 PC

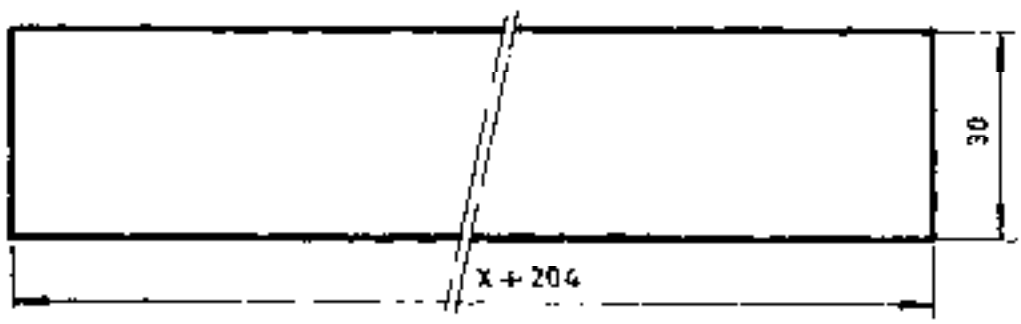
PUT THIS RUBBER IN BETWEEN INLET ASSEMBLY (T1-08.0) AND SUPPORT FRONT (T1-02.20) OF SUPPORT ASSEMBLY. MARK HOLE CENTER, PUNCH HOLES.

SEALING FLAP GASKET

T1-12.11

1 : 2

3.MM RUBBER
1 PC



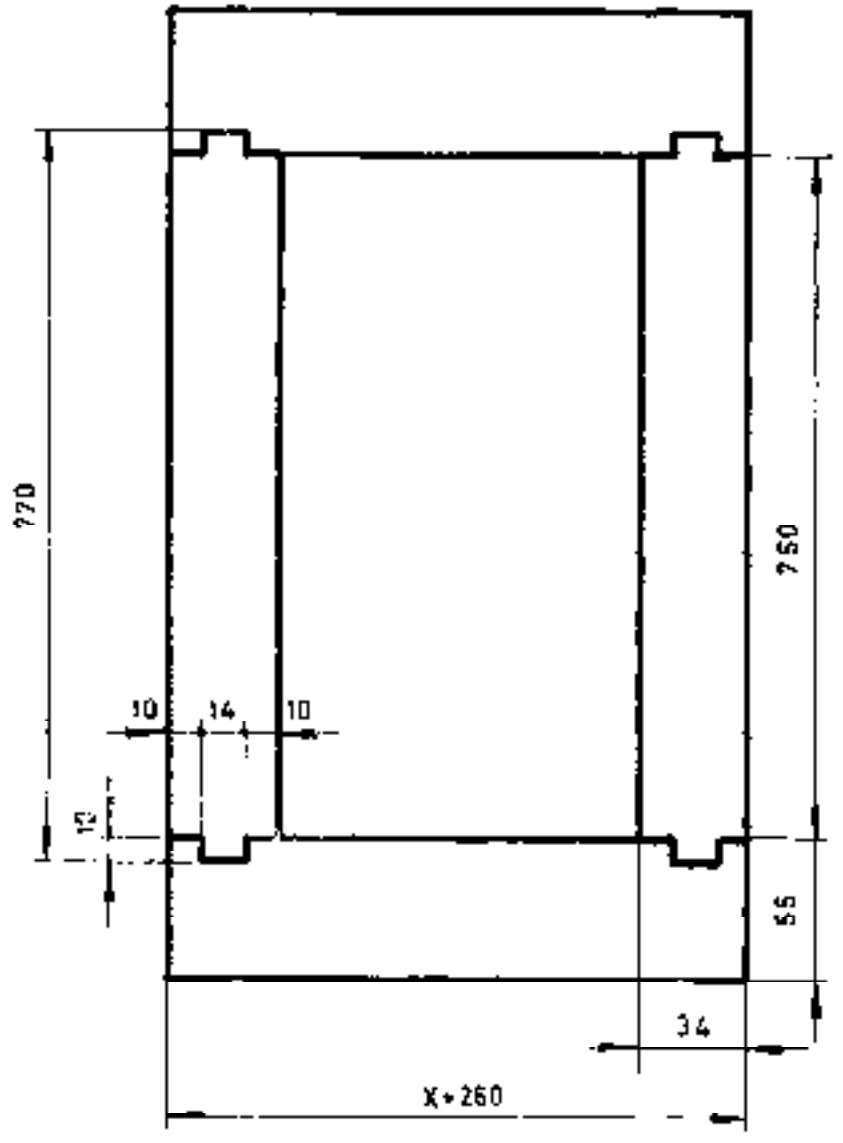
PUT THIS RUBBER INBETWEEN IN FLANGE (T1-08.5)+
SEALING STRIP (T1-08-8) AND BAFFLE HOUSING TOP (T1-03.3),
DURING ASSEMBLY WORK, MARK HOLE CENTRES. PUNCH HOLES.

Revised 18.2.14 AK

BAFFLE PLATE GASKET

T1-12.12

1:1



6.MM RUBBER

1 NOS

FOUNDATION FRAME GASKET

T1-12-13

HEX HEAD BOLT

SR NO	POS	SIZE	PCS									DRAWING NUMBER
			X70	X100	X150	X180	X200	X220	X300	X360	X400	
1	34	W 3/4" X 2"	4	4	4	4	4	4	4	4	4	T1-001-1
2	33	W 3/4" X 1/2"	2	2	2	2	2	2	2	2	2	T1-001-1
3	35	W 1/2" X 2"	4	4	4	4	4	4	4	4	4	T1-[illegible]
4	30	W 1/2" X 1 1/2"	37	39	41	41	44	44	47	47	47	T
5	19	W 1/2" X 1 1/2"	2	2	2	2	2	2	2	2	2	T1-09.0
6	21	W 1/2" X 1"	6	6	6	6	6	6	6	6	6	T1-09.0
7	31	W 3/8" X 3/4"	5	5	6	6	6	7	7	8	8	T1-00.2
8	20	W 3/8" X 3/4"	1	1	1	1	1	1	1	1	1	T1-09.0
9	32	W 1/4" X 5/8"	122	122	122	122	122	122	122	122	122	T1-00.2
10	5	W 1/4" X 5/8"	8	8	8	8	8	8	8	8	8	T1-05.0
11	6	W 1/4" X 5/8"	6	6	6	6	6	6	6	6	6	T1-07.0
12	37	W 1/4" X 5/8"	4	4	4	4	4	4	4	4	4	T1-00.3

HEX NUT

SR.NO	POS	SIZE	PCS									DRAWING NUMBER
			X70	X100	X 150	X180	X200	X220	X300	X360	X400	
1	34	W3/4"	4	4	4	4	4	4	4	4	4	T1-00.1
2	33	W3/4"	2	2	2	2	2	2	2	2	2	T1-00.1
3	35	W1/2"	4	4	4	4	4	4	4	4	4	T1-00.1
4	30	W1/2"	37	39	41	41	44	44	47	47	47	T1-00.1
5	21	W1/2"	4	4	4	4	4	4	4	4	4	T1-09.0
6	31	W3/8"	5	5	6	6	6	7	7	8	8	T1-00.2/T1-08.0
7	18	W3/8"	2	2	2	2	2	2	2	2	2	T1-09.0
8	37	W1/4	4	4	4	4	4	4	4	4	4	T1-00.3
HEX.NUT/BOLT W1/2"X1 1/2"*			24	24	24	26	26	26	28	28	28	

* REQUIRED ONLY IF DRAFTTUBE IS USED.

PART LIST

FASTENERS

T1-13.0

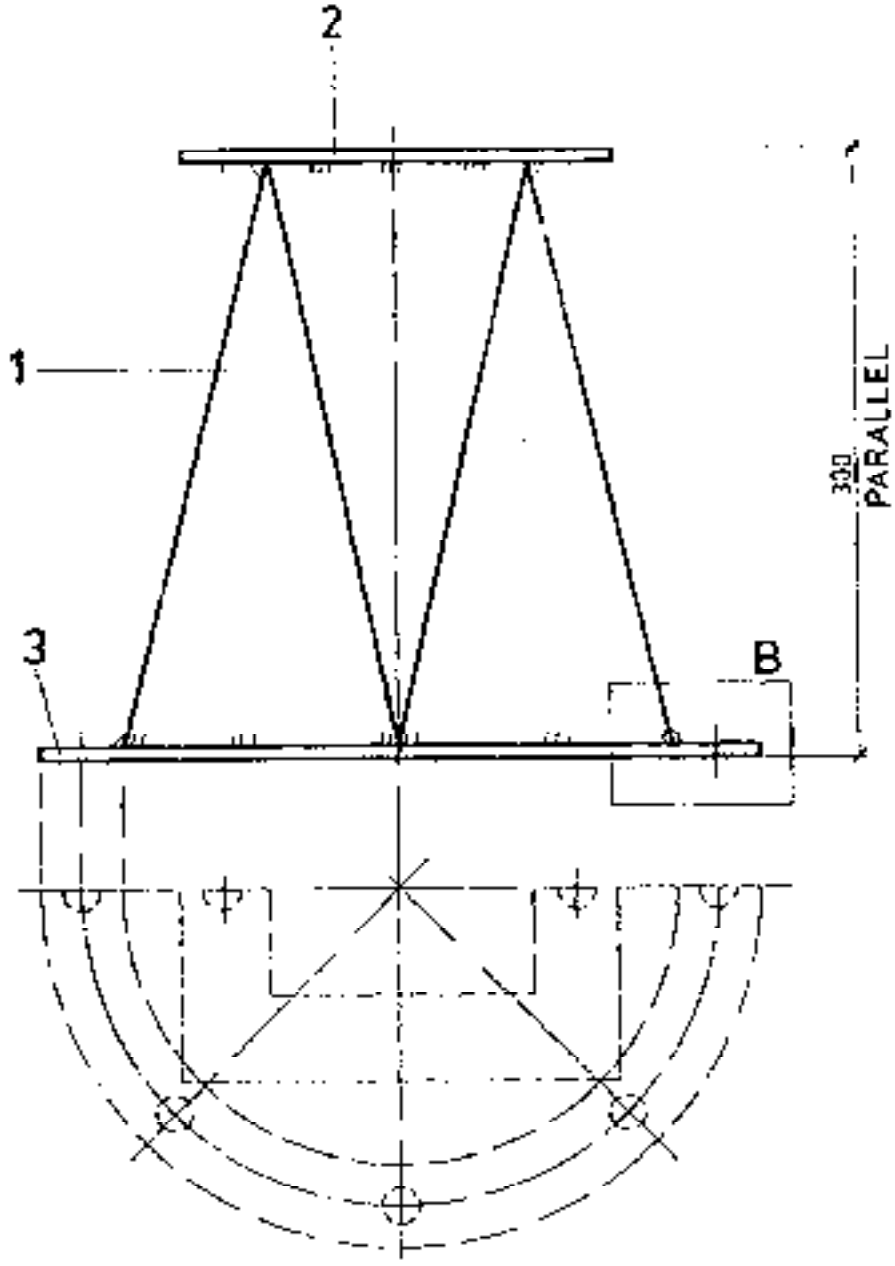
POS	NO OF ITEMS	ITEM	DRAWING NO	SPECIFICATION	REMARKS
1	1	ADAPTER	T1-14.1		
2	1	SQUARE FLANGE	T1-14.2		
3	1	PIPE FLANGE	T1-14.3		

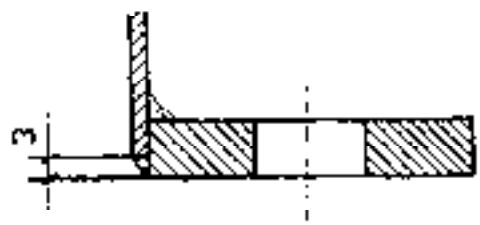
CONSISTING OF

ADAPTER ASSEMBLY

PARTS LIST

T1-14.0

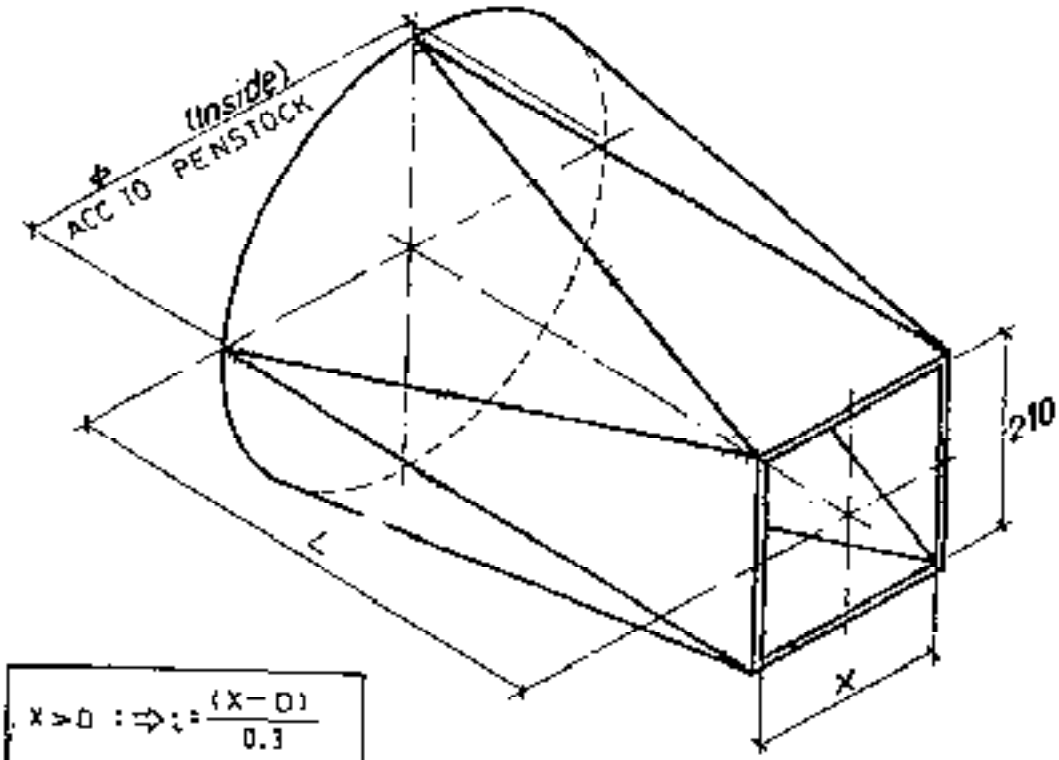




DETAIL 'B'

ADAPTER

T1-14.0



X > D : ⇨ L = (X − D) / 0.3
X ≤ D : ⇨ L = 300 mm

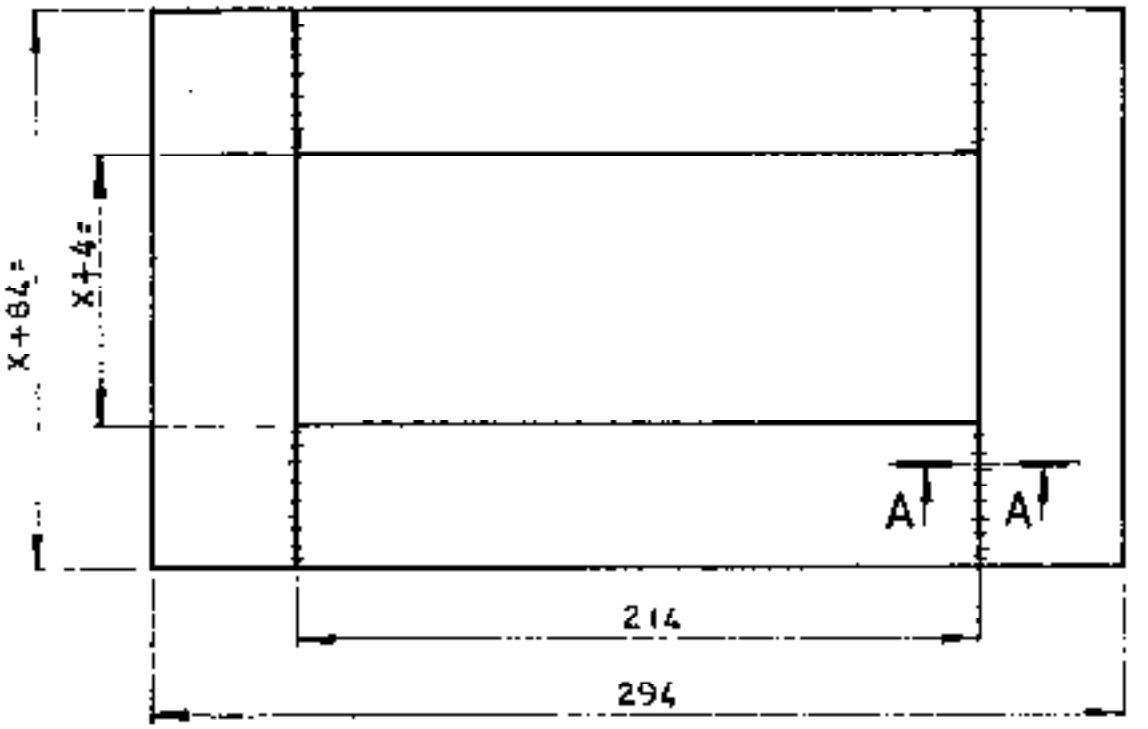
M.S SHEET 2.5 mm

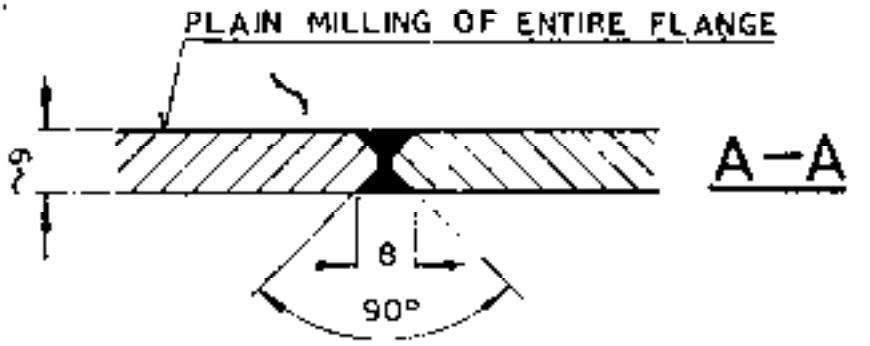
1 Pc

ADAPTER

T1-14.1

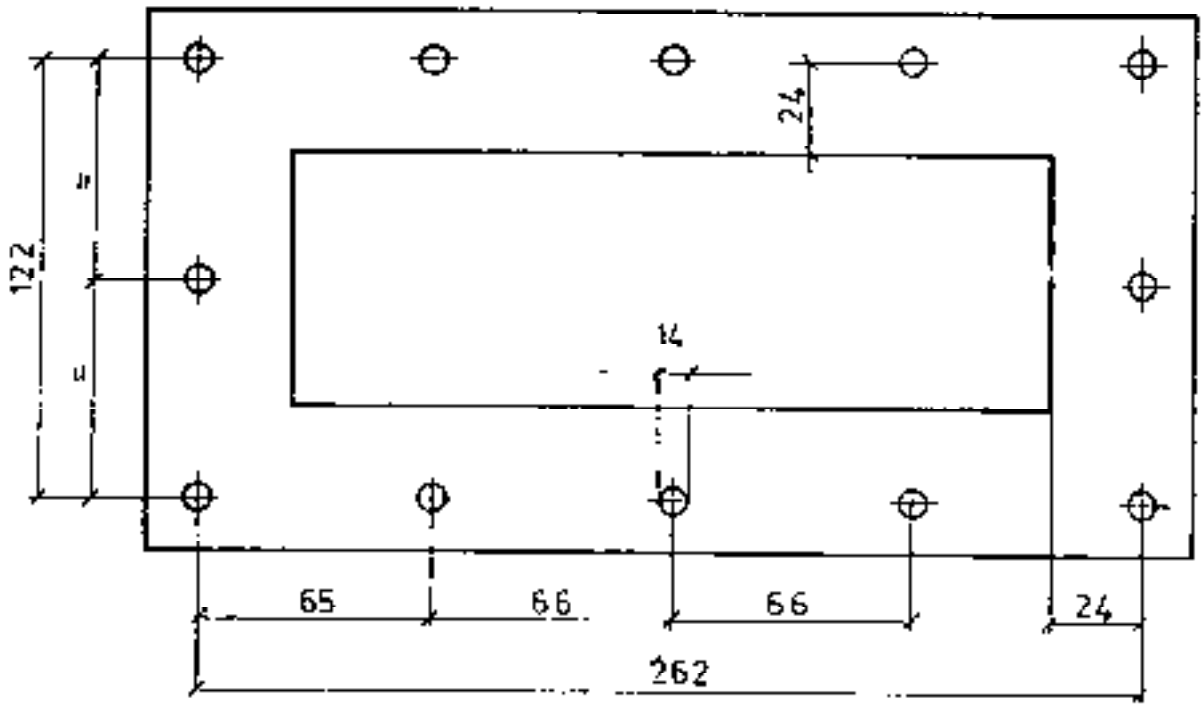
MS FLAT 10 X 40





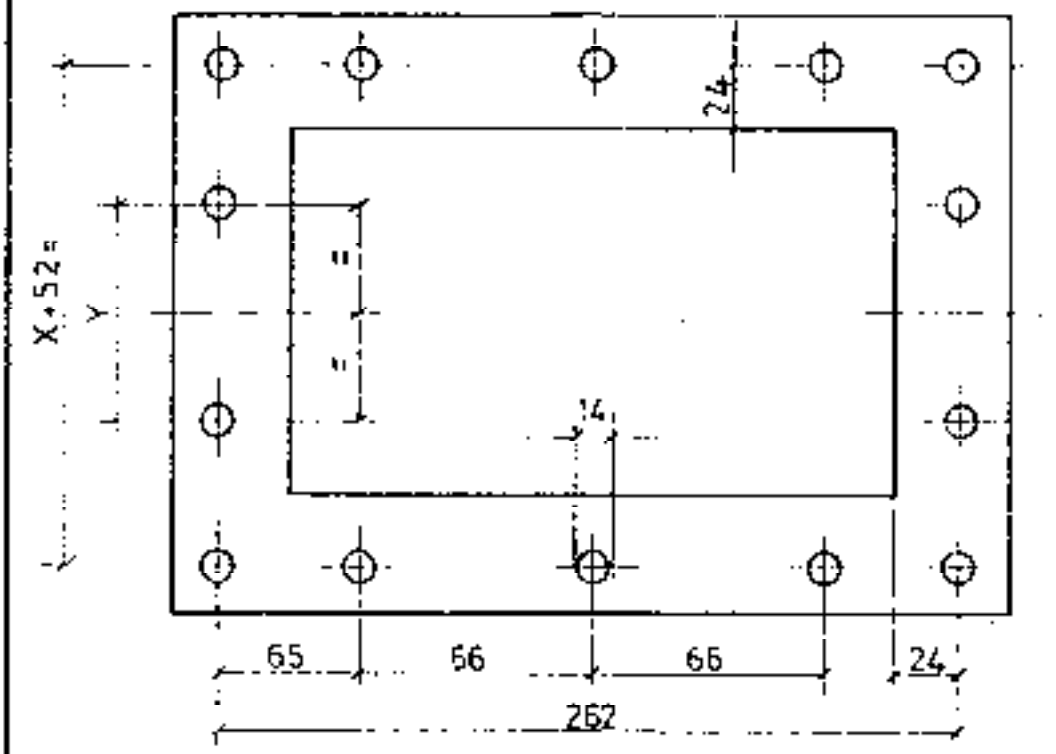
FOR DRILLING HOLES REFER TO T1-14.2/1 – 2/4

ADAPTER SQUARE FLANGE T1-14.2



ADAPTER FLANGE (X70)

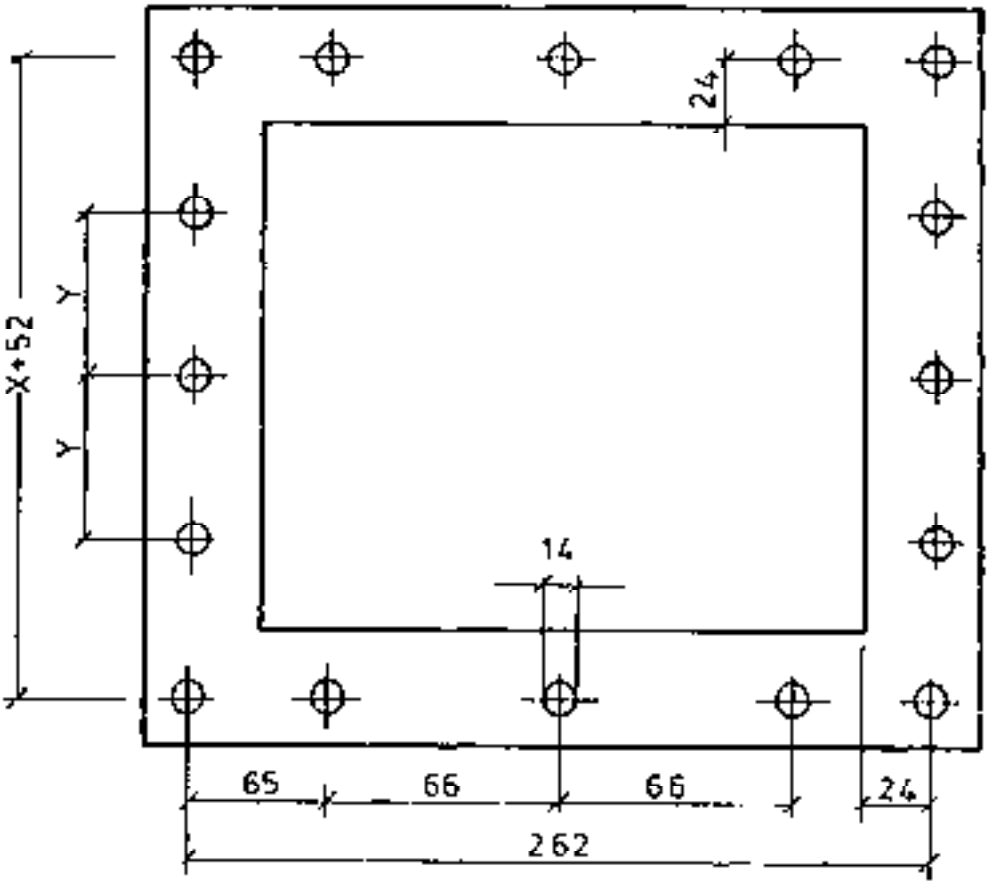
T1-14.2/1



Y	X 100	X 150	X 180
	50	68	80

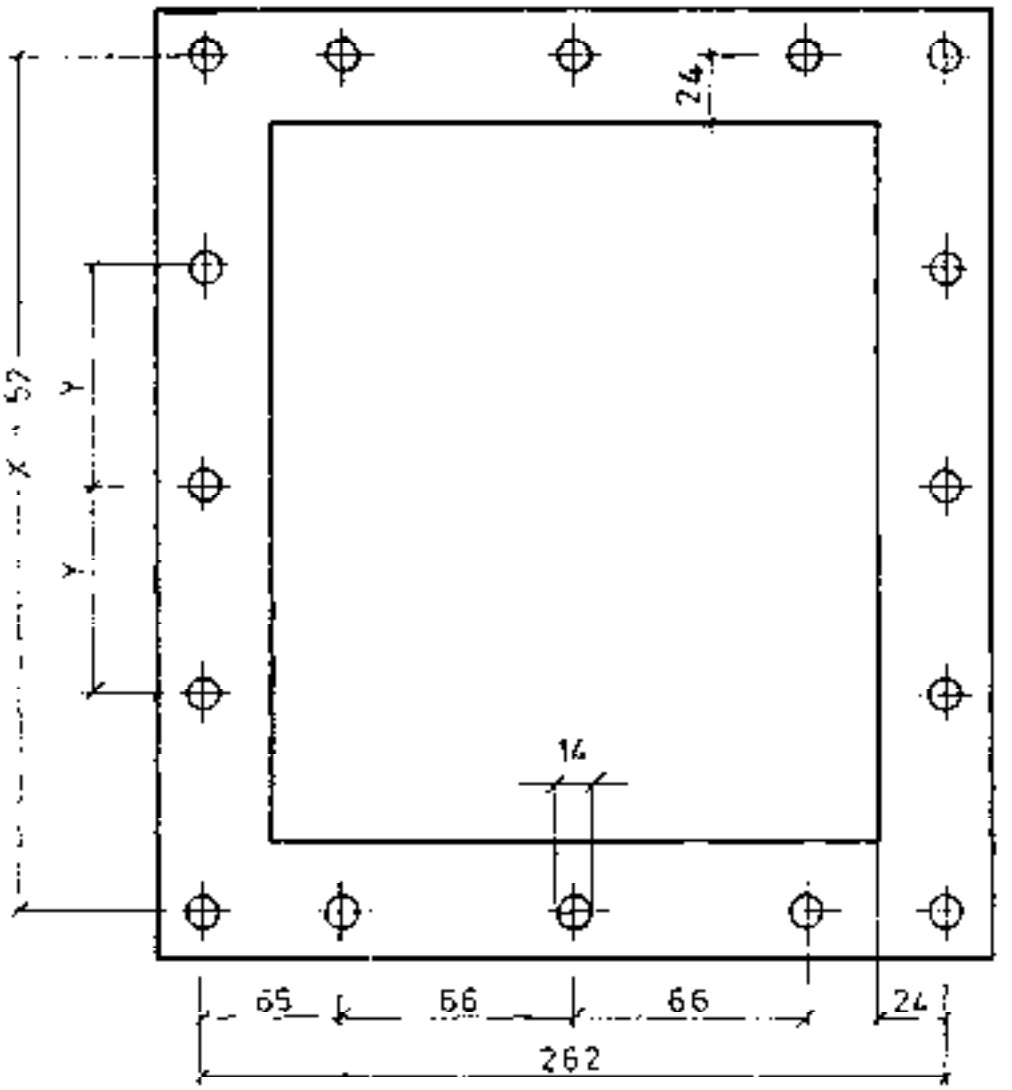
ADAPTER FLANGE (X100, X150, X180)

T1-14.2/2



	X 200	X 220
Y	63	68

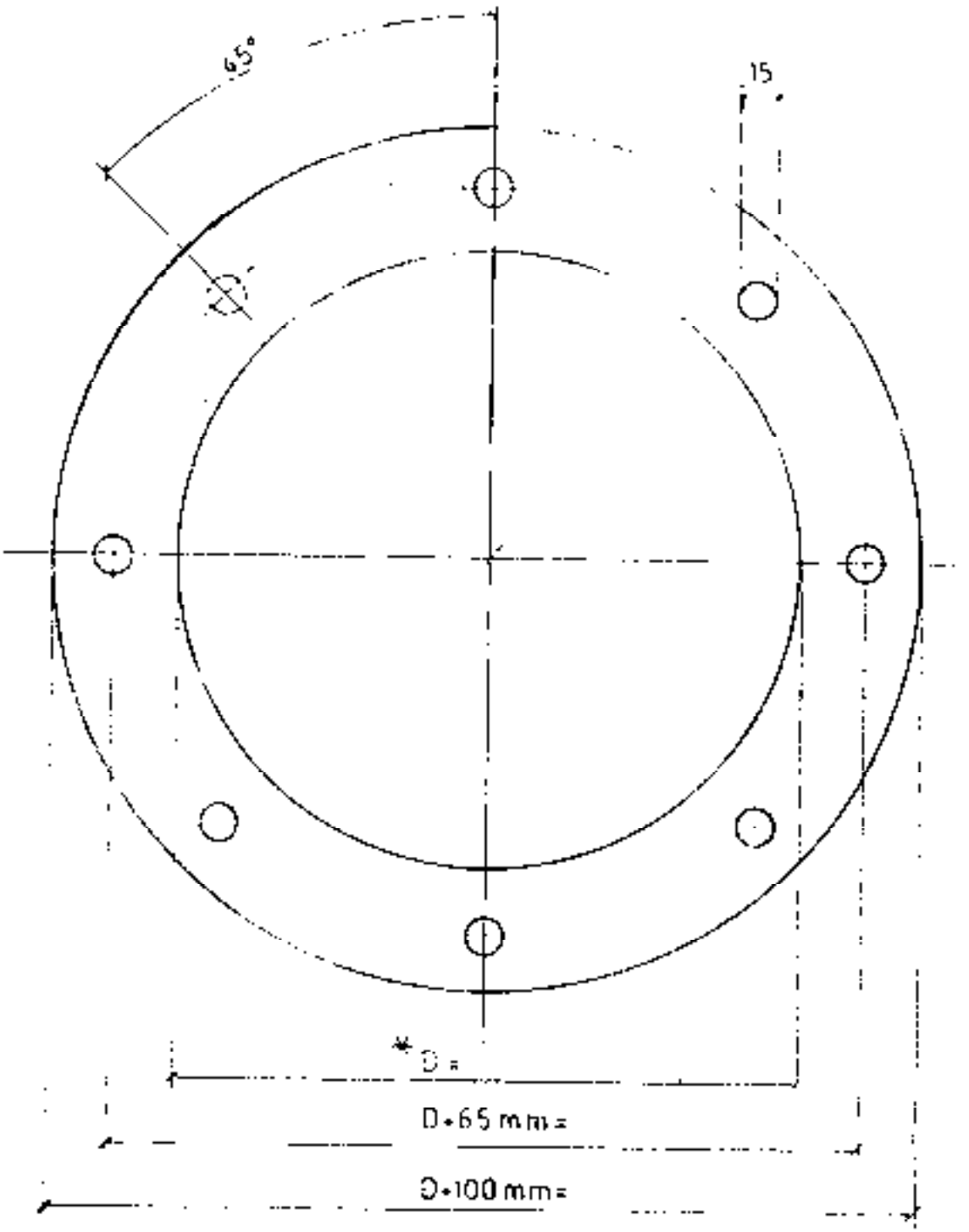
ADAPTER FLANGE (X200, X220) T1-14.2/3



	X 300	X 360	X 400
Y	88	103	118

ADAPTER FLANGE (X300, X360, X400)

T1-14.2/4



USE 8 MM PLATE

NOS

* ACCORDING TO PENSTOCK USED

PIPE FLANGE

T1-14.3