

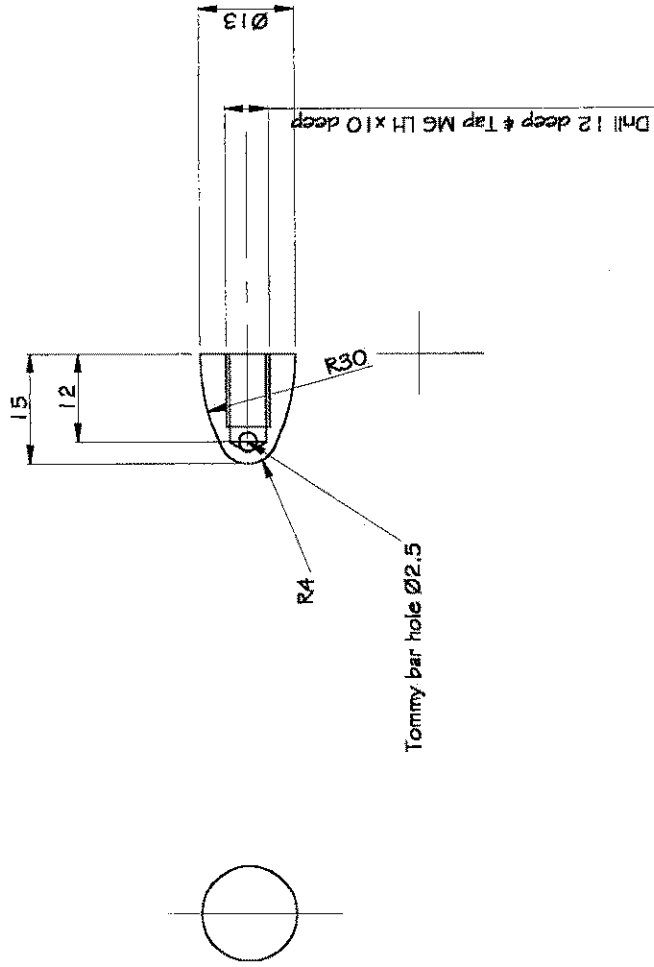
Item No	Description	No Off	Material	Issue	Remarks
1	Compressor Nut	1	Aluminium alloy	1	
2	Front Spacer	1	Mild steel	1	
3	Compressor	1	Garrett (Part No.446335-10)	5	Standard compressor modified
4	Intake	1	Nylon	4	Drg. now to suit comp. 09 or -10
5	Shaft Seal	1	Aluminium alloy	2	
6	Case Front	1	Aluminium alloy	5	'Chf. not required' note added
7	Diffuser	1	Aluminium alloy	3	Sheet 2: issue 3
8	Filter	1	Stainless steel	2	
9	Filter Cover	1	Aluminium alloy	2	
10	Spring	1	Spring steel	2	
11	Tunnel	1	Aluminium alloy	3	
12	Shaft	1	En 24T	2	
13	Combustion Chamber S/A	1	Comprising items 14 - 19	4	
14	Combustion Chamber Front	1	Stainless steel	1	
15	Glow Plug Boss	2	Stainless steel	1	
16	Combustor Wrapper Inner	1	Stainless steel	2	
17	Combustor Wrapper Outer	1	Stainless steel	4	
18	Vaporiser Tube	6	Stainless steel	3	
19	Combustion Chamber Rear	1	Stainless steel	2	
20	Fuel Pipe Assy.	1	Brass	3	
21	Case Outer	1	Stainless steel	3	
22	Case Rear	1	Mild steel	3	
23	NGV Outer	1	Stainless steel	1	Not required if cast version is used - item 35
24	NGV Inner	1	Stainless steel	2	
25	Turbine Wheel	1	Inconel	1	
26	Rear Spacer	1	Mild steel	1	
27	Turbine Nut	1	Stainless steel	1	
28	Exhaust Cone Assy.	1	Comprising items 29 - 31	2	
29	Cone Outer	1	Stainless steel	1	
30	Cone Inner	1	Stainless steel	1	
				Issue: 3	Item List for MW54 Sht. 1

Item No	Description	No Off	Material	Issue	Remarks
31	Outlet Vane	4	Stainless steel	2	
32	Adaptor	3	Brass	2	
33	Lubrication Pipe	1	Brass	2	
34	Gas Pipe	1	Brass/Stainless steel	2	
35	Cast NGV	1		2	Items 23/24 not req
36	Tube End Fitting	3	Stainless steel	3	
37	Templates			2	
38	Preload Tube	1	Mild steel	2	
39	Swirl Jet	6	Stainless steel	2	
40	Ball Race	2	GRW 688 - Ceramic		
41	Cap screw M2.5 x 5	22*	Stainless steel		*18 if cast NGV
42	Cap screw M2.5 x 7	8	Stainless steel		
43	Cap screw M3 x 4	8	Stainless steel		
44	Skt hd. Csk. Screw M3 x 12	6	Stainless steel		
45	'O' ring	2	16 x 1.5		Viton
46					
47	Seal	3	Fibre washer 3.0 bore		
48	Sealant		High temp Silicone		
49	Cap screw M2.5 x 8	8	Stainless steel		
50	'O' ring cord		Dia. 1.5 mm section		275 long
	General arrangement			5	

NOTES

- a) Some items have an indication ' TOP '. It is suggested you mark this position on the item during manufacture.
- b) Some groups of holes are marked with the symbol # , this indicates that the relative position between these groups is important.
- c) All drawings are full size, although some have enlarged views.
- d) All dimensions are **nominal**, this means that you should allow the appropriate clearances where parts are fitted together. Full engineering tolerances would only complicate the manufacture.

Dimensions in Millimeters



Material: Aluminium alloy

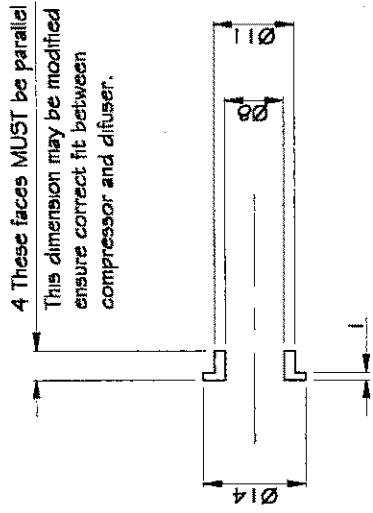
Title: Compressor Nut

Issue: 1

Part No. 001

Drawn: Terry Lee | Third Angle Projection | © WREN Turbines | Turbine - MW54

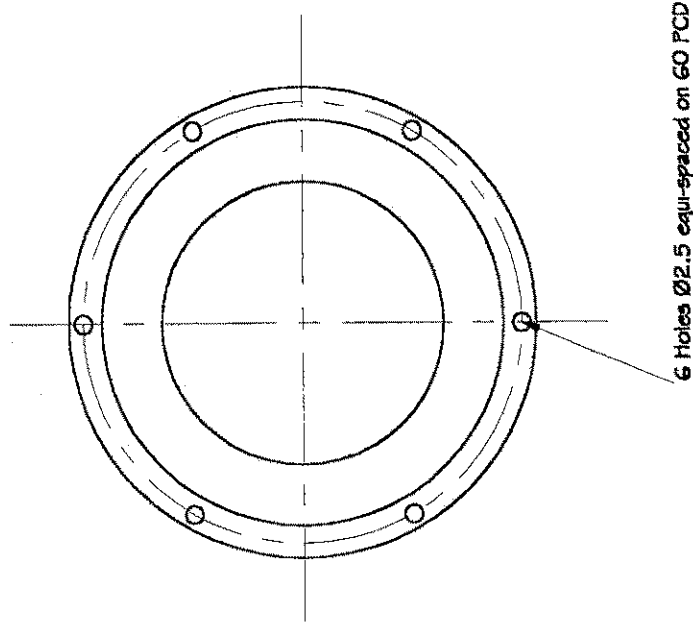
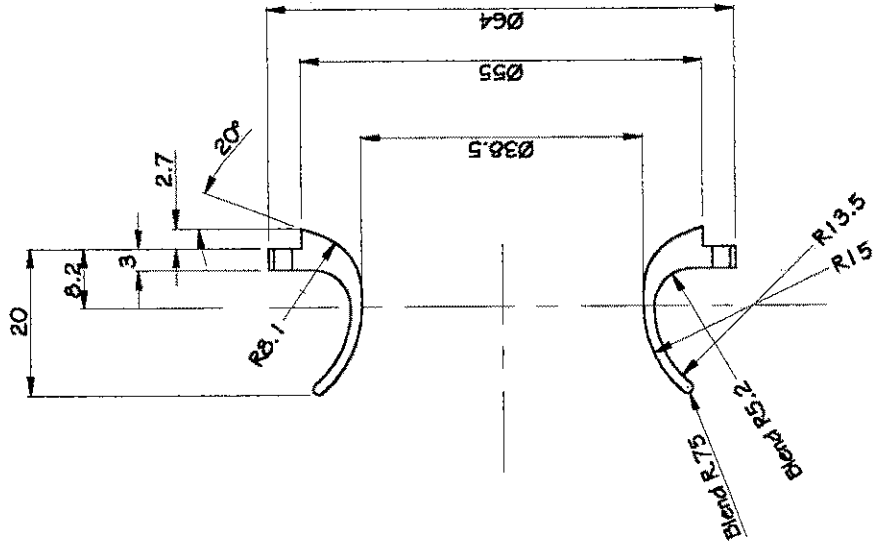
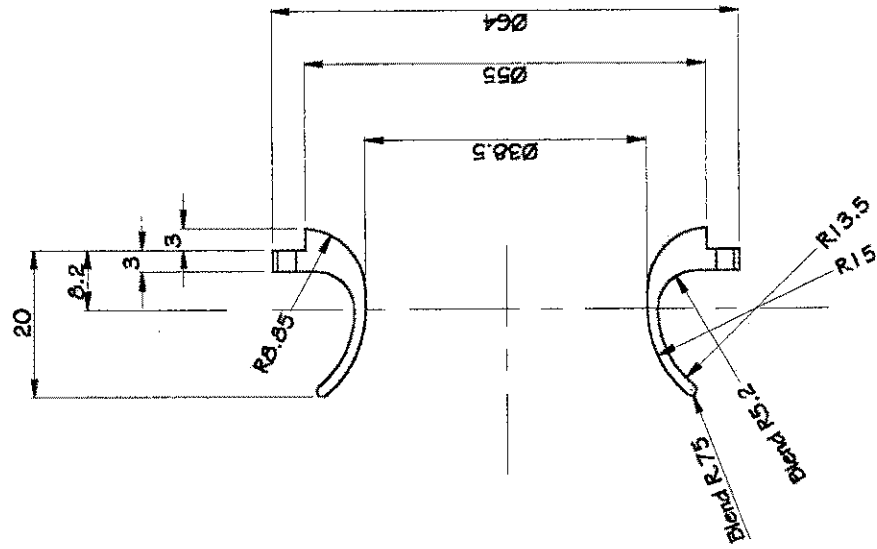
Dimensions in Millimeters



Actual Size

Material: Mild Steel	Issue: 1	Part No. 002
Title: Front Spacer		
Drawn: Terry Lee	Third Angle Projection	© WREN Turbines Turbine - MW54

Dimensions in Millimeters



Profile to suit modified compressor

Profile to suit standard compressor
Part No. 446335-9

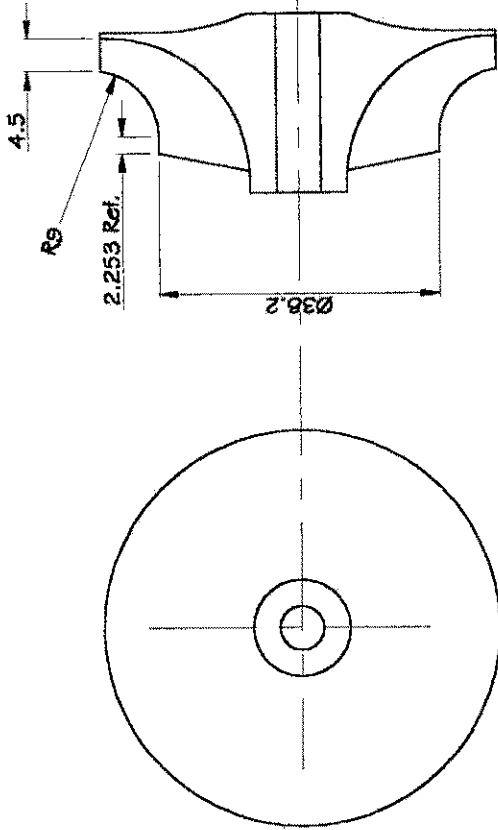
Material: Nylon

Title: Intake

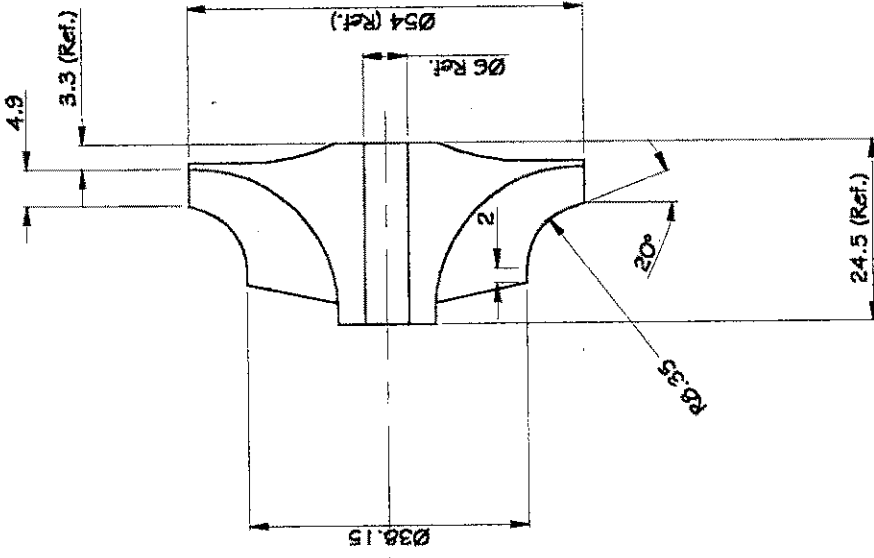
Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Issue: 4 Part No. 004

Dimensions in Millimeters



Profile of compressor
as modified from
Garrett Part No. 446335-10
(or 446335-9)



Profile of standard compressor:
Garrett Part No. 446335-9

Please Note:

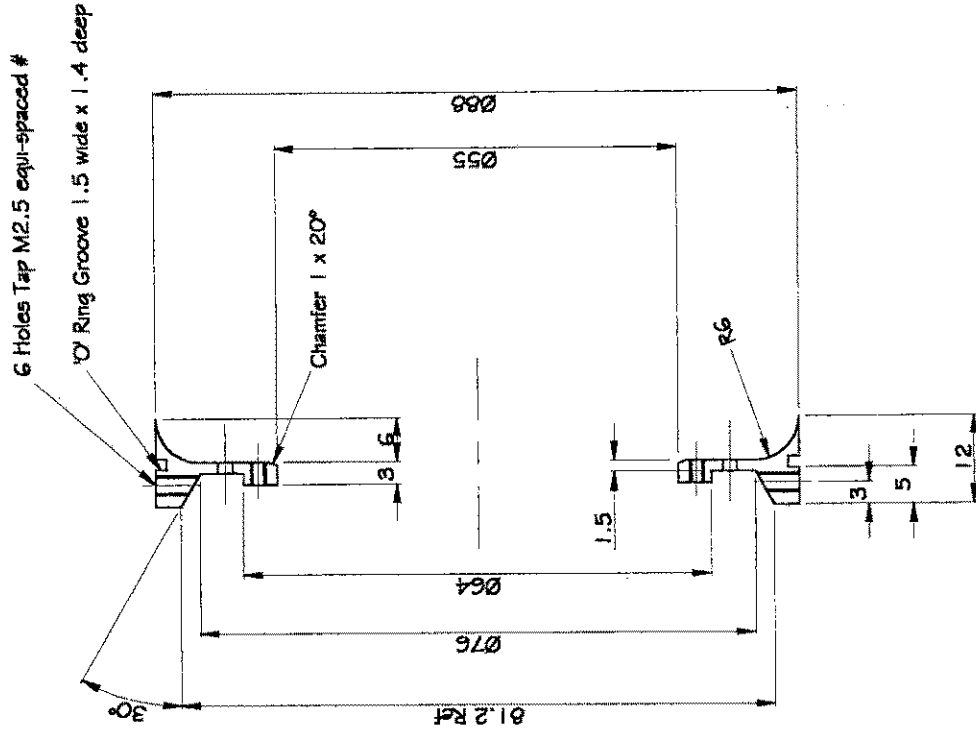
Although the engine will run using the compressor part No. 446335-9,
it will accelerate much better using the modified form as shown above.
The L10 compressor is also less expensive.

Material: Aluminum Alloy	Issue: 5	Part No. 003
Title: Compressor		
Drawn: Terry Lee	Third Angle Projection	© WREN Turbines Turbine - MW54

Dimensions in Millimeters

- 11 Holes equi-spaced on 60 PCD #
- 6 @ $\varnothing 2.5 \# 3$ (Marked *) @ $\varnothing 3.0$

Line up with one outer hole (Mark TOP)



Note! relative positions of holes marked thus is important.

Material: Aluminum alloy
Title: Case Front

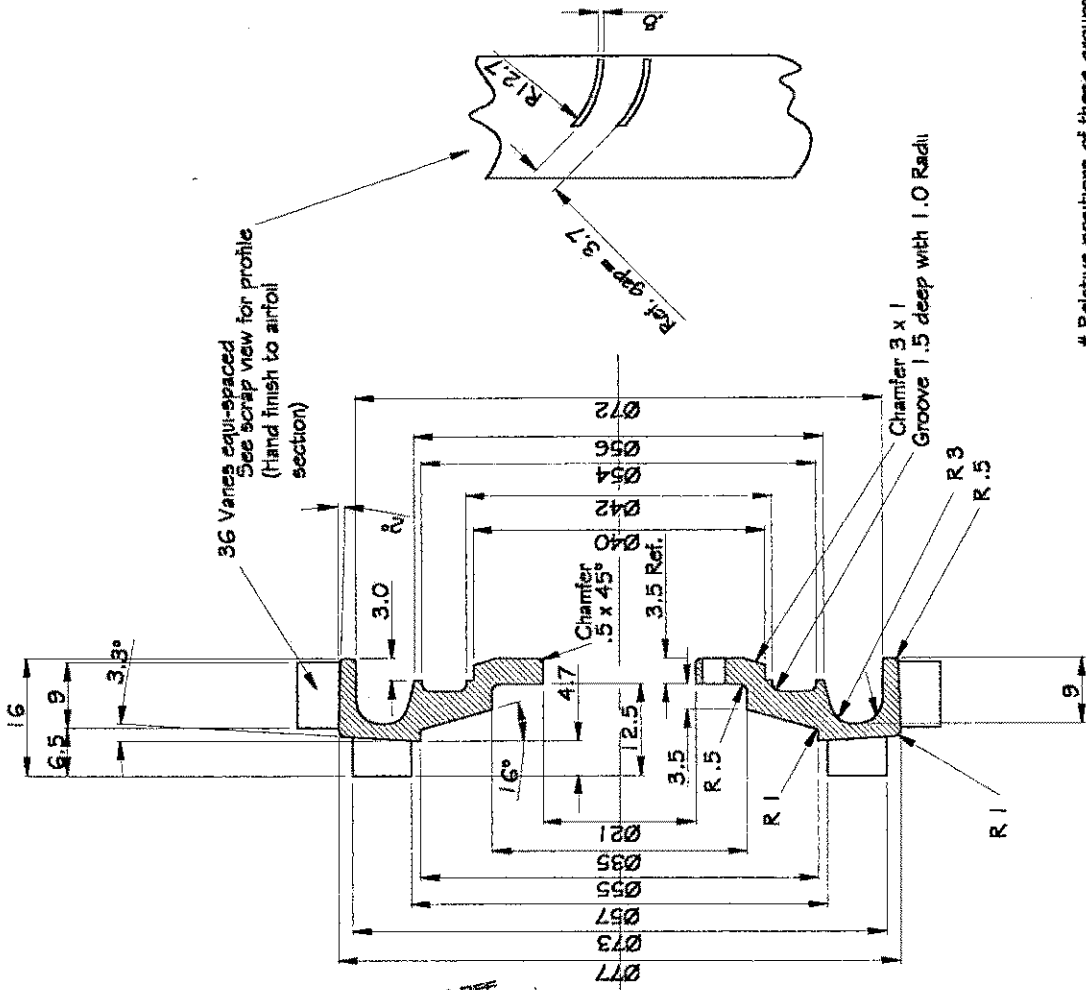
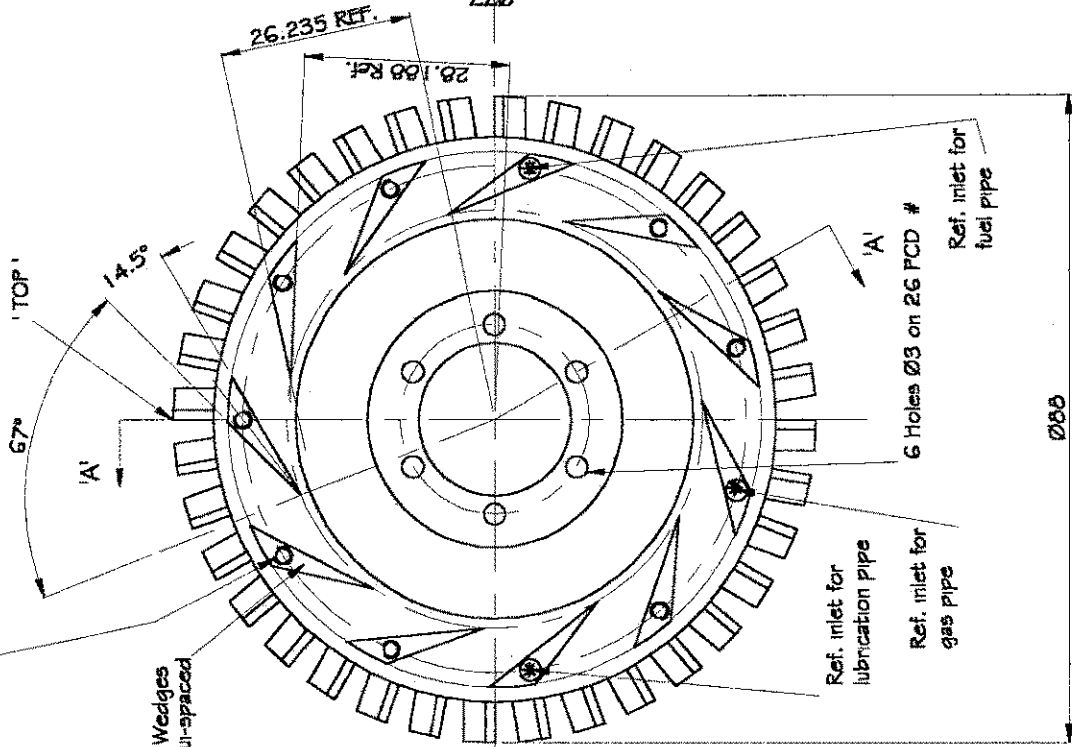
Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Issue: 4 Pat No. 006

Dimensions in Millimetres

Ø Holes tap M2.5 through
 * 3 Holes drill Ø 3 through (at *)
 on 69 PCD #

11 Wedges
 equi-spaced



Section 'A-A'

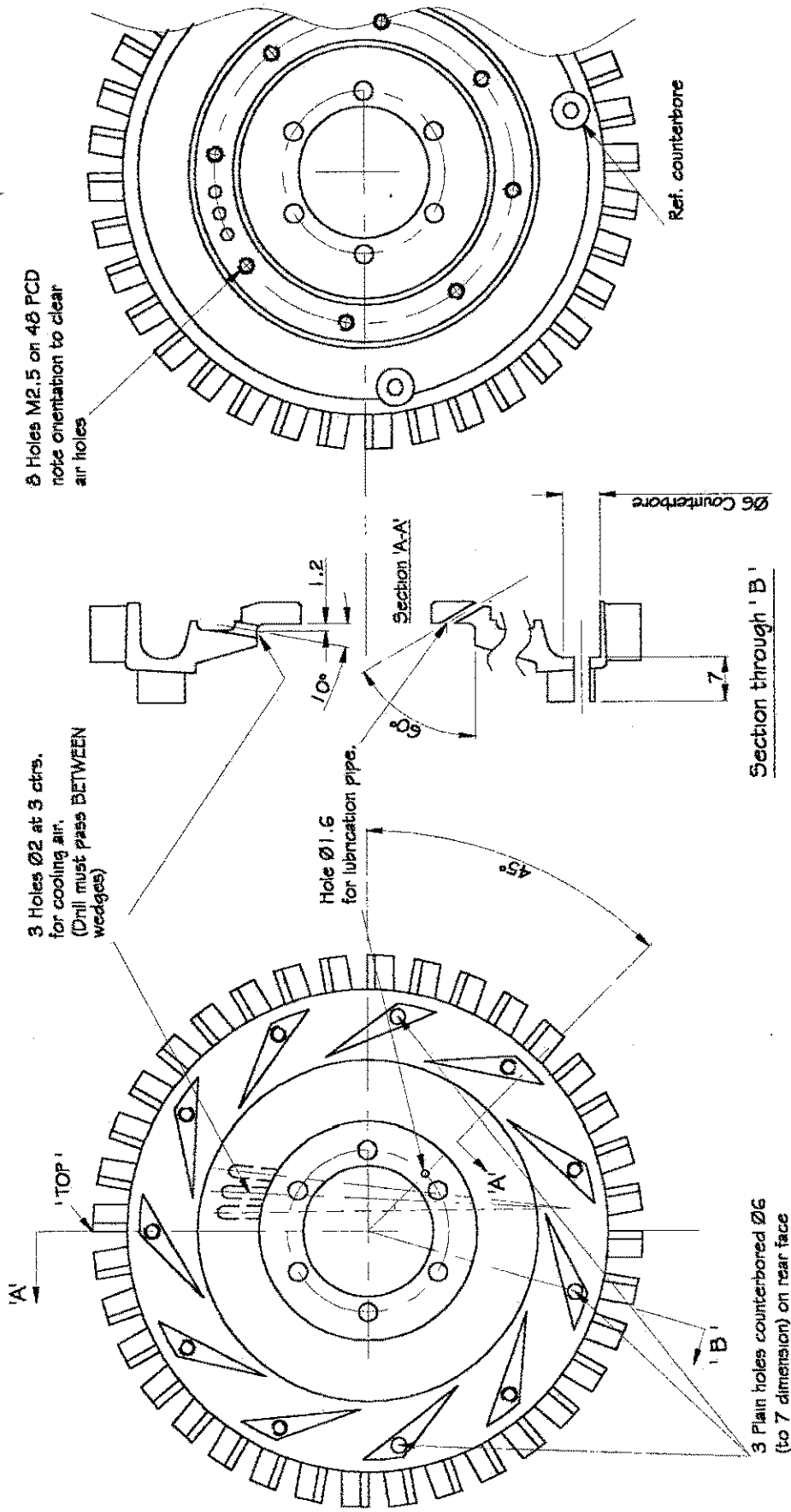
NOTE: Background lines omitted for clarity

Relative positions of these groups
 of holes is important.

NOTE: See sheet 2 for more detail.

Drawn: Terry Lee	Third Angle Projection	© WREN Turbines	Turbine - MW54	Title: Diffuser - Sht. 1	Material: Aluminium Alloy
				Issue: 3	Part No. 007

Dimensions in Millimetres



8 Holes M2.5 on 48 PCD
note orientation to clear
air holes

3 Holes $\varnothing 2$ at 3 ctrs.
for cooling air.
(Drill must pass BETWEEN
wedges)

Hole $\varnothing 1.6$
for lubrication pipe.

3 Plain holes counterbored $\varnothing 6$
(to 7 dimension) on rear face

Ref. counterbore

Section 'A-A'

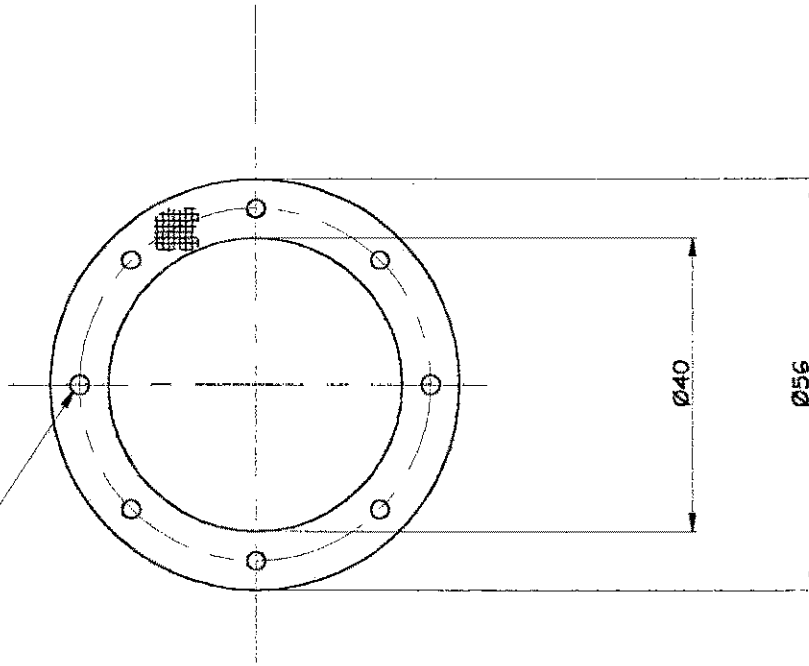
Section through 'B'

$\varnothing 6$ Counterbore

Material: Aluminium Alloy	Issue: 3	Part No. 007
Title: Diffuser - Sht. 2		
© WREN Turbines	Turbine - MW54	
Drawn: Terry Lee	Third Angle Projection	

Dimensions in Millimeters

8 Holes $\varnothing 2.5$ equi-spaced on 48 PCD



Suggested method of manufacture

Affix mesh to filter cover using super glue taking care not to block the mesh in the area of the intake holes.
Cut round edges using scissors or knife.
Punch 2mm fixing holes.

Filter Specification

Material: Stainless steel mesh
'200 mesh' with strands of .005"

Material may be obtained from:

J.A. Crewe & Co
Watery Gate Farm,
Chipping Campden,
Gloucestershire,
GL55-6QU
Tel: 01386-841979

Material: Stainless Steel

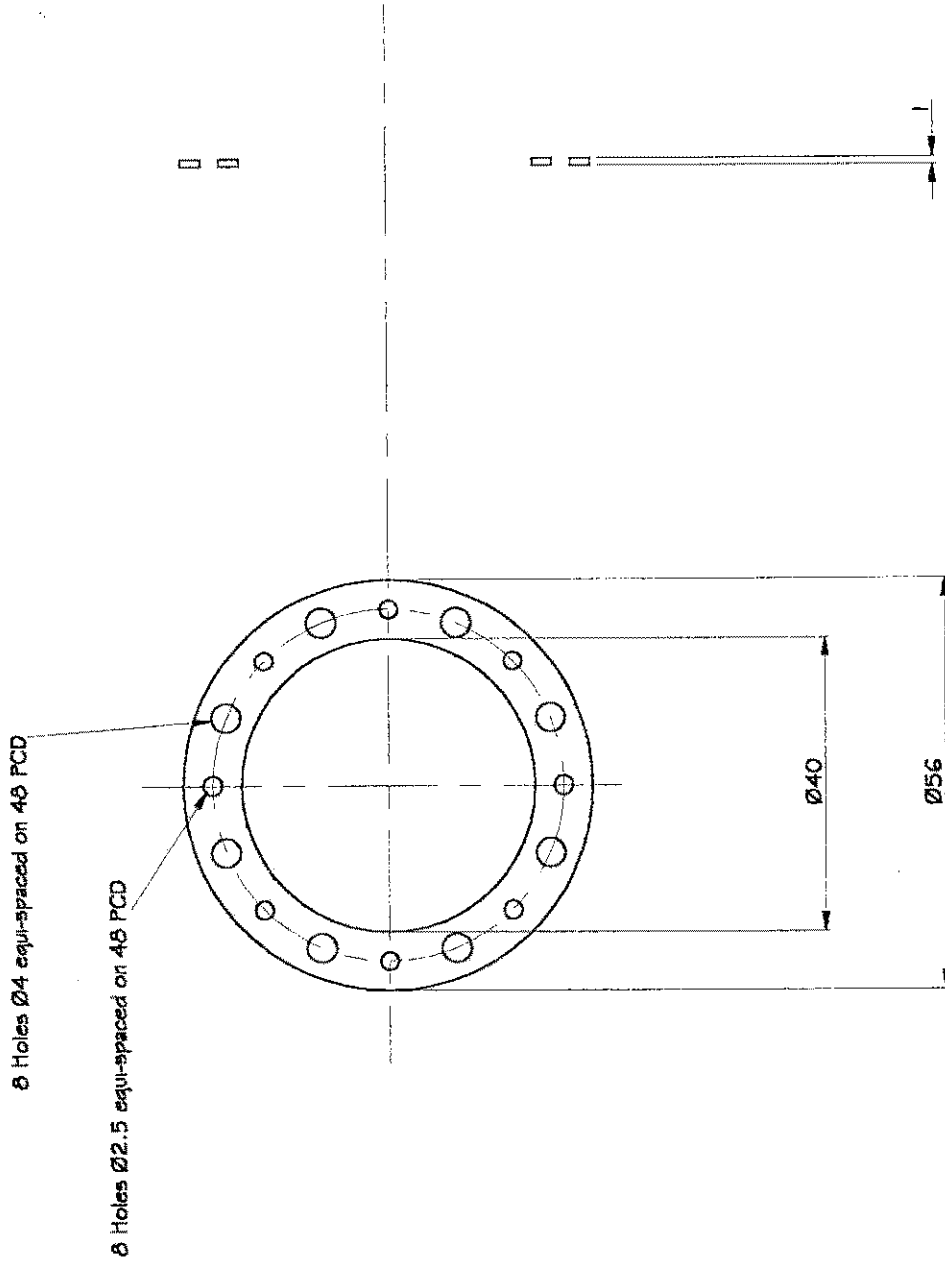
Title: Filter

Drawn: Terry Lee | Third Angle Projection | © WREN Turbines | Turbine - MW54

Issue: 2

Part No. 006

Dimensions in Millimeters



Material: Aluminum Alloy

Title: Filter Cover

Issue: 2

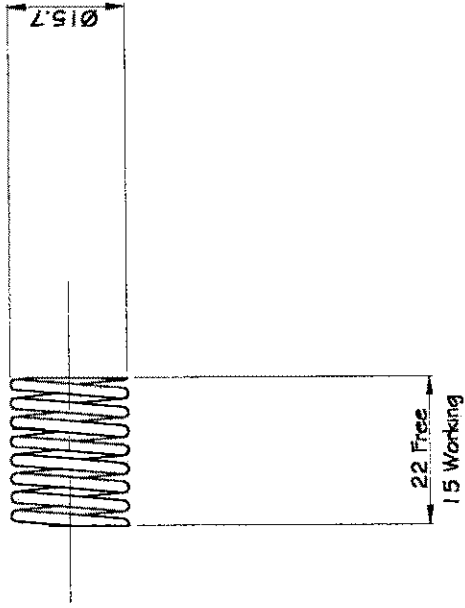
Part No. 009

© WREN Turbines Turbine - MW54

Drawn: Terry Lee

Third Angle Projection

Dimensions in Millimeters



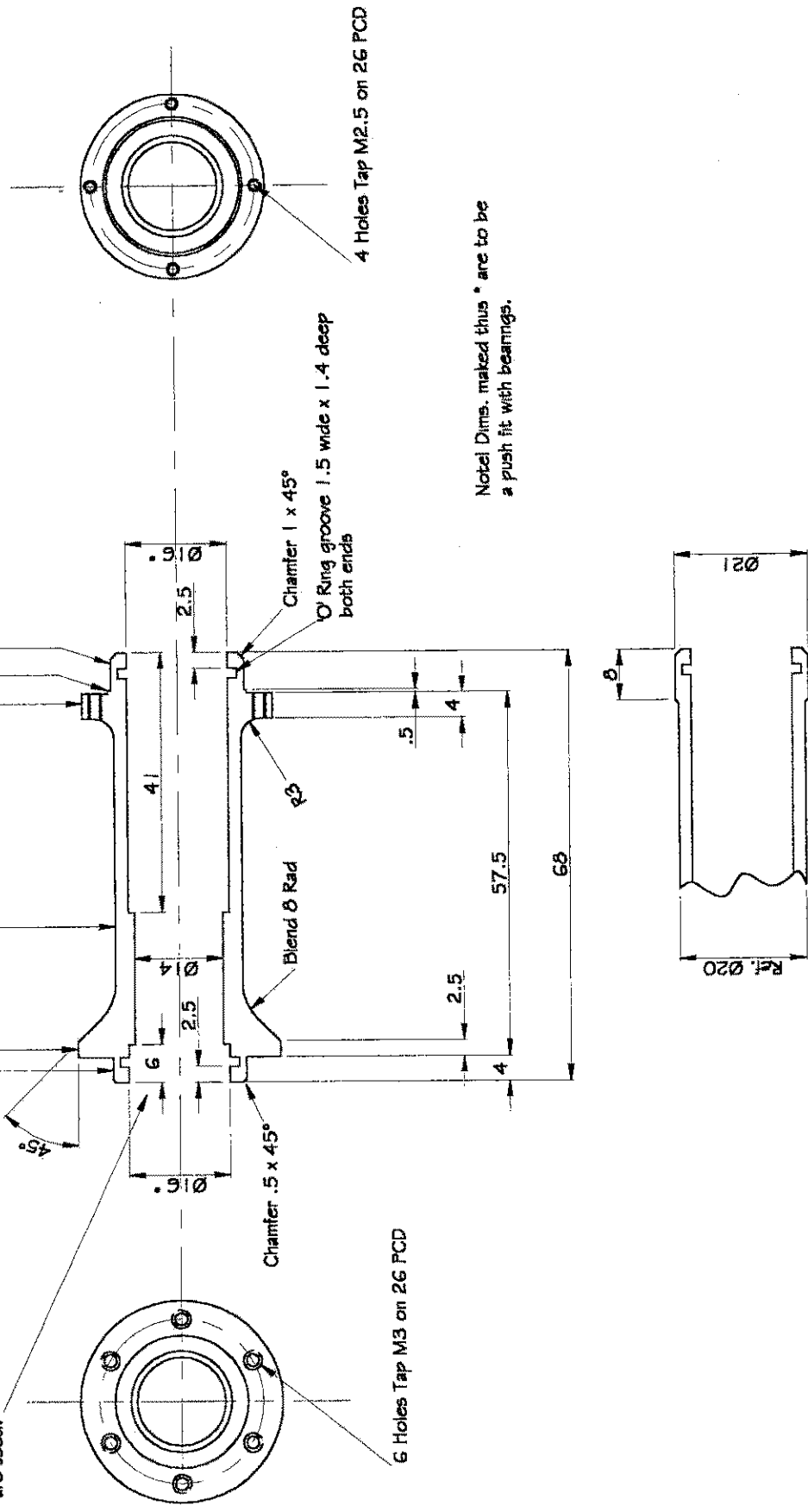
Spring Details

Diameter: 15.7
Free Length: 22
Working Length: 15
Load at working length: 3.75kg.
Wire Dia: 1.6mm
No. working coils: 4

Material: Spring Steel	Issue: 2	Part No. 010
Title: Spring		
Drawn: Terry Lee	Third Angle Projection	© WREN Turbines Turbine - MW54

Dimensions in Millimeters

Note: \varnothing ring groove sizes are for 1.5mm section rings. Adjust accordingly if other sizes are used.

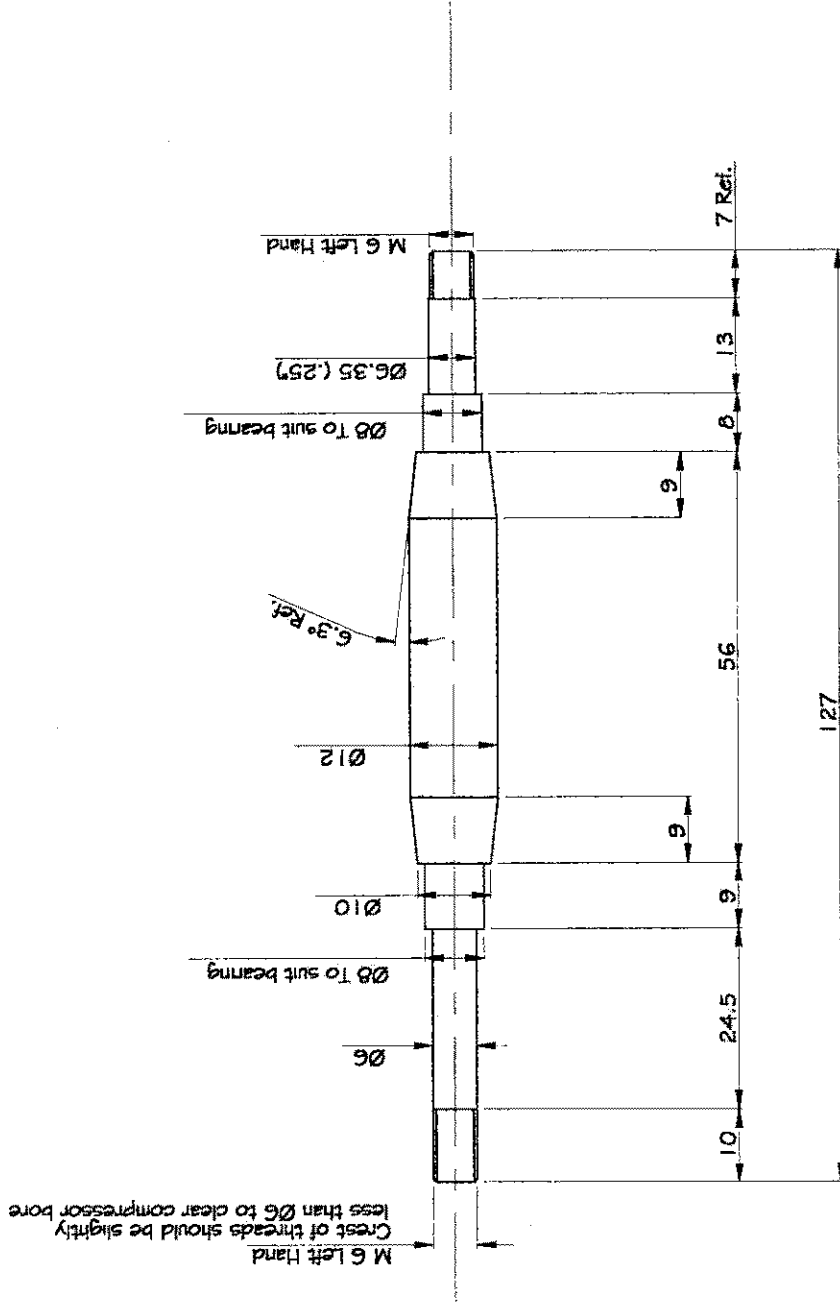


Note: Dims. marked thus * are to be a push fit with bearings.

Shape of rear of tunnel if cast NGV is to be used.

Material: Aluminum Alloy	Issue: 3	Part No. 011
Title: Shaft Tunnel		
Drawn: Terry Lee	Third Angle Projection	© WREN Turbines Turbine - MW54

Dimensions in Millimeters



Material: En 24T or Equivalent

Title: Shaft

Issue: 2

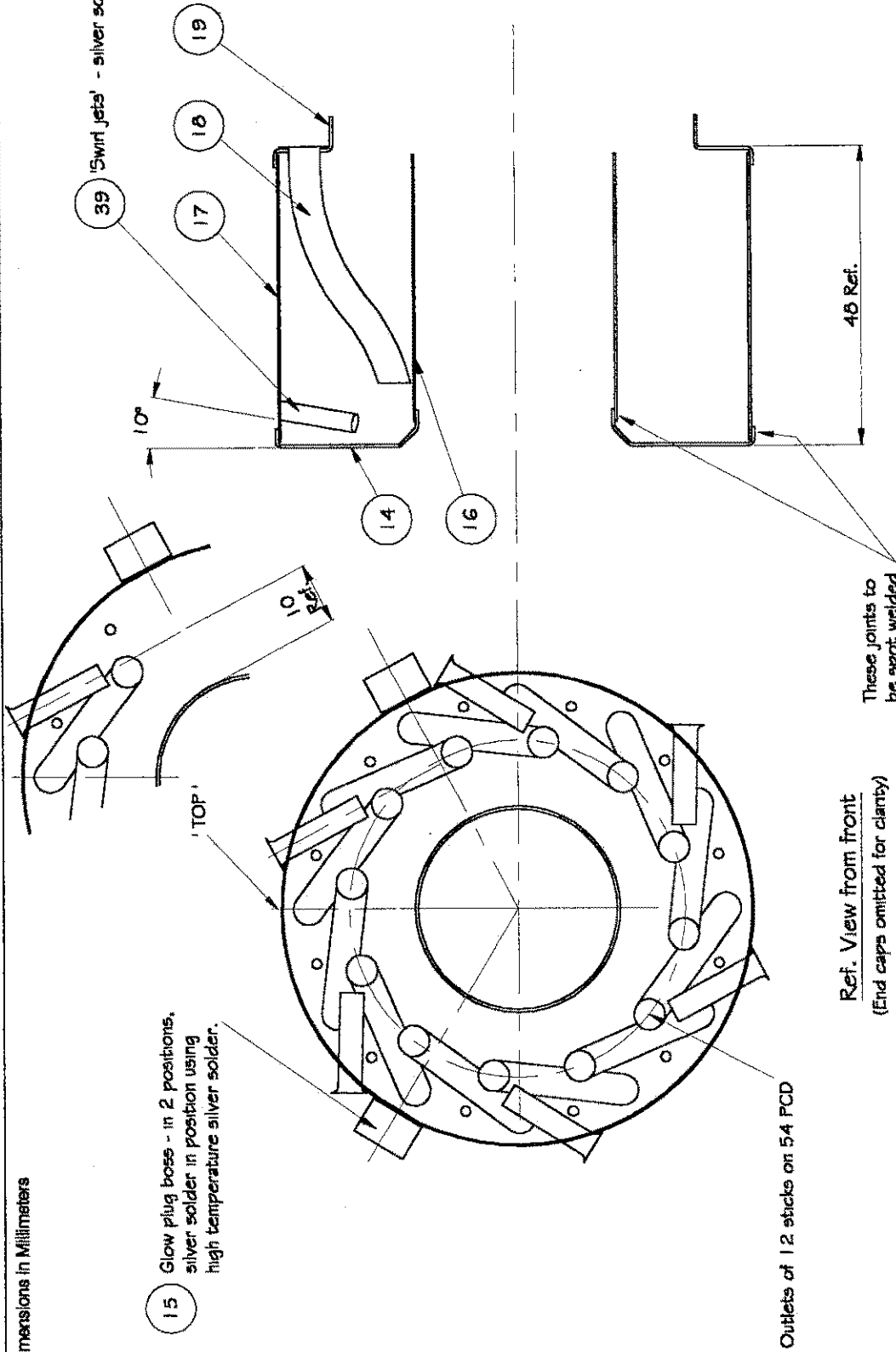
Part No. 012

Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Dimensions in Millimeters

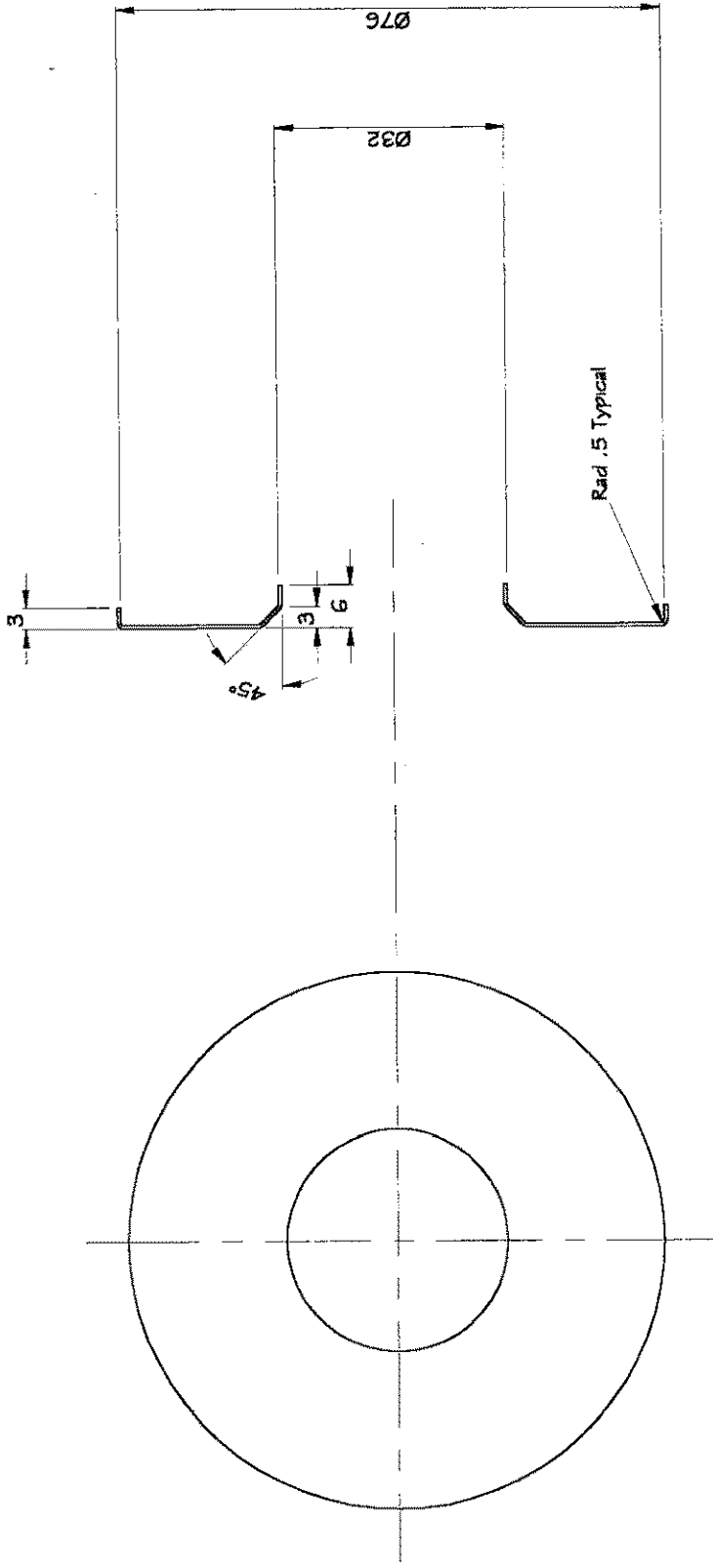
15 Glow plug boss - in 2 positions, silver solder in position using high temperature silver solder.

39 'Swirl jets' - silver solder in position



Material: As details	Material: As details
Title: Combustion Chamber Sub - Assy Issue: 4	Title: Combustion Chamber Sub - Assy Issue: 4
Drawn: Terry Lee	Part No. 013
© WREN Turbines Turbine - MW54	

Dimensions in Millimeters



Material: Stainless Steel sheet - .4mm Thick

Title: Combustion Chamber Front

Issue: 1

Part No. 014

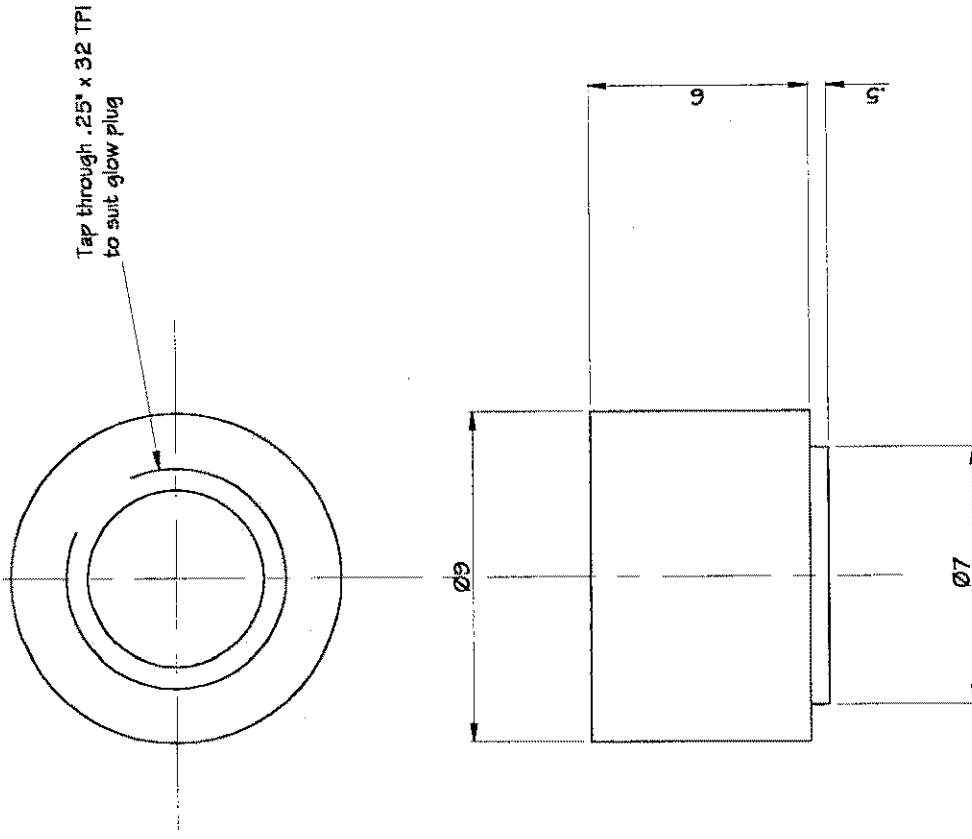
Turbines - MW54

© WREN

Third Angle Projection

Drawn: Terry Lee

Dimensions in Millimeters



Actual Size

Enlarged View Scale 5:1

Material: Stainless Steel

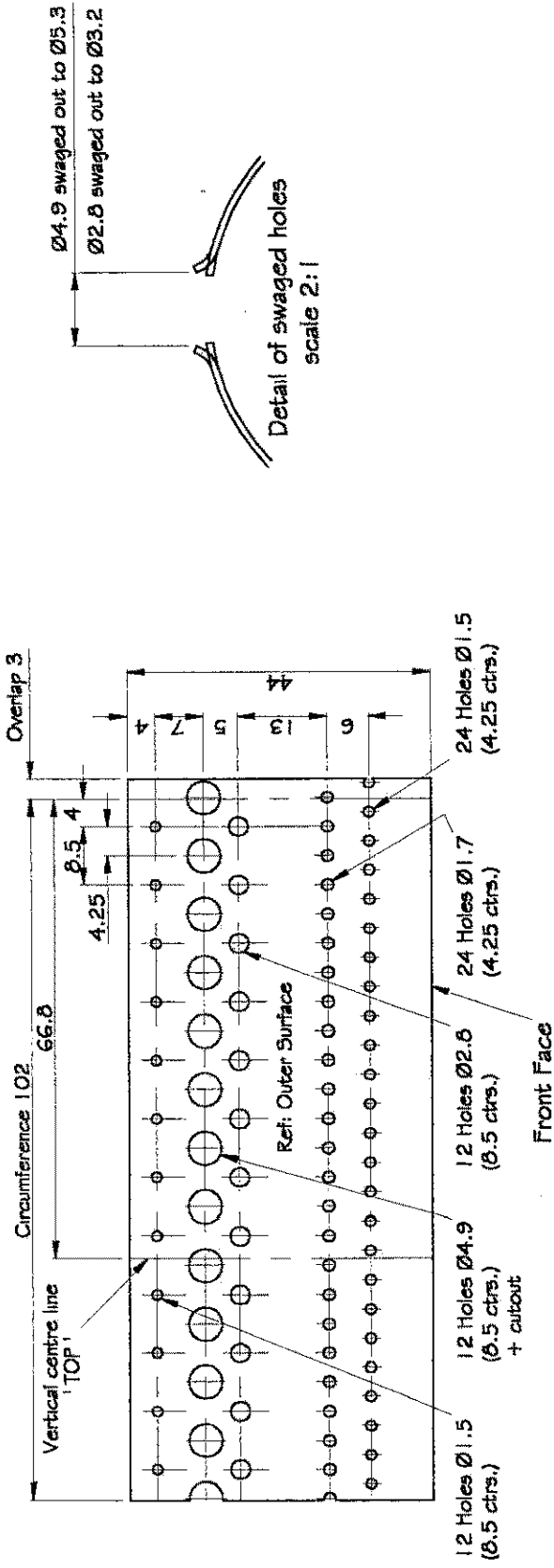
Title: Glow Plug Boss

Issue: 1

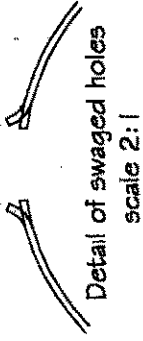
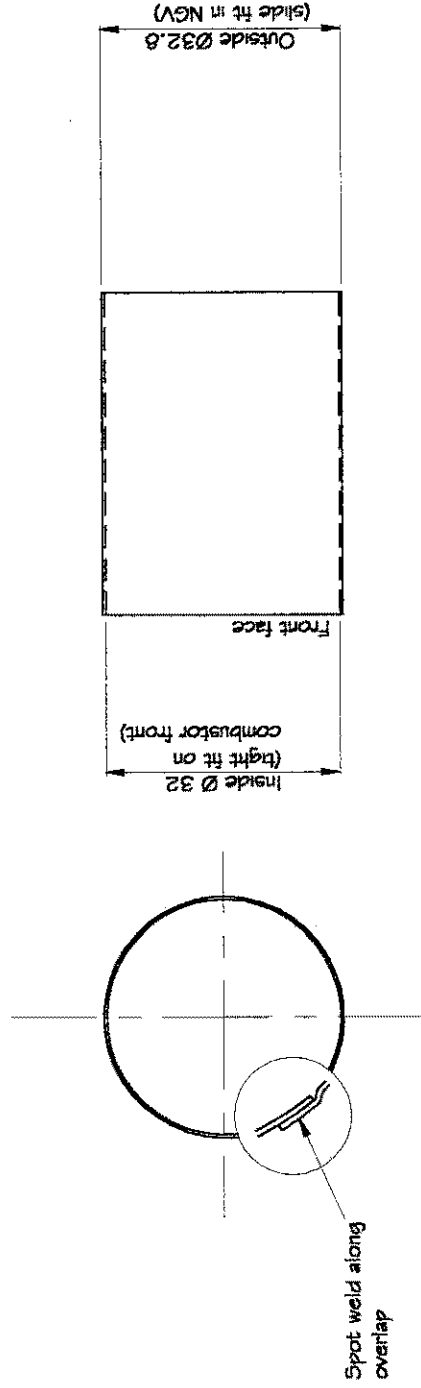
Part No. 015

Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

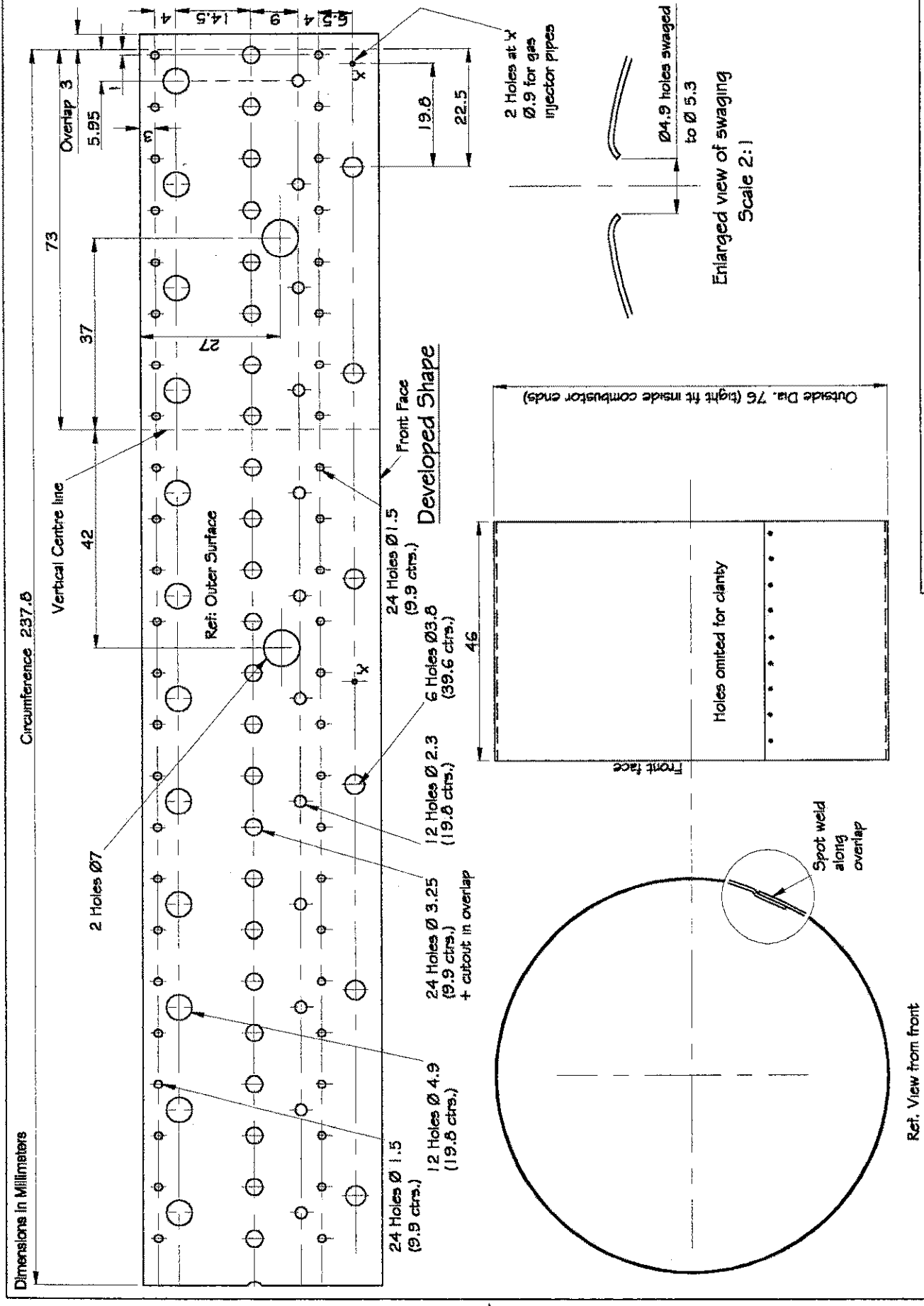
Dimensions in Millimeters



Developed Shape



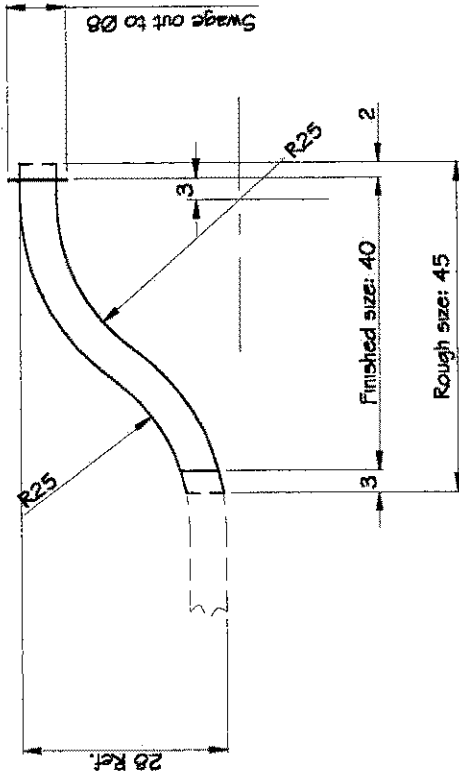
Drawn: Terry Lee	Third Angle Projection	© WREN Turbines	Turbine - MW54	Material: Stainless Steel sheet .4mm thick
				Title: Combustor - Inner Wrapper
				Issue: 2
				Part No. 016



Material: Stainless Steel sheet - .4mm thick
Title: Combustor - Outer Wrapper
Issue: 4
Part No. 017

Drawn: Terry Lee Third Angle Projection © Mike Murphy Turbine - MW54

Dimensions in Millimeters

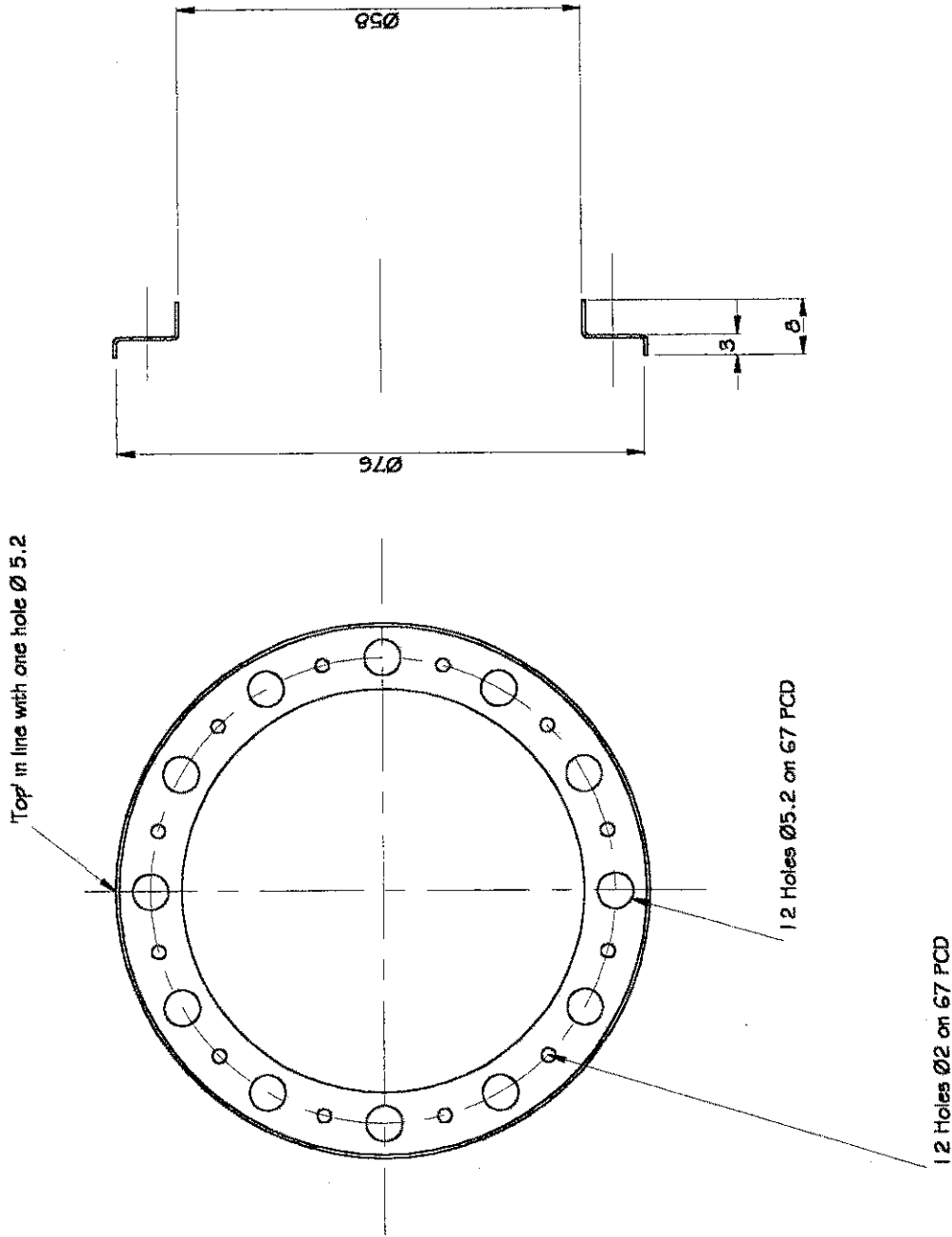


Make from Stainless Steel tube
Ø5 x .3 wall thickness



Material: See Above	Issue: 3	Part No. 018
Title: Vaporiser Tube		
Drawn: Terry Lee	Third Angle Projection	© WREN Turbines Turbine - MW54

Dimensions in Millimeters



Material: Stainless Steel sheet - .4mm thick

Title: Combustor Rear

Issue: 2

Part No. 019

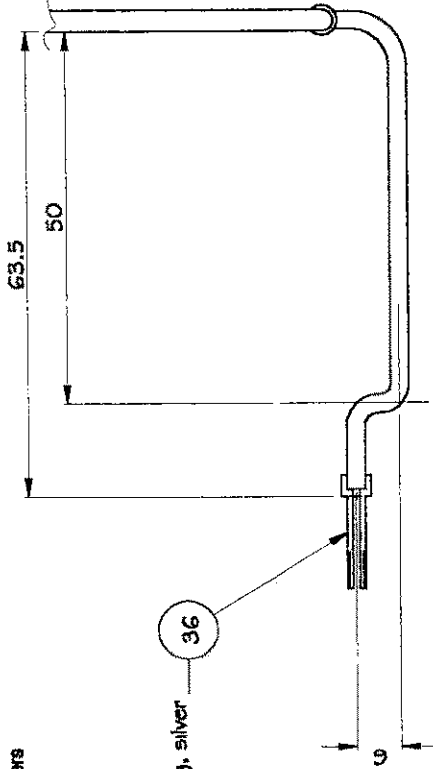
Turbine - MW54

© WREN Turbines

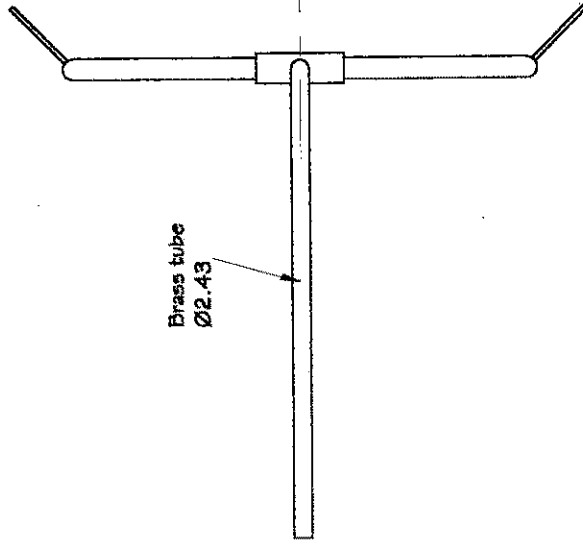
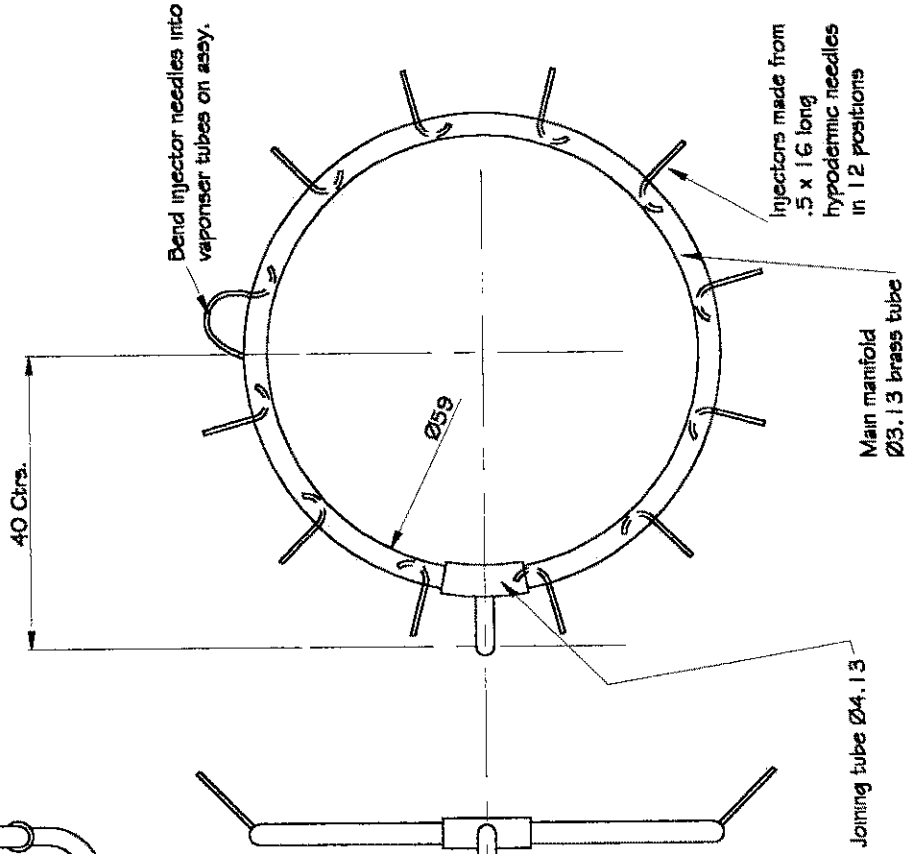
Third Angle Projection

Drawn: Terry Lee

Dimensions in Millimeters



Tube end fitting, silver solder to tube.



NOTES:

- All joints to be silver soldered
- It is important to ensure that no flux or solder is trapped inside the assembly.
- Tube diameters quoted are Outside dia.
- The assembly will require clipping (not shown) to the combustion chamber, position to suit.
- Ensure no holes are covered by clips or tube.

Material: See above
Title: Fuel Pipe Assy.

Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Issue: 3

Part No. 020

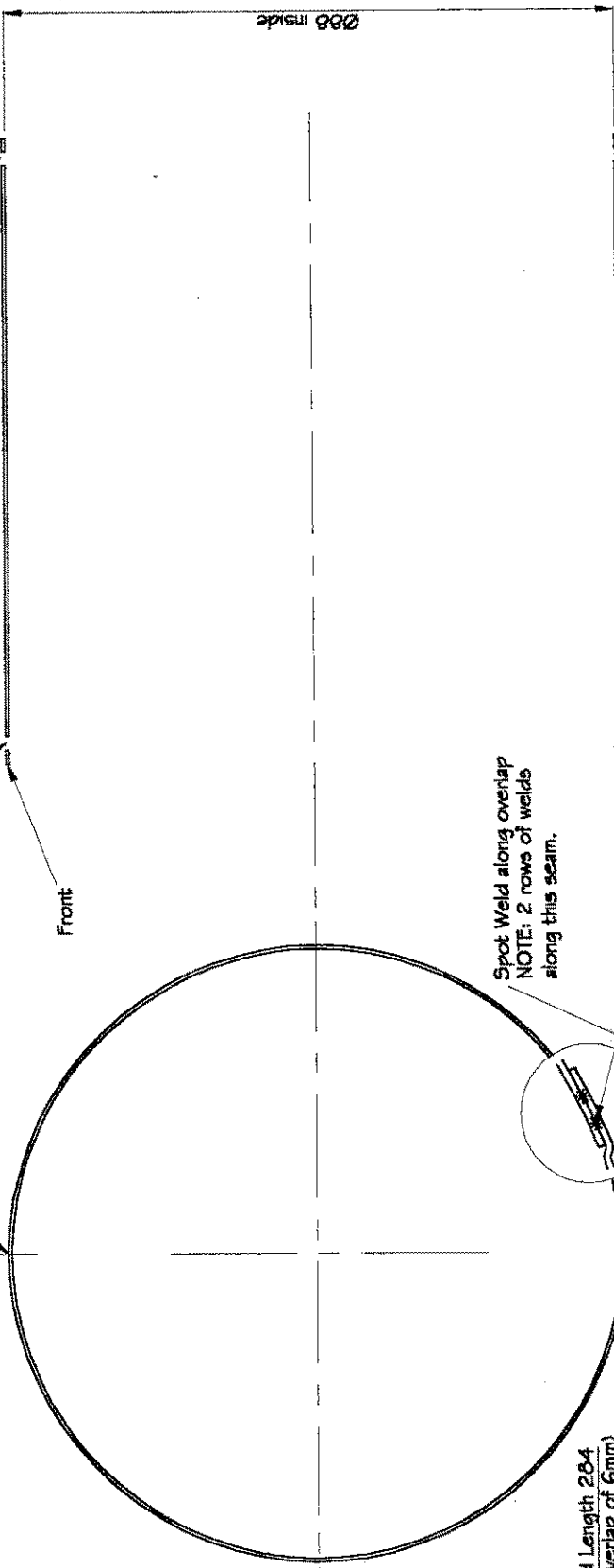
Dimensions in Millimeters

6 Holes Ø2.5 equi-spaced

TOP

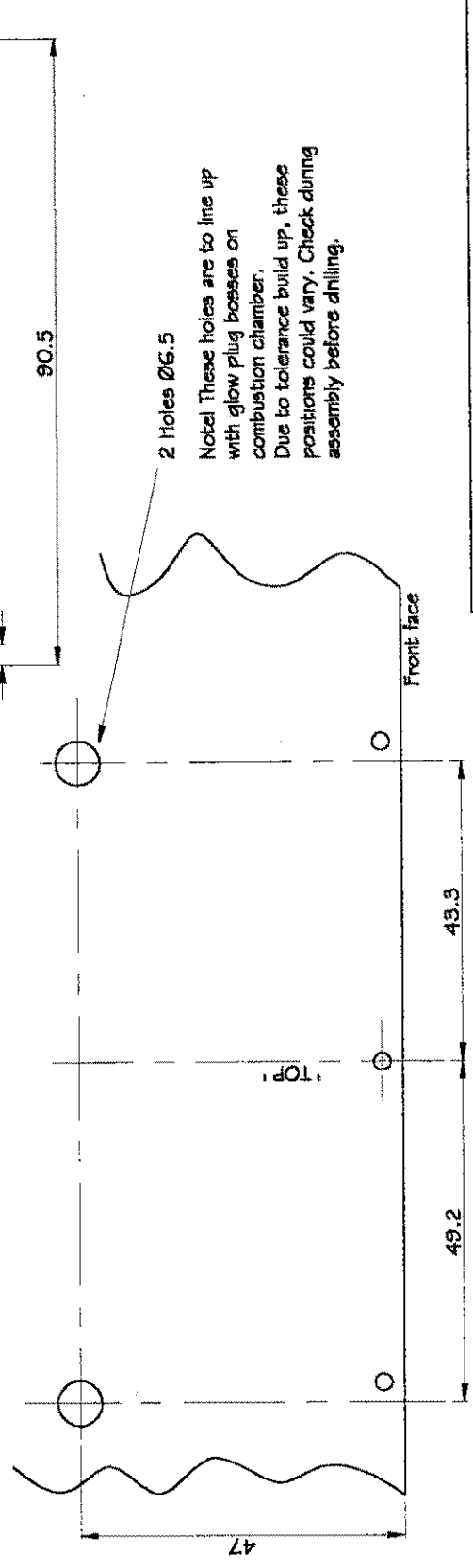
Front

Ø28 inside



Spot Weld along overlap
NOTE: 2 rows of welds
along this seam.

Developed Length 284
(including overlap of 6mm)



2 Holes Ø6.5

Notel These holes are to line up
with glow plug bosses on
combustion chamber.
Due to tolerance build up, these
positions could vary. Check during
assembly before drilling.

Front face

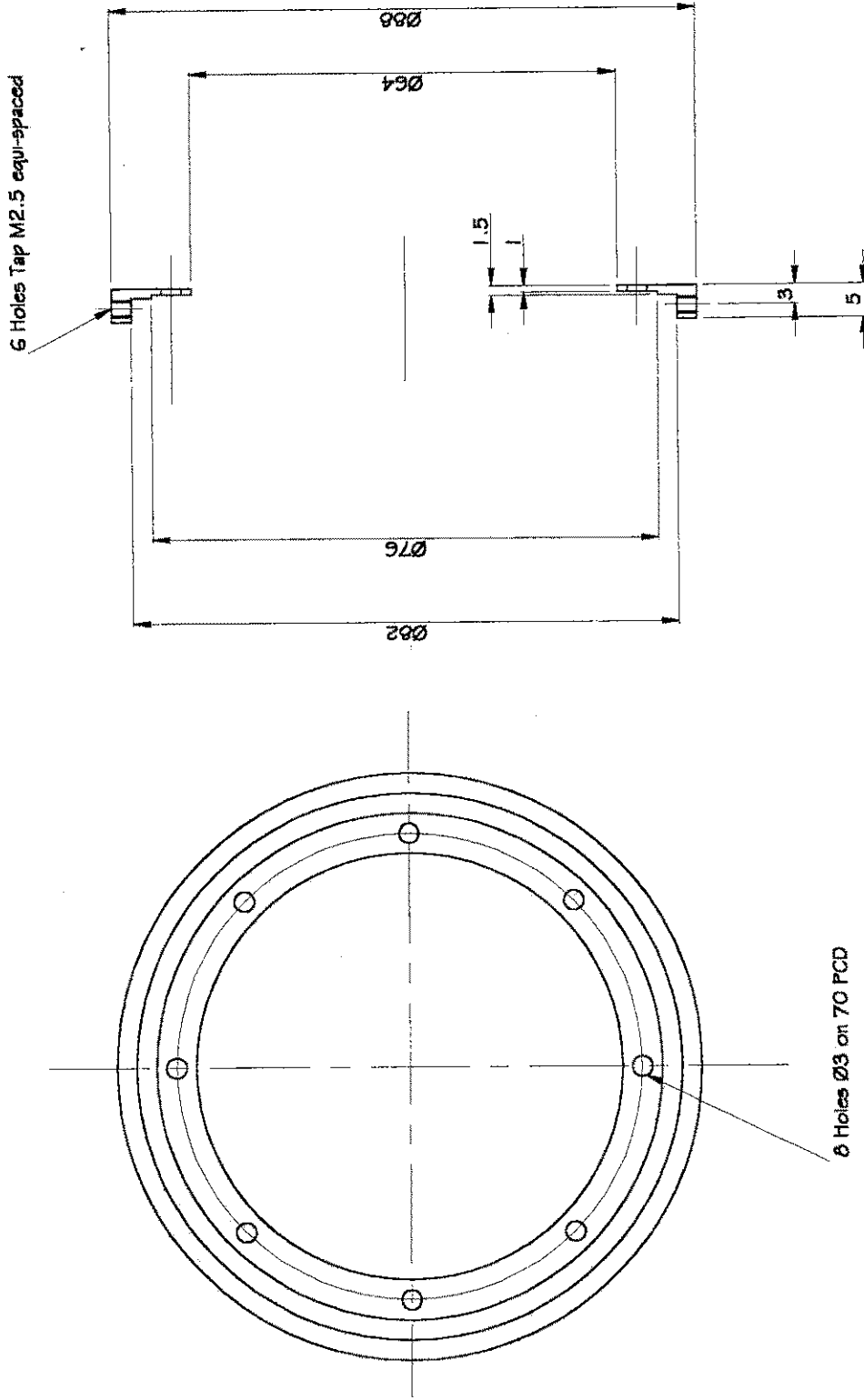
Material: Stainless Steel - .4 thick
Title: Case Outer

Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Issue: 3

Part No. 021

Dimensions in Millimeters



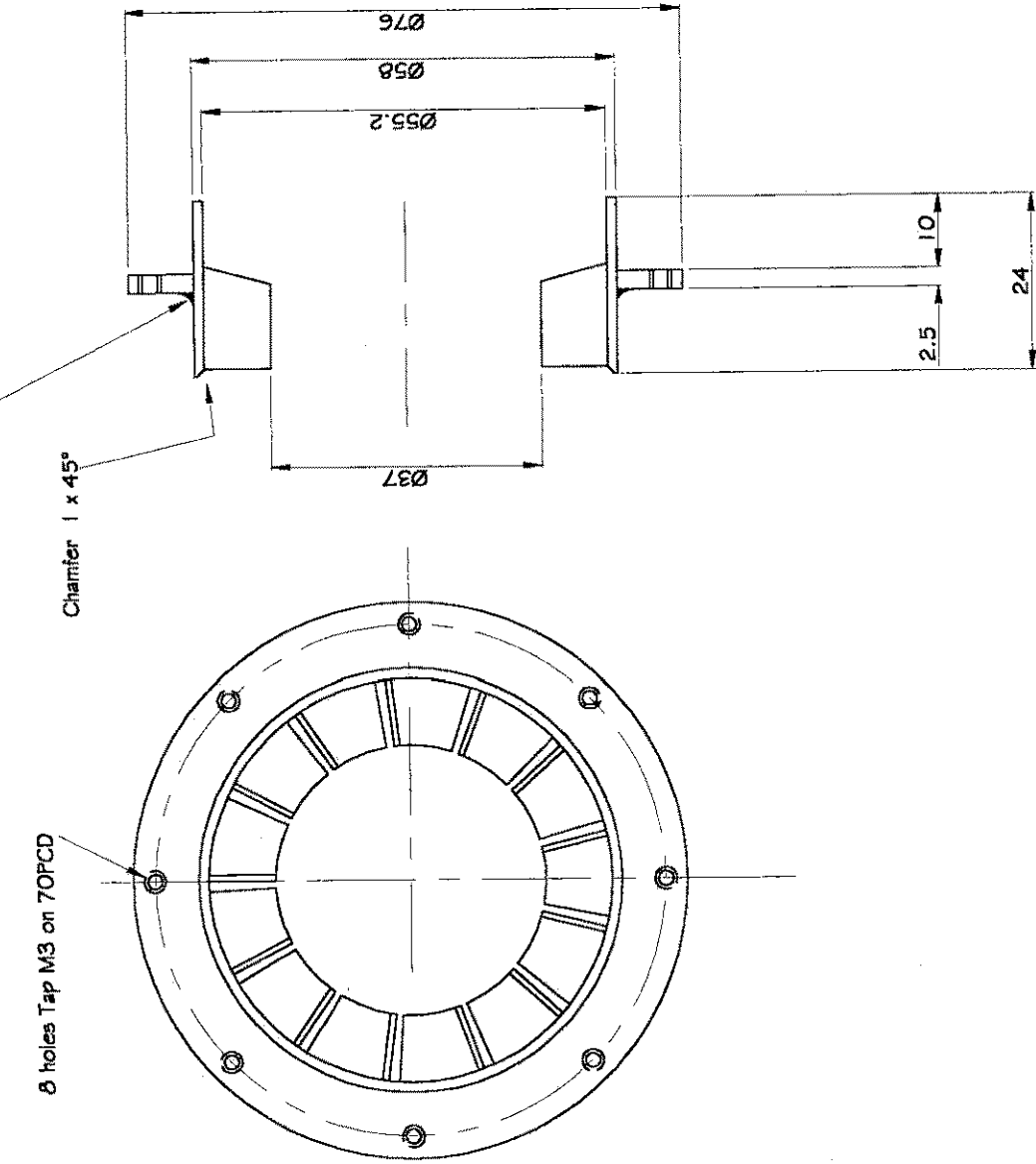
Material: Mild Steel	Issue: 3	Part No. 022
Title: Case Rear		
Drawn: Terry Lee	Third Angle Projection	© WREN Turbines Turbine - MW54

Dimensions in Millimeters

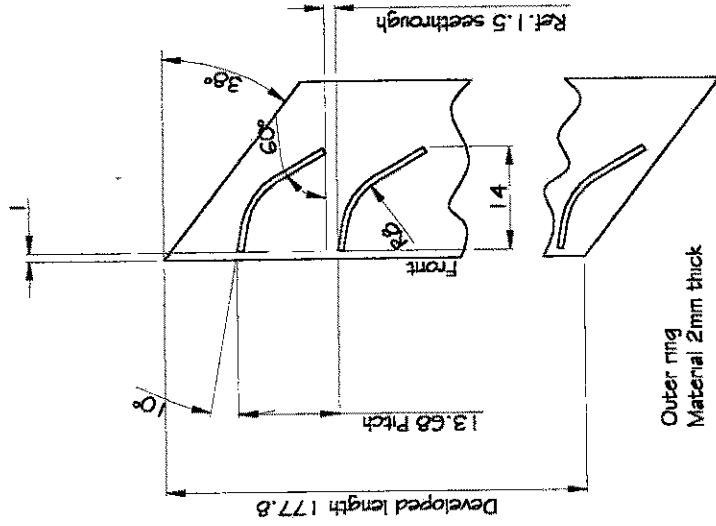
For fabricated assembly
weld this side of flange

Ø holes Tap M3 on 70°PCD

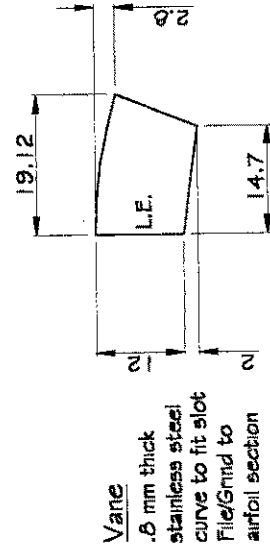
Chamfer 1 x 45°



13 Slots for vanes equi-spaced



Outer ring
Material 2mm thick
Roll to 54.6 inside dia.



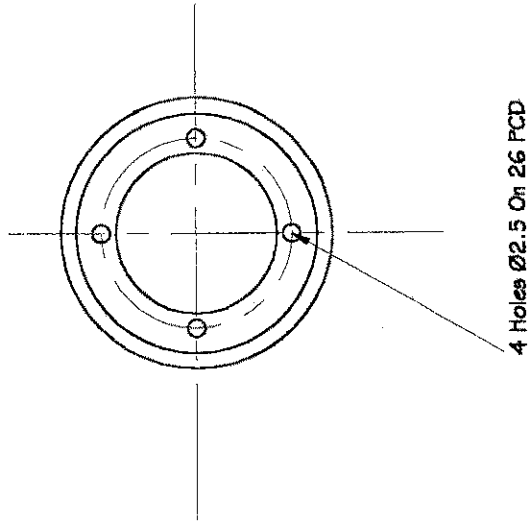
Material: Stainless Steel

Title: NGV Outer

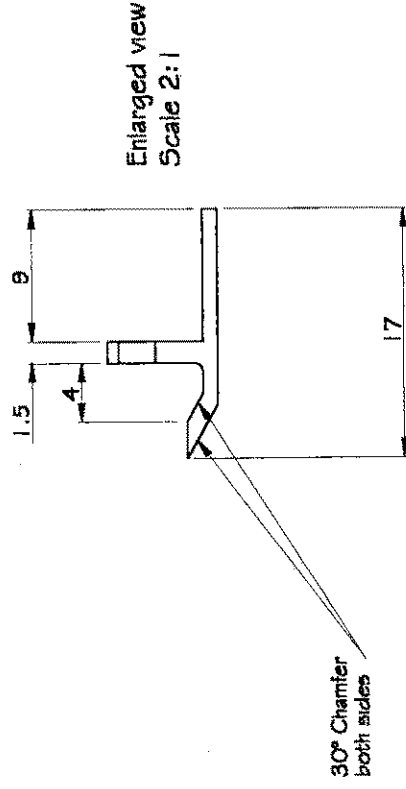
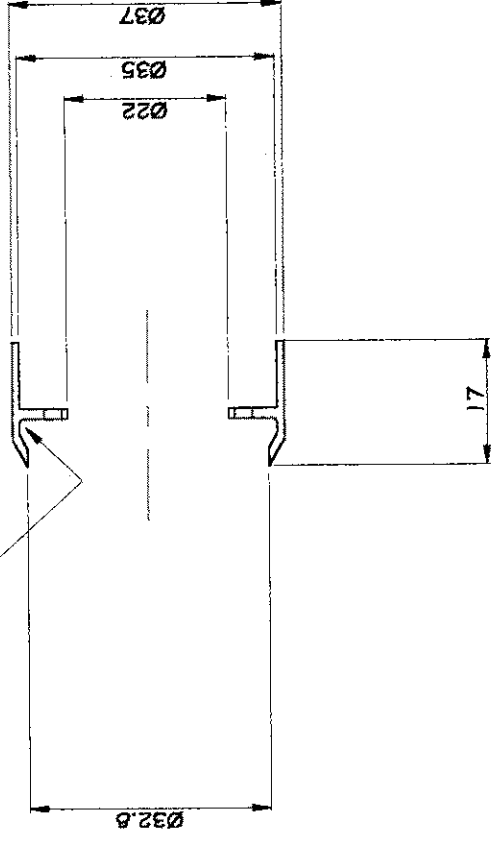
Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Issue: 1 Part No. 023

Dimensions in Millimeters



This portion chamfered out for lightness only



Material: Stainless Steel

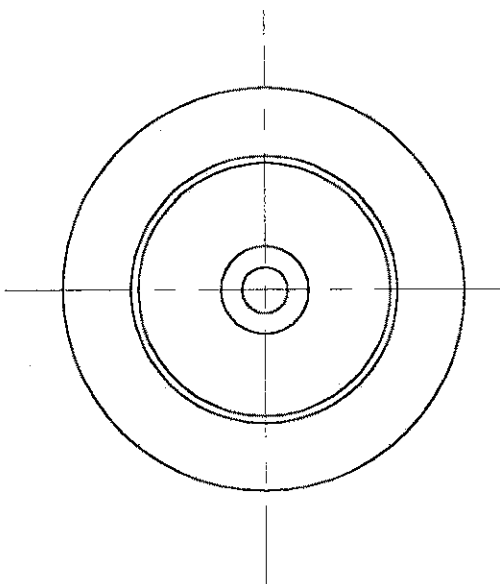
Title: NGV Inner

Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

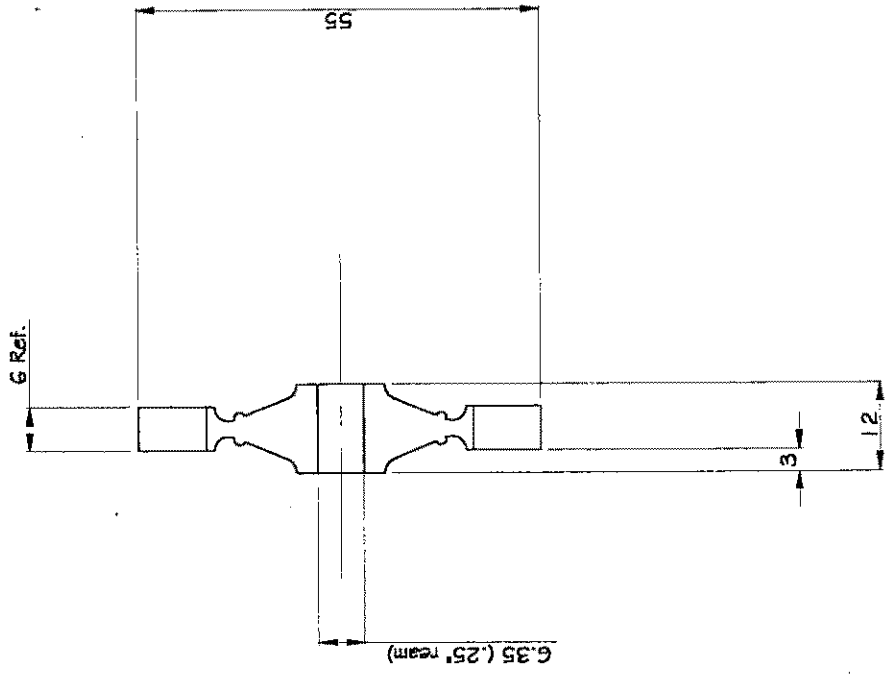
Issue: 2

Part No. 024

Dimensions in Millimeters

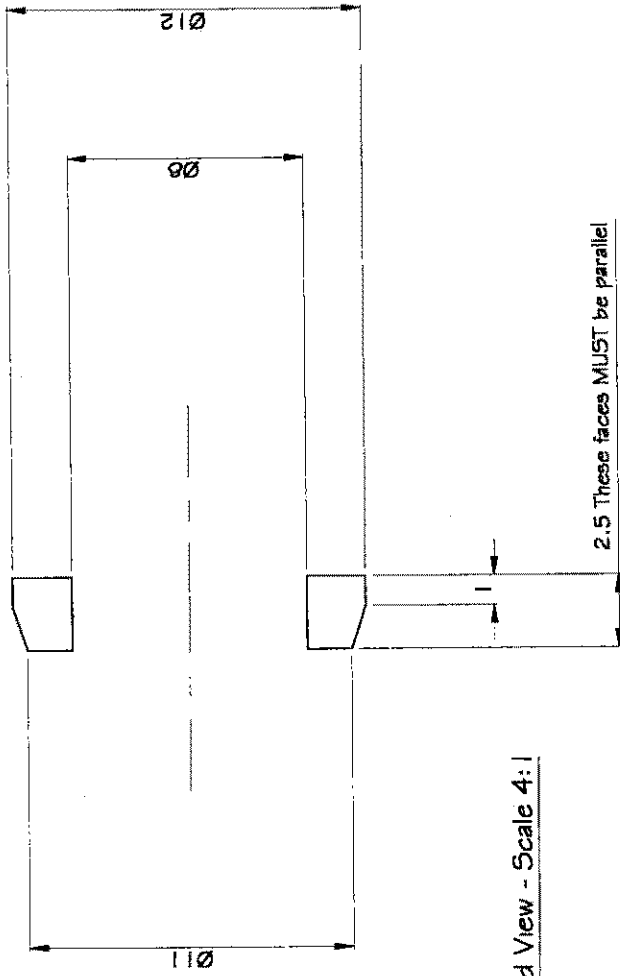


Turbine wheel is produced as a casting
Machine to dimensions shown.
Castings may be obtained from 'Wren Turbines'



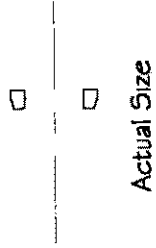
Material: Inconel	Issue: 1	Part No. 025
Title: Turbine wheel		
© WREN Turbines	Turbine - MW54	
Drawn: Terry Lee	Third Angle Projection	

Dimensions in Millimeters



Enlarged View - Scale 4:1

2.5 These faces MUST be parallel



Material: Stainless Steel

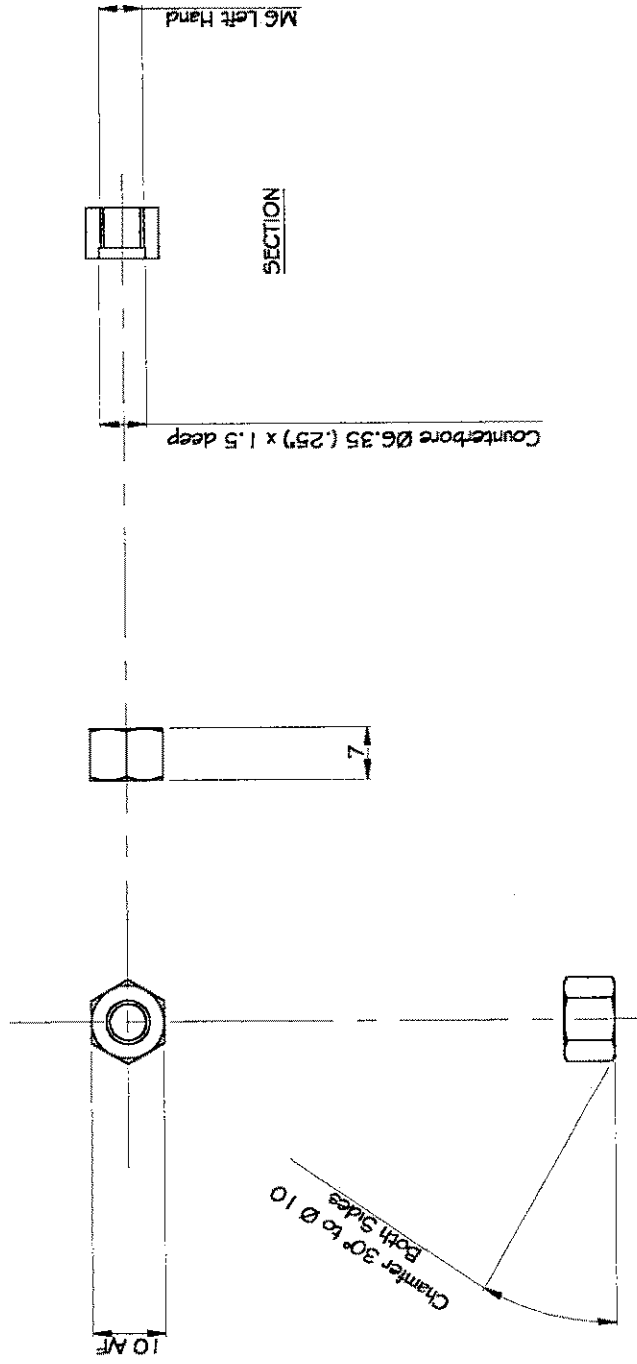
Title: Rear Spacer

Issue: 2

Part No. 026

Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Dimensions in Millimeters



Material: Stainless Steel

Title: Turbine Nut

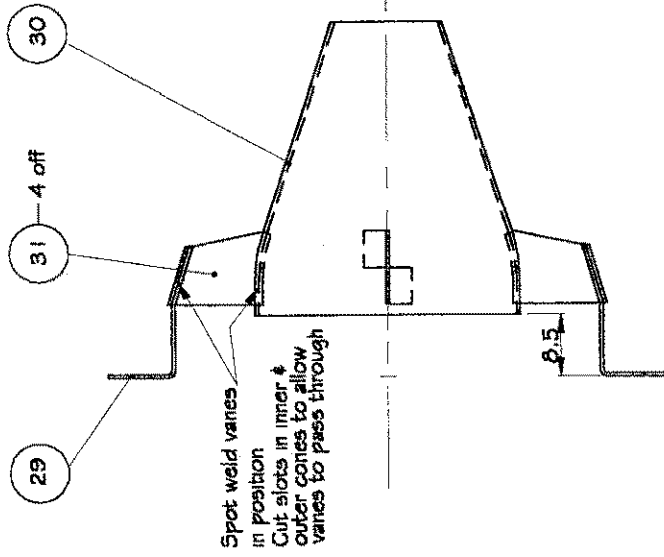
Issue: 1

Part No. 027

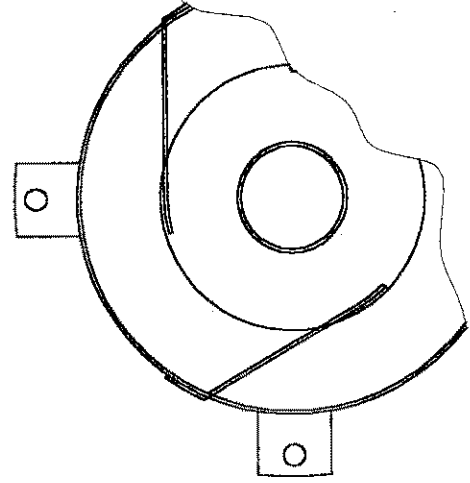
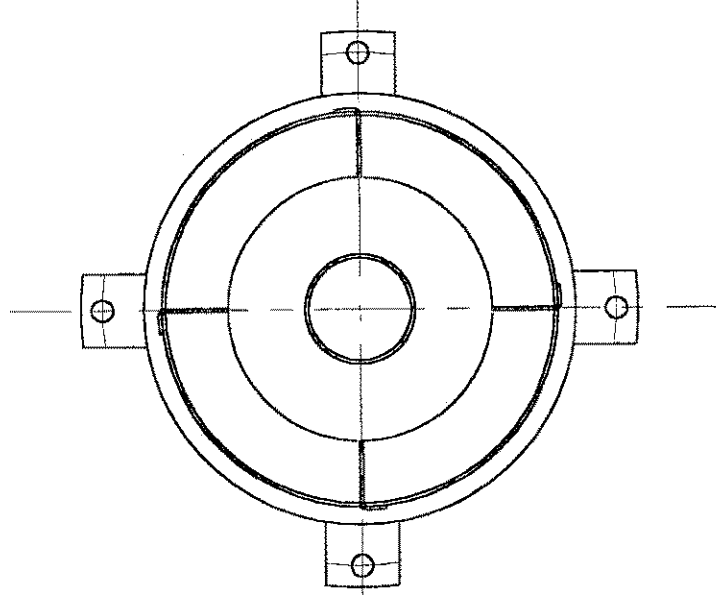
© WREN Turbines Turbine - MW54

Drawn: Terry Lee Third Angle Projection

Dimensions in Millimeters



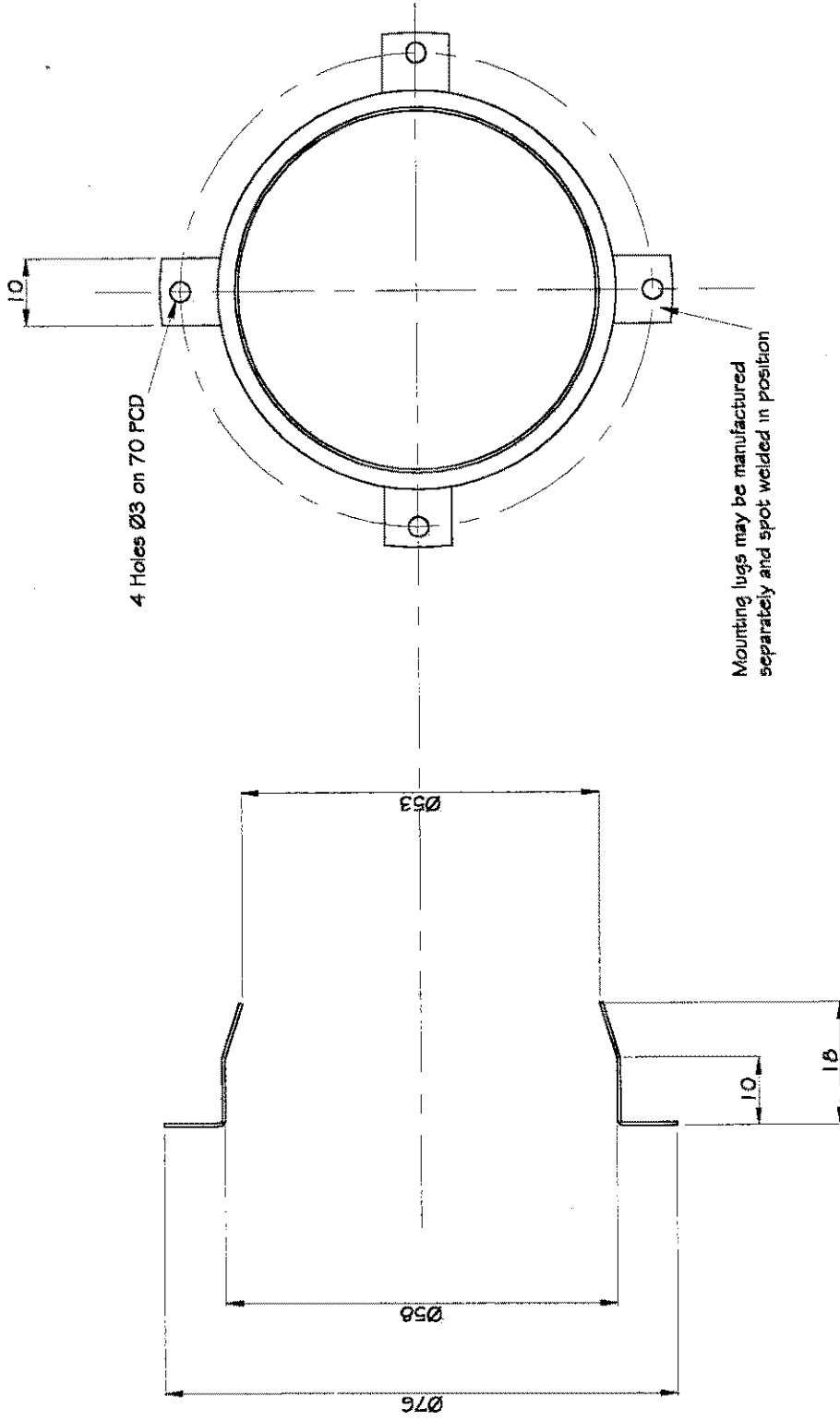
Ensure cone inner and cone outer are concentric.



Alternative tangential vanes in 3 positions spot weld in place

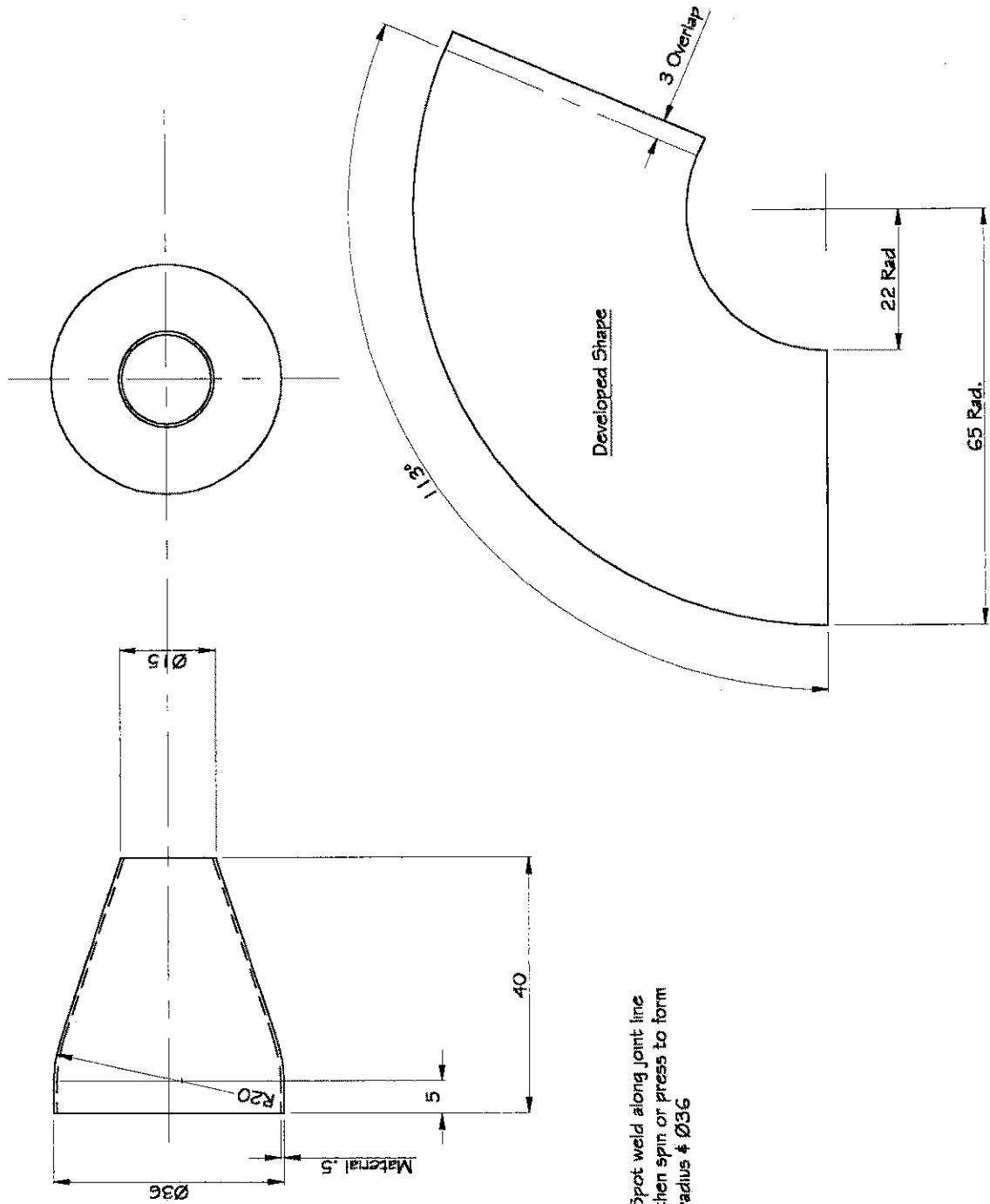
Material: A5 Details	Material: A5 Details
Title: Exhaust Cone Sub Assy.	Title: Exhaust Cone Sub Assy.
Issue: 2	Issue: 2
Part No. 020	Part No. 020
© WREN Turbines Turbine - MW54	© WREN Turbines Turbine - MW54
Drawn: Terry Lee	Drawn: Terry Lee
Third Angle Projection	Third Angle Projection

Dimensions in Millimeters



Material: Stainless Steel Sheet	Issue: 1	Part No. 029
Title: Cone Outer		
© WREN Turbines	Turbine - MW54	
Drawn: Terry Lee	Third Angle Projection	

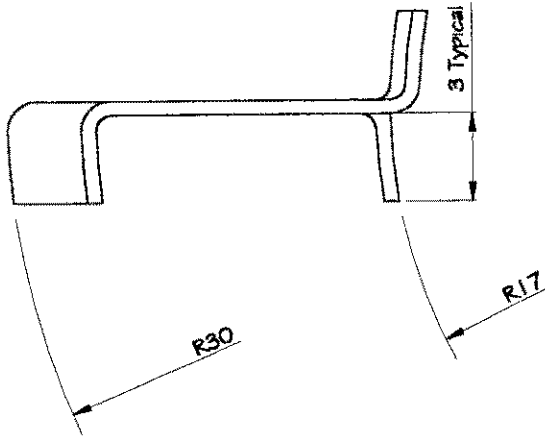
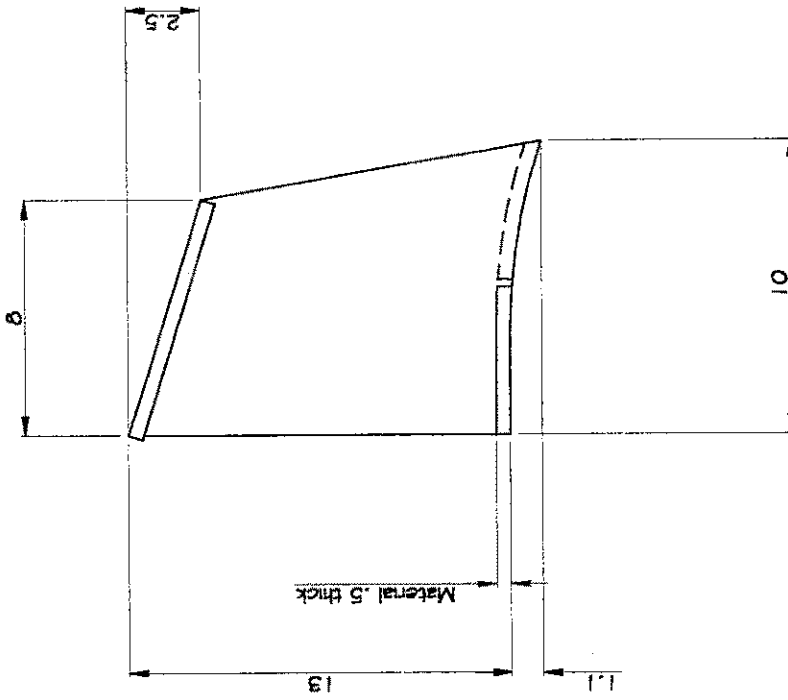
Dimensions in Millimeters



Spot weld along joint line
then spin or press to form
radius $\varnothing 36$

Material: Stainless Steel Sheet	Issue: 1	Part No. 030
Title: Cone Inner		
© WREN Turbines Turbine - MW54		
Drawn: Terry Lee	Third Angle Projection	

Dimensions in Millimeters



Enlarged View - Scale 4:1



Actual Size

Material: Stainless Steel Sheet

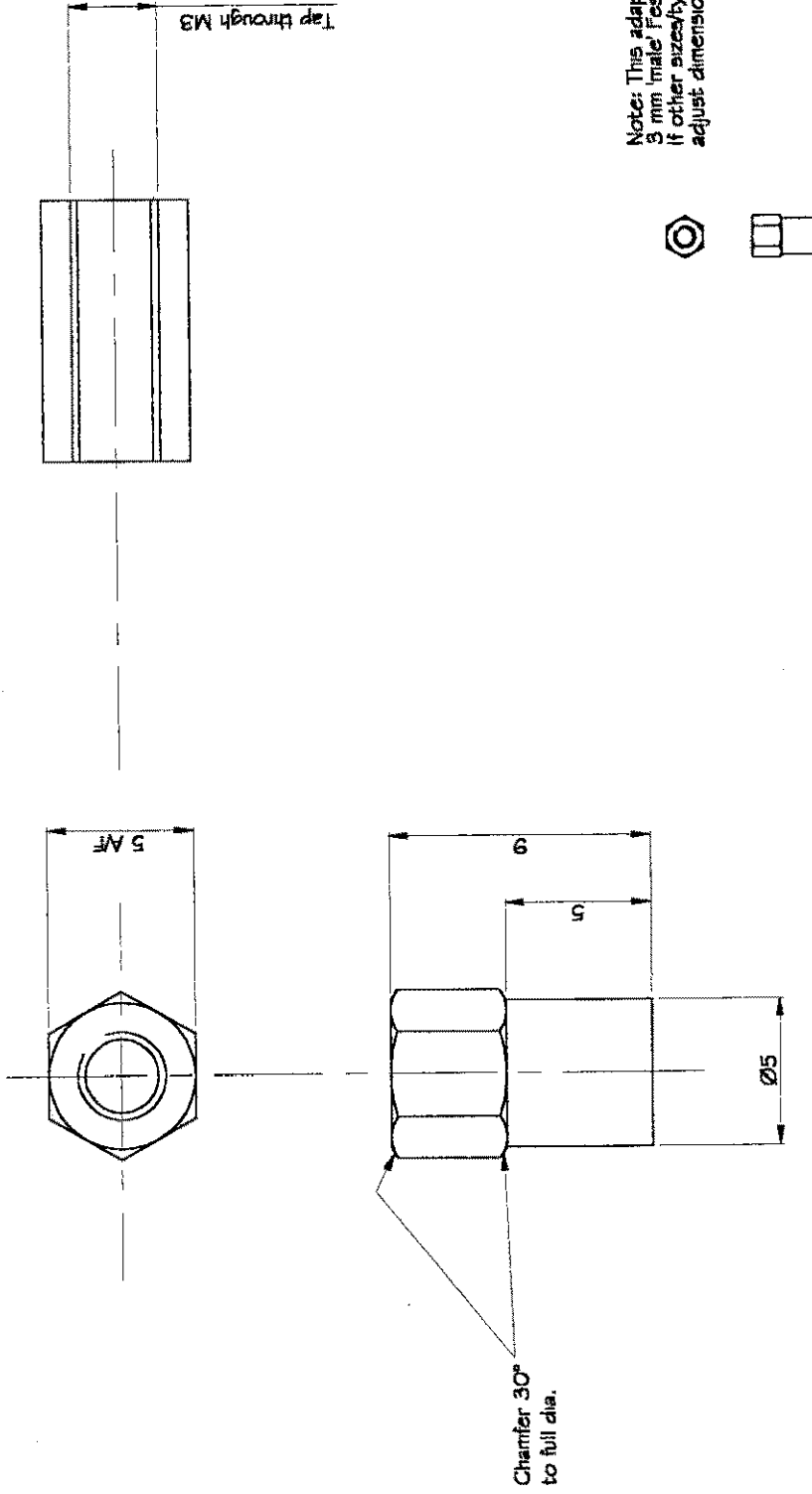
Title: Outlet Vane

Issue: 2

Part No. 031

Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Dimensions in Millimeters



Note: This adaptor is for use with 5 mm 'male' Festo type fittings. If other sizes/types are to be used, adjust dimensions accordingly.



Actual Size

Enlarged view - Scale 4:1

Material: Brass

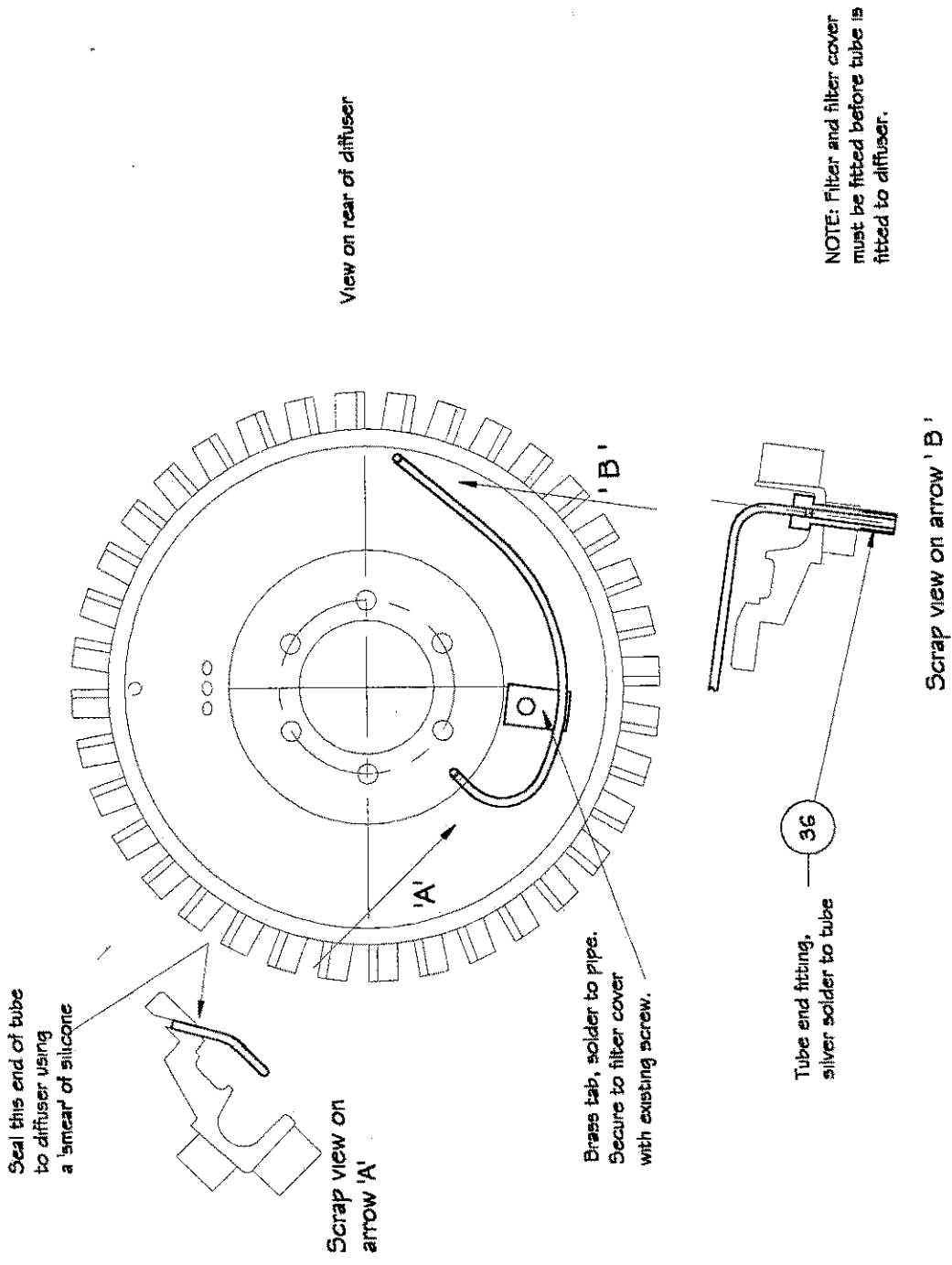
Title: Adaptor

Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Issue: 2

Part No. 032

Dimensions in Millimeters



Seal this end of tube to diffuser using a smear of silicone

Scrap view on arrow 'A'

View on rear of diffuser

Brass tab, solder to pipe. Secure to filter cover with existing screw.

Tube end fitting, silver solder to tube

NOTE: Filter and filter cover must be fitted before tube is fitted to diffuser.

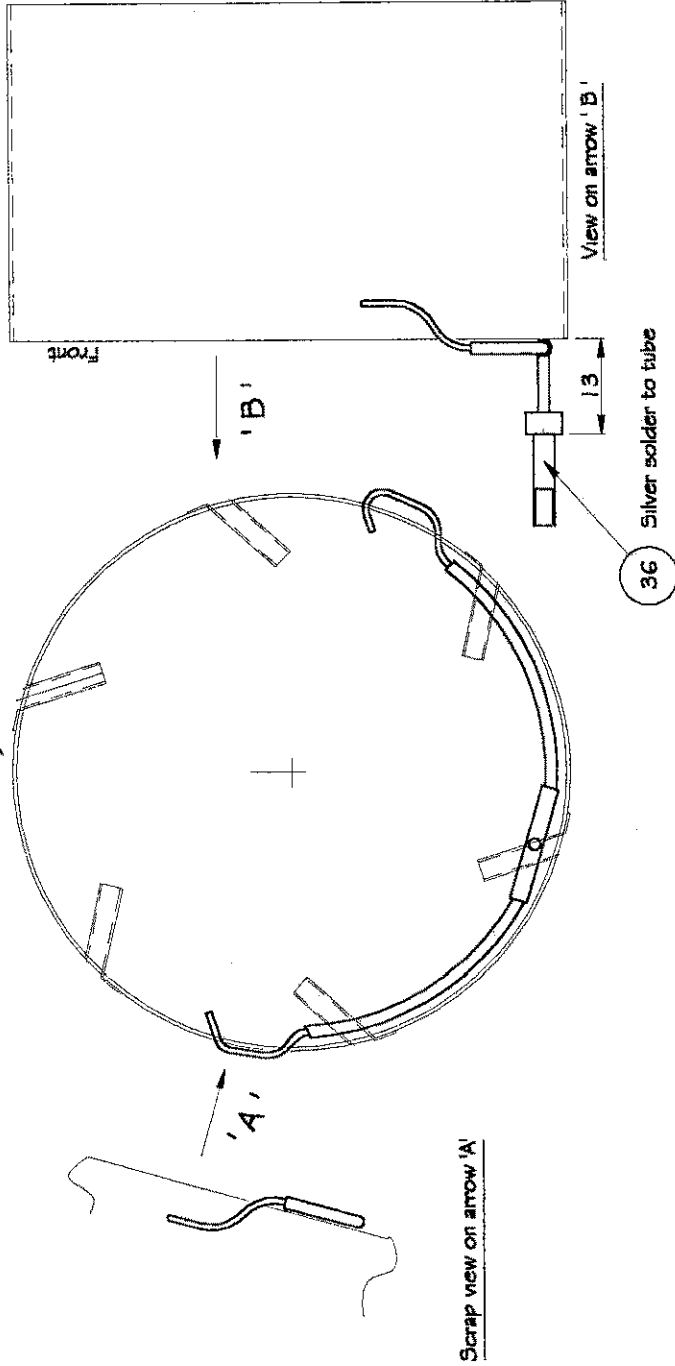
Scrap view on arrow 'B'

Material - Brass tube 1.6 mm O /Dia.

Material: Brass Tube	Issue: 2	Part No. 033
Title: Lubrication pipe		
Drawn: Terry Lee	Third Angle Projection	© WREN Turbines Turbine - MW54

Dimensions in Millimeters

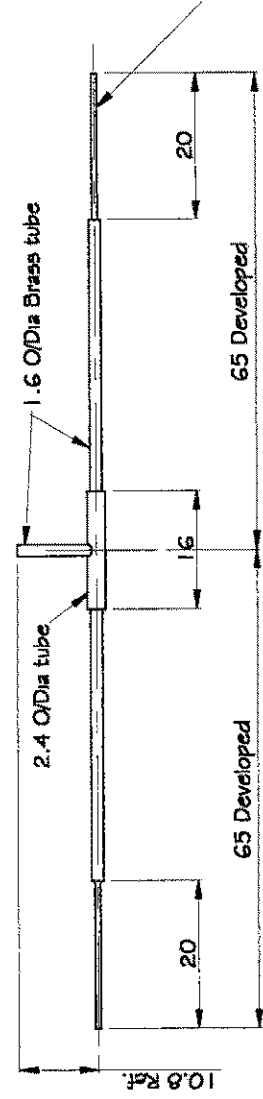
Ref: Combustion chamber outer



A joints to be silver soldered.
Bend to finished shape on assembly.
Avoid covering air holes in chamber.

Fit suitable clips (spot welded to combustion chamber - if req.)

Ends to be .8 x 25 hypodermic needles (stainless steel)



Material: Brass/Stainless Steel

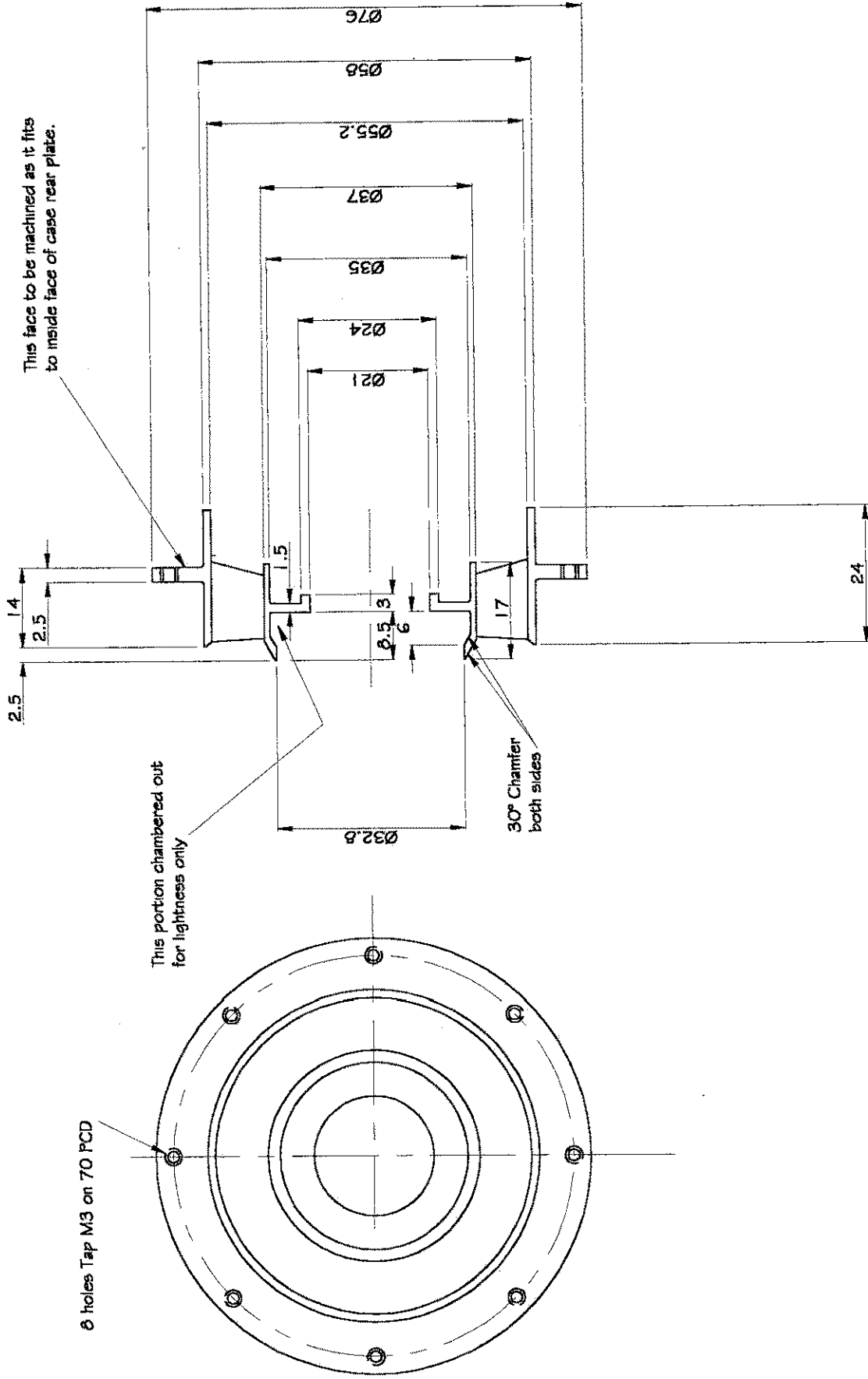
Title: Gas Pipe

Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Issue: 2

Part No. 034

Dimensions in Millimeters



Material:

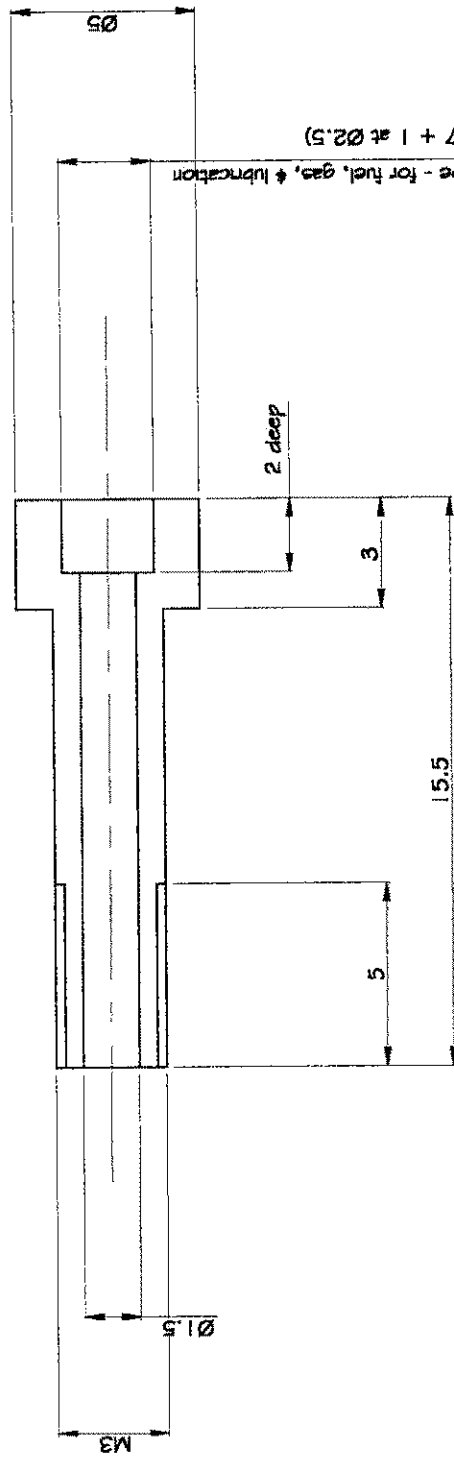
Title: Cast NGV - Machining

Issue: 2

Part No. Q35

Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Dimensions in Millimeters



Enlarged view - Scale 5:1



Actual Size

Material: Stainless Steel

Title: Tube End Fitting

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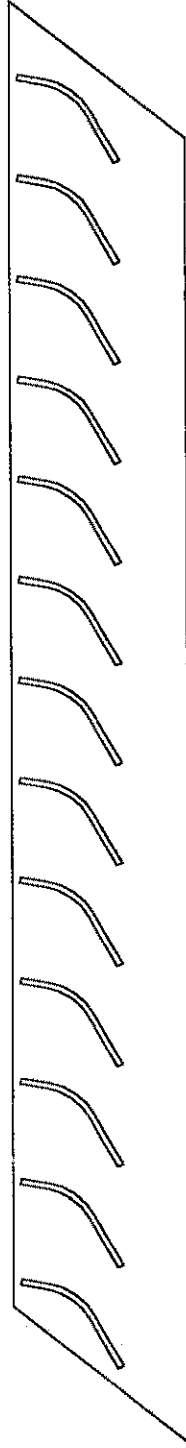
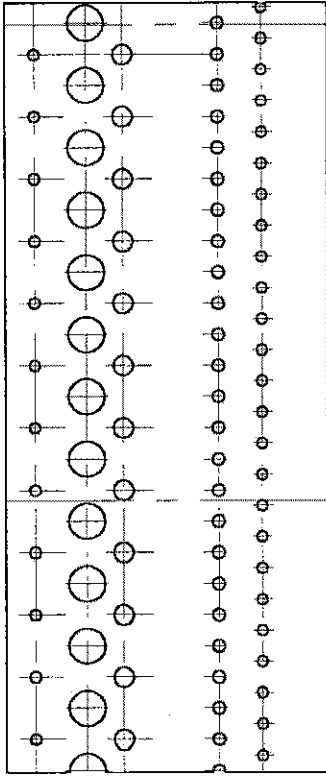
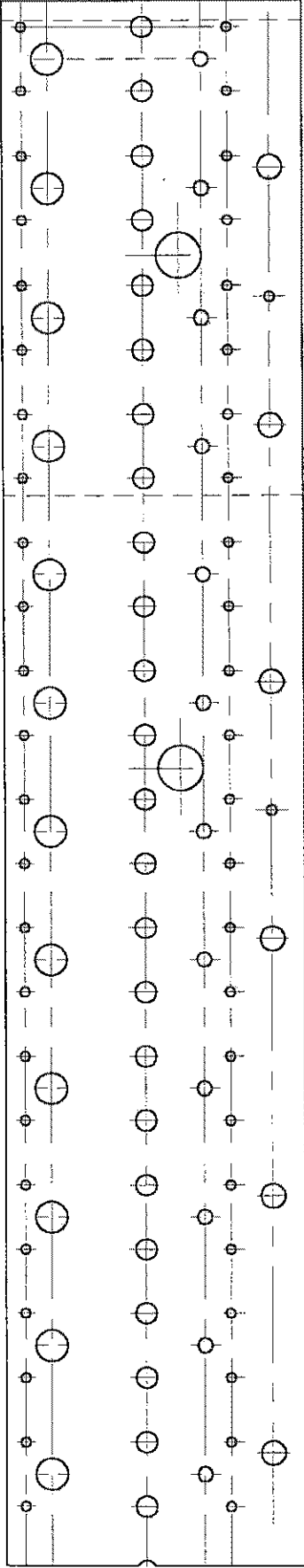
Third Angle Projection

Drawn: Terry Lee

Issue: 3

Part No. 036

Dimensions in Millimeters



Material: See Details

Title: Templates

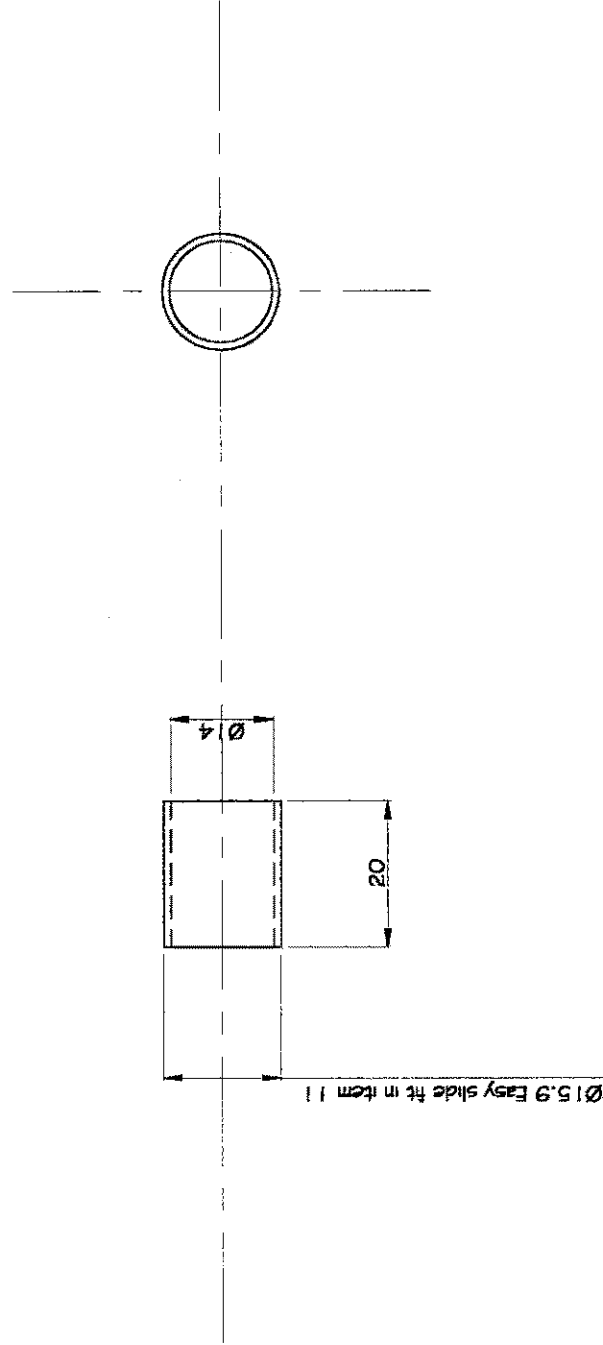
© Mike Murphy Turbine - MW54

Drawn: Terry Lee Third Angle Projection

Issue: 1

Part No. 037

Dimensions in Millimeters



Ø 15.9 Easy slide fit in item 11

Material: Mild steel

Title: Tube

Turbine - MW54

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Drawn: Terry Lee

Issue: 2

Part No. 036

