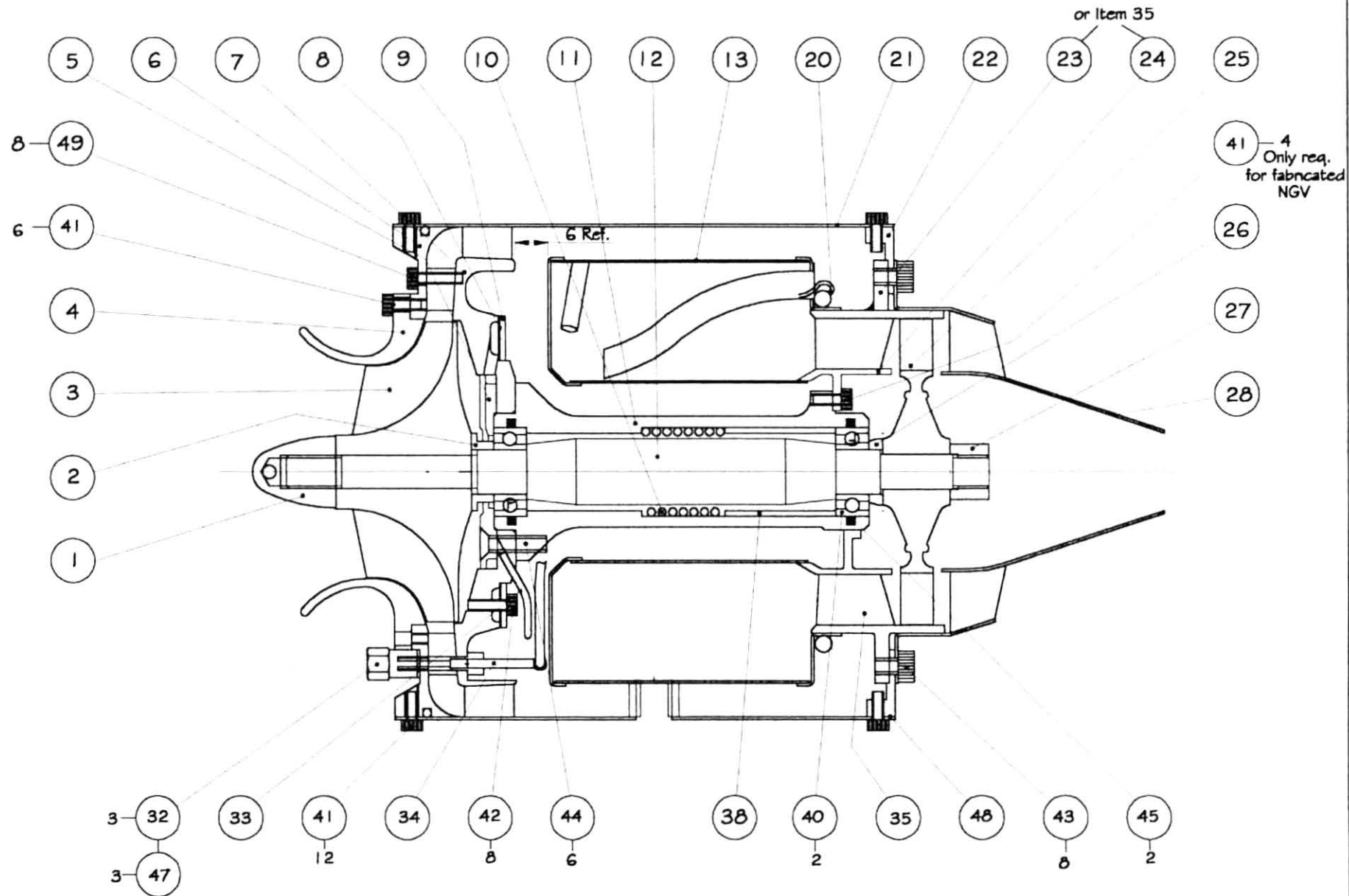


MW54 TURBO-JET

PLANS AND BUILDING INSTRUCTIONS

Dimensions in Millimeters



Note: The lower half of the drawing is not a specific section, to allow all details to be shown.

Material:

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

Title: G.A. Motor

Issue: 4

Part No. MW54

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

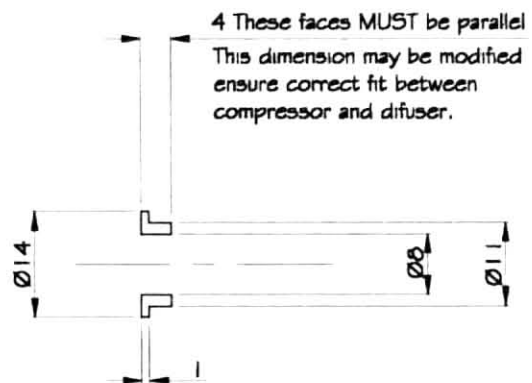
Item List for MW54
Sht.1

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

- Some items have an indication 'TOP'. It is suggested you mark this position on the item during manufacture.
- Some groups of holes are marked with the symbol #, this indicates that the relative position between these groups is important.
- All drawings are full size, although some have enlarged views.
- 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: Mild Steel

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

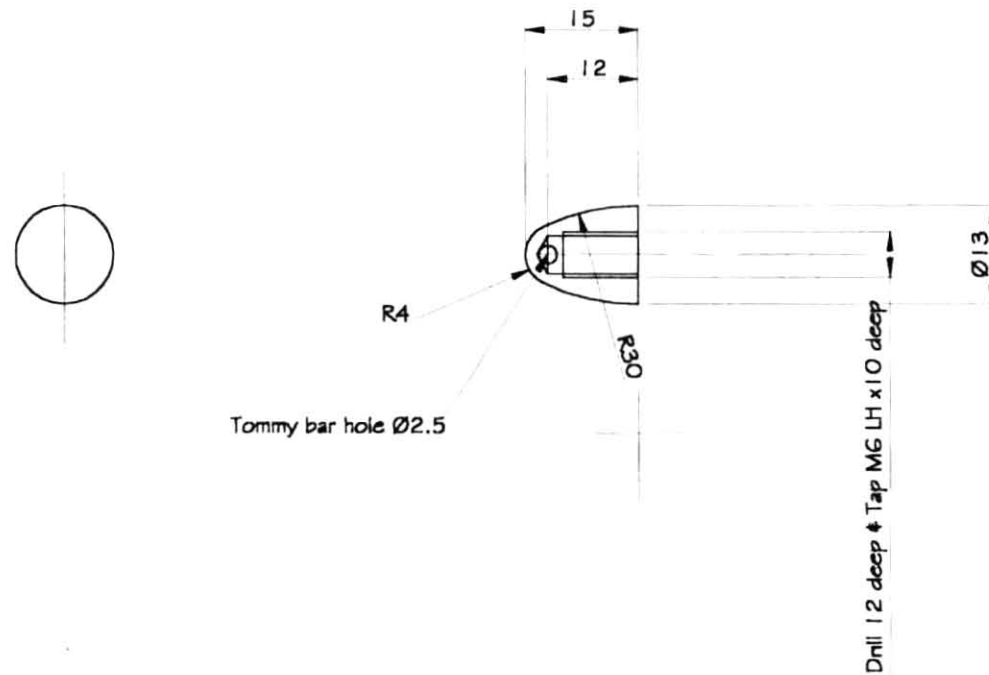
Turbine - MW54

Title: Front Spacer

Issue: 1

Part No. 002

Dimensions in Millimeters



Material: Aluminium alloy

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

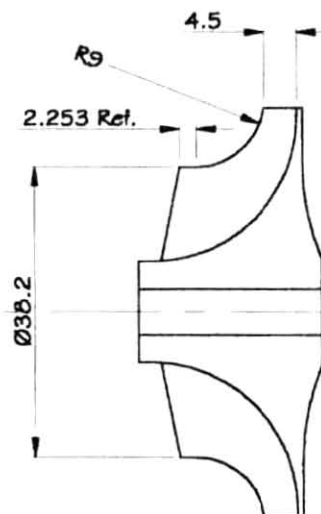
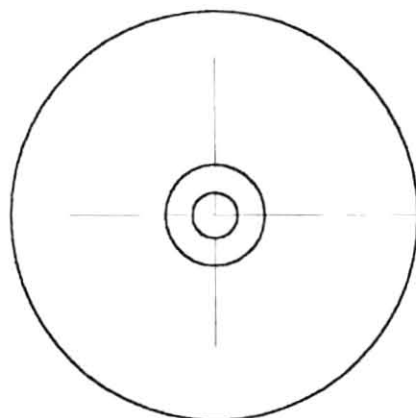
Turbine - MW54

Title: Compressor Nut

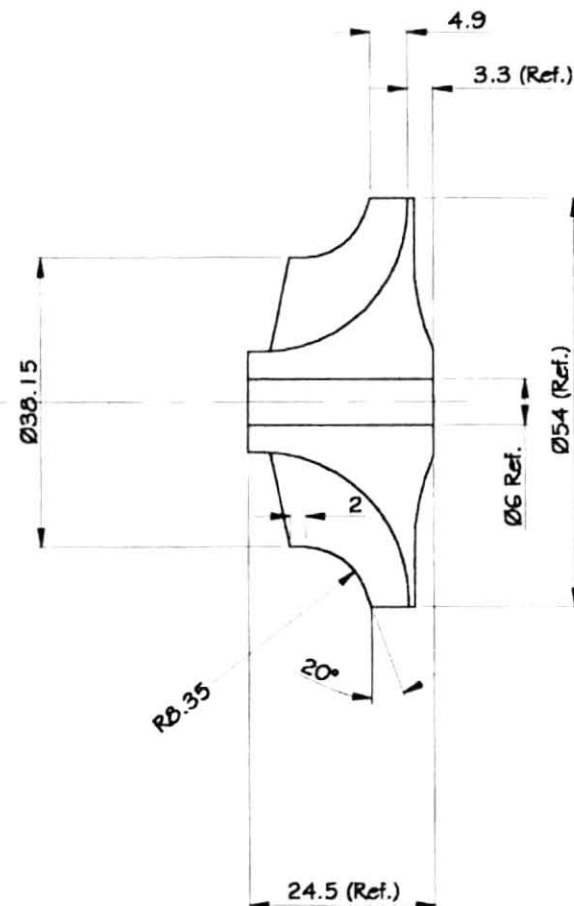
Issue: 1

Part No. 001

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 '10' compressor is also less expensive.

Material: Aluminium Alloy

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

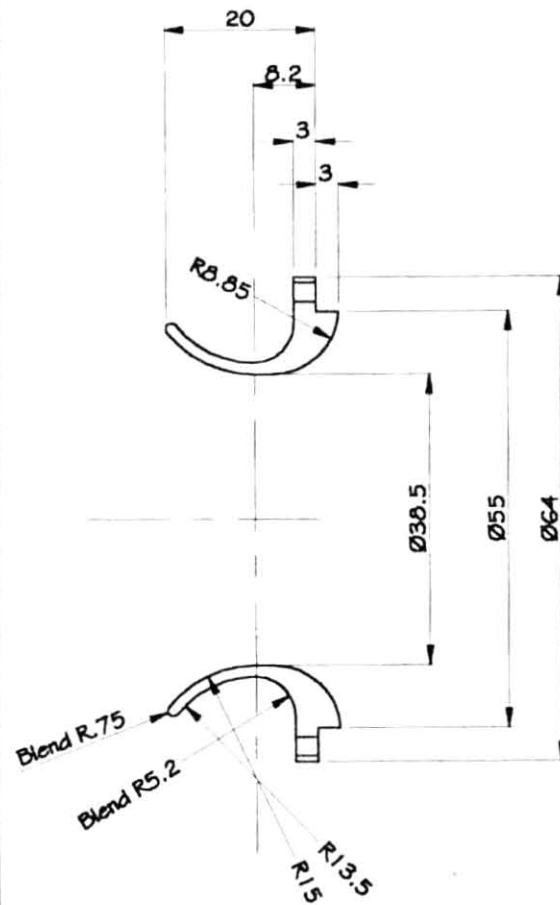
Turbine - MW54

Title: Compressor

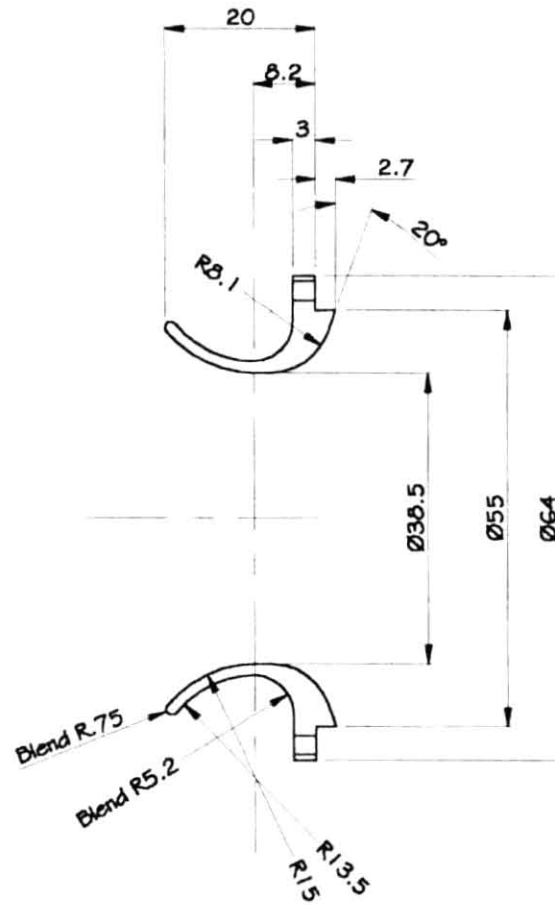
Issue: 5

Part No. 003

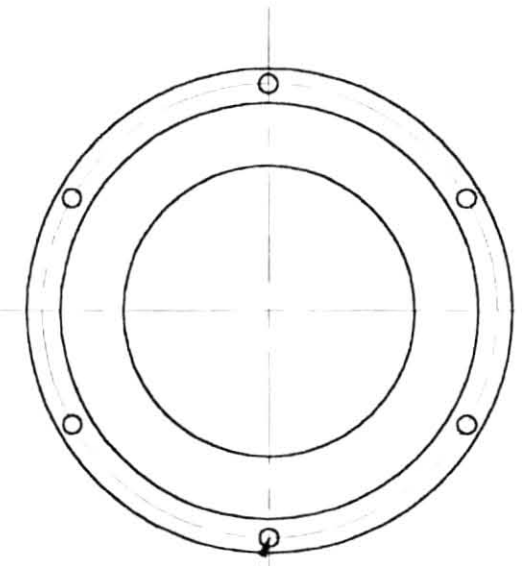
Dimensions in Millimeters



Profile to suit modified compressor



Profile to suit standard compressor
Part No. 446335-9



6 Holes Ø2.5 equi-spaced on 60 PCD

Material: Nylon

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

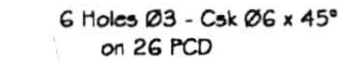
Turbine - MW54

Title: Intake

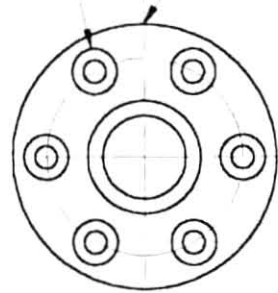
Issue: 4

Part No. 004

Dimensions In Millimeters



TOP



Actual size

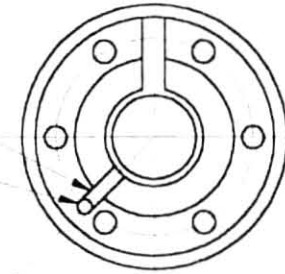


Groove for cooling air 2 deep

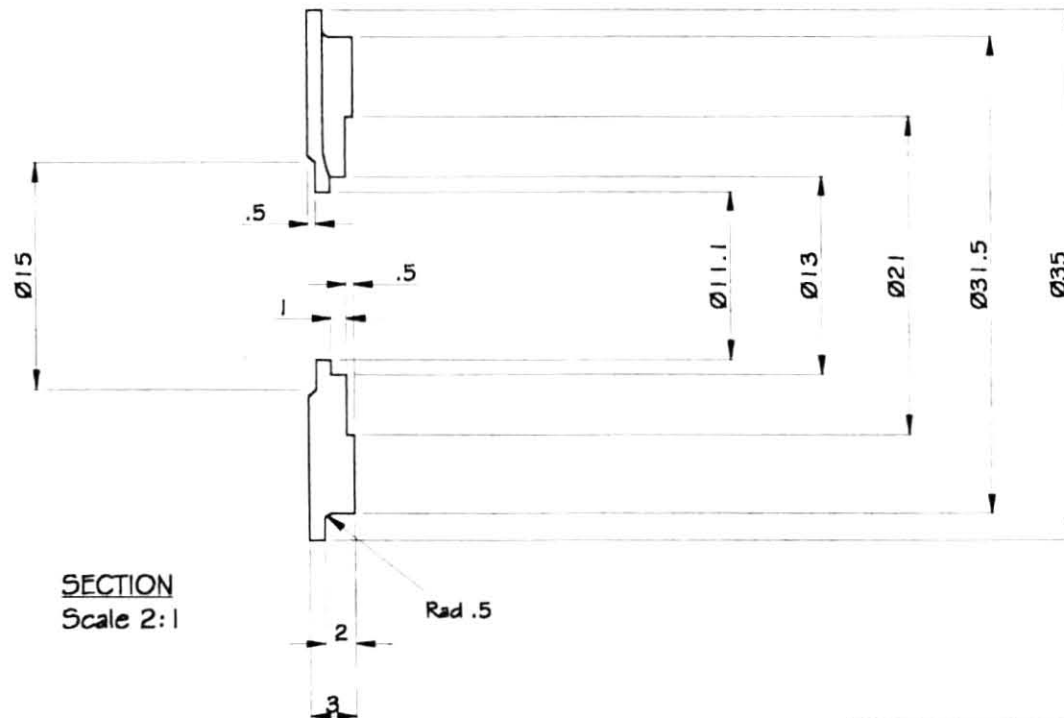
7.

Groove for lubrication
2 wide x 1 deep

Drill Ø2 x 1.5 deep



450



SECTION
Scale 2:1

Rad .5

Material: Aluminium alloy

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

Title: Shaft Seal

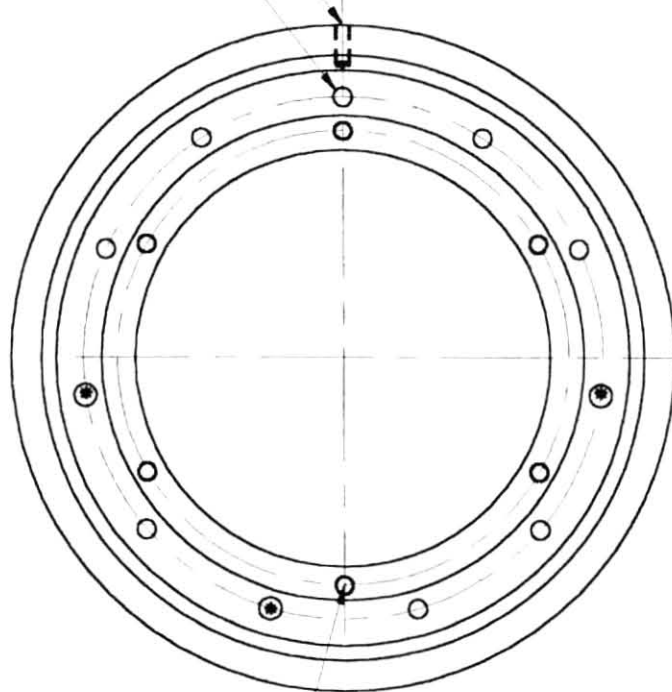
Issue: 2

Part No. 005

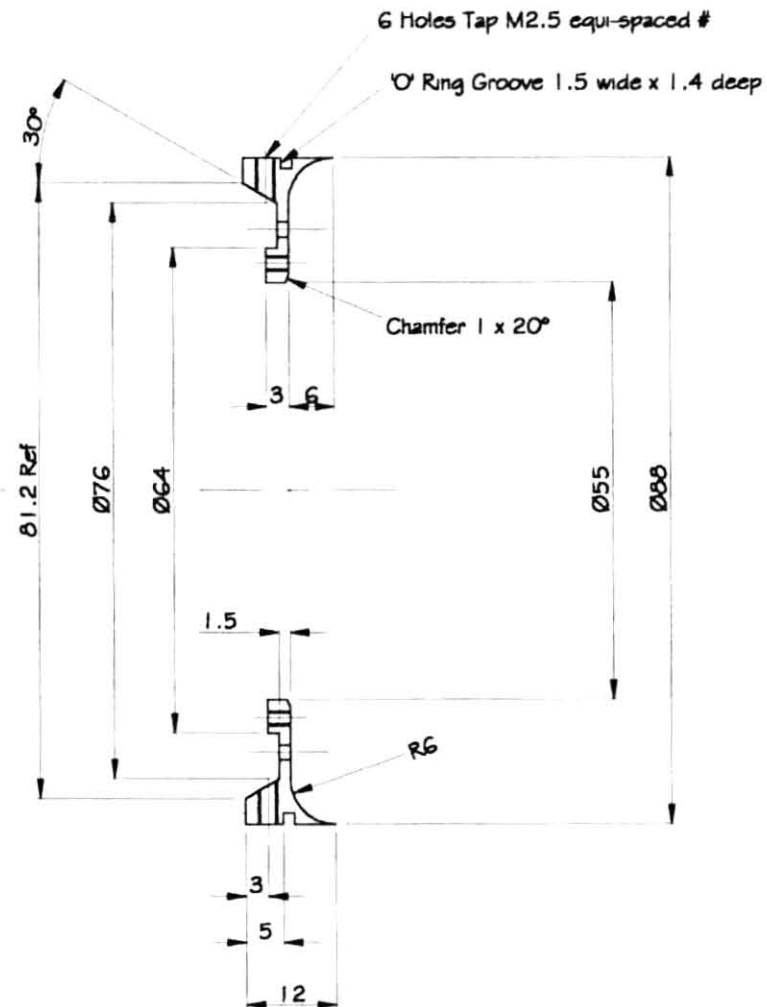
Dimensions in Millimeters

11 Holes equi-spaced on 69 PCD #
 8 @ Ø2.5 # 3 (Marked *) @ Ø 3.0

Line up with one outer hole (Mark 'TOP')



6 Holes Tap M2.5 Equi-spaced on 60 PCD



Note! relative positions of
 holes marked thus is important.

Material: Aluminium alloy

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

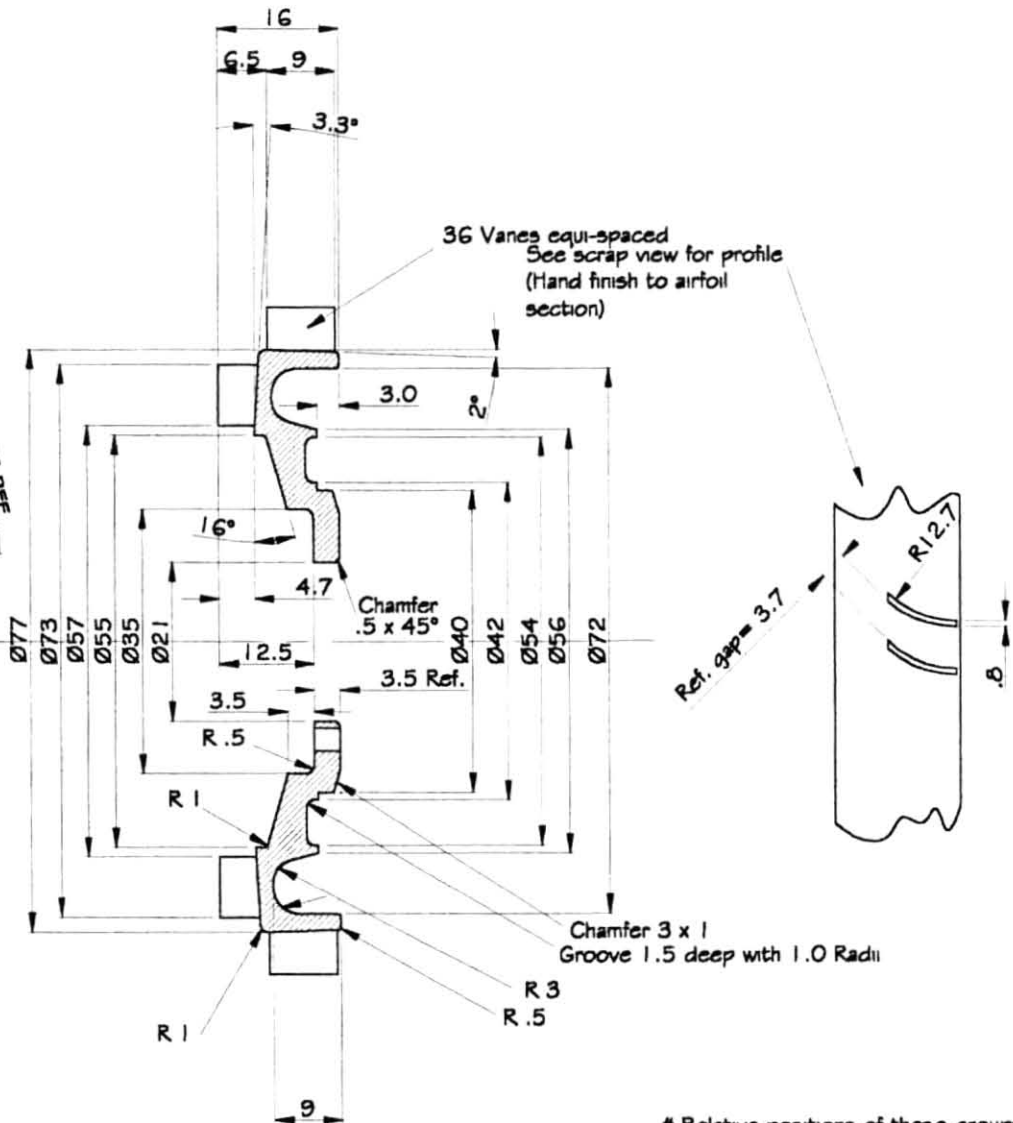
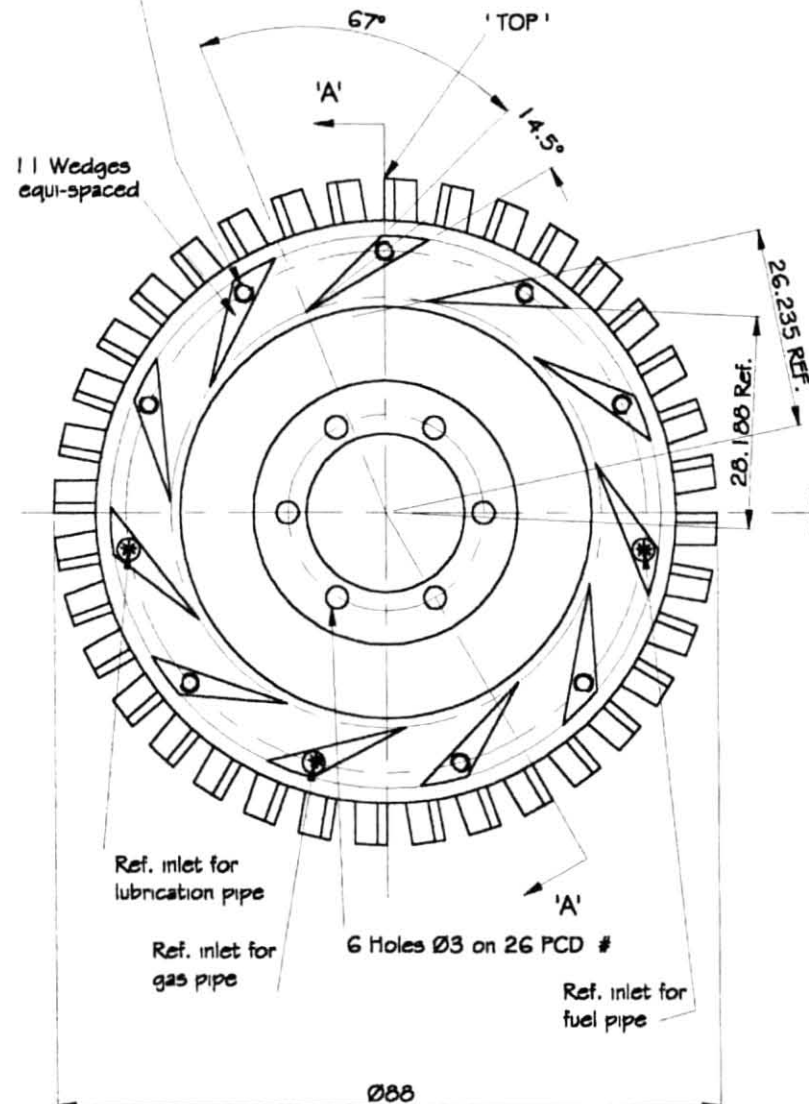
Title: Case Front

Issue: 4

Part No. 006

Dimensions in Millimetres

8 Holes tap M2.5 through
 4 3 Holes drill Ø 3 through (at #)
 on 69 PCD #



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.

Material: Aluminium Alloy

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

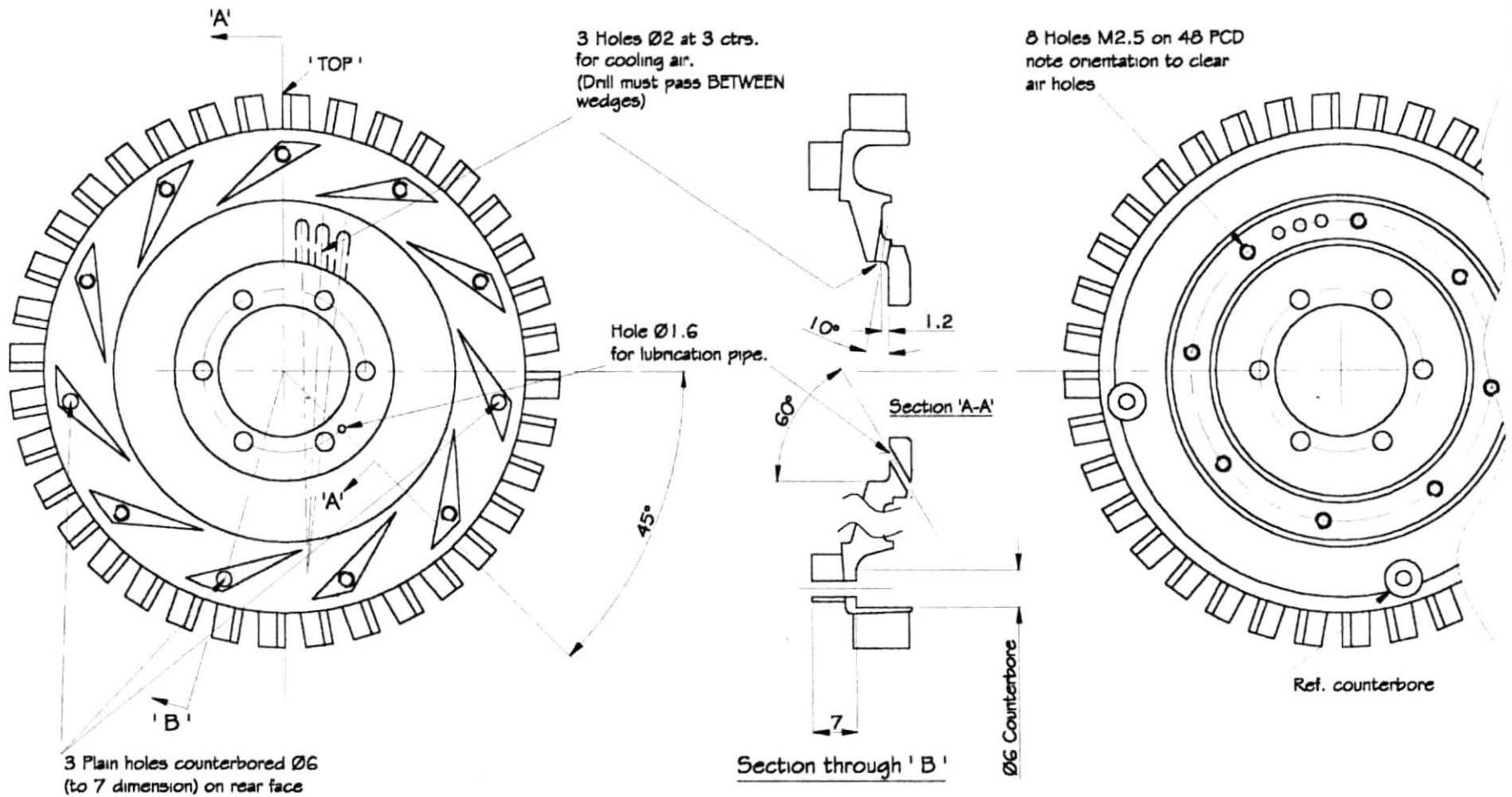
Turbine - MW54

Title: Diffuser - Sht. 1

Issue: 3

Part No. 007

Dimensions in Millimetres



Material: Aluminium Alloy

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

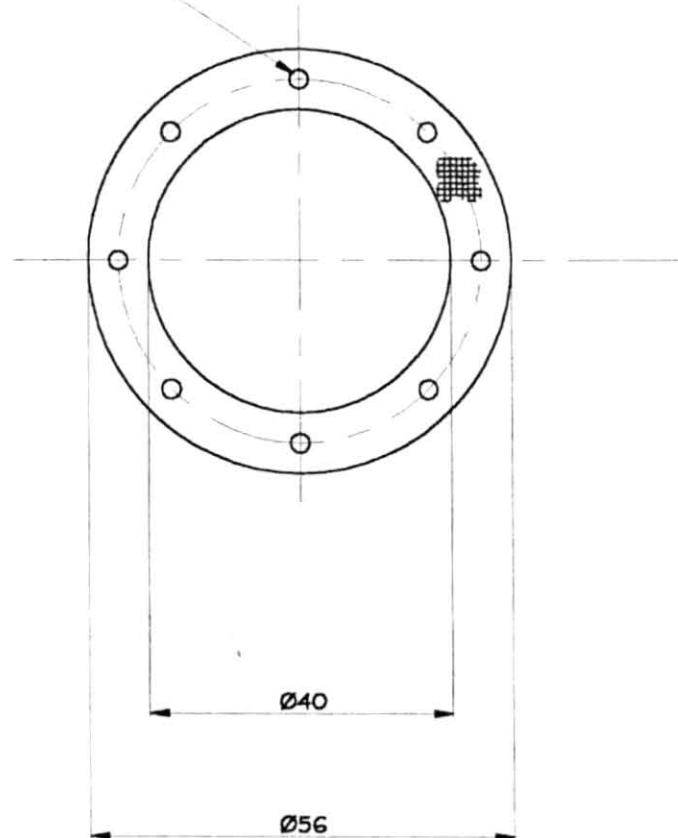
Title: Diffuser - Sht. 2

Issue: 3

Part No. 007

Dimensions in Millimeters

8 Holes Ø2.5 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

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

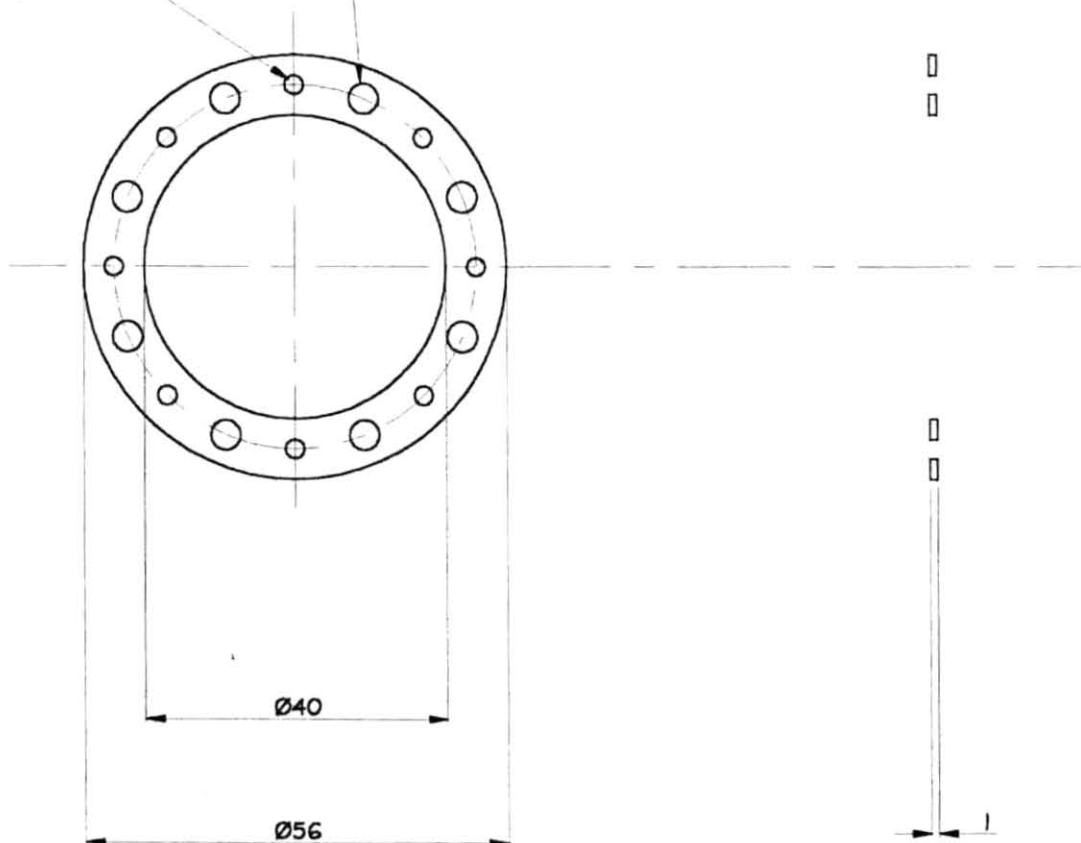
Title: Filter

Issue: 2

Part No. 008

Dimensions in Millimeters

8 Holes $\varnothing 4$ equi-spaced on 48 PCD
8 Holes $\varnothing 2.5$ equi-spaced on 48 PCD



Material: Aluminium Alloy

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

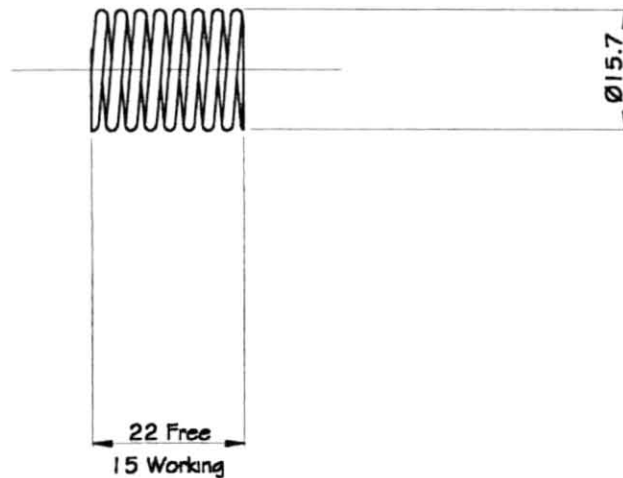
Turbine - MW54

Title: Filter Cover

Issue: 2

Part No. 009

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

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

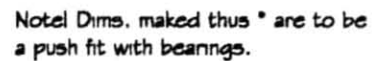
Turbine - MW54

Title: Spring

Issue: 2

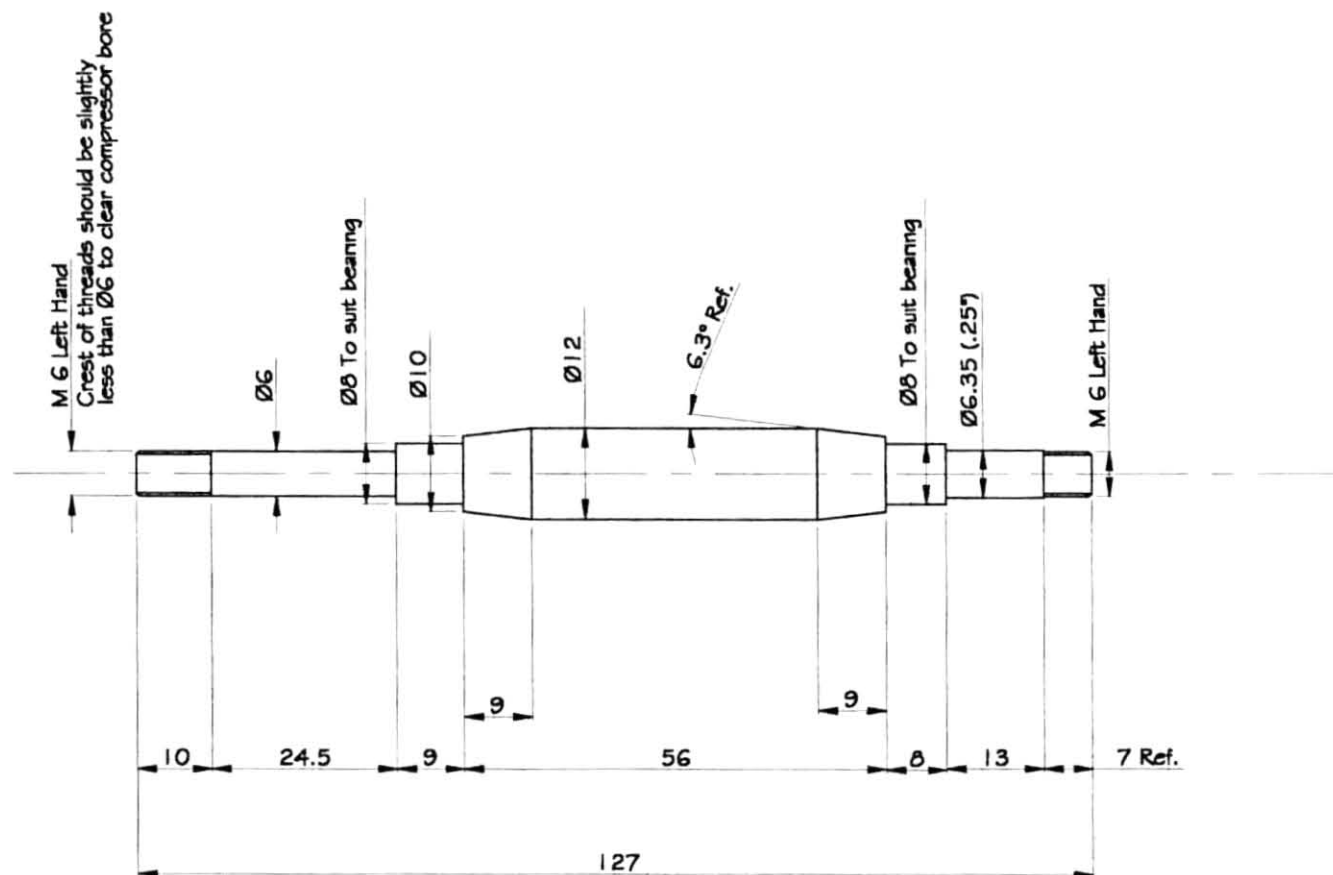
Part No. 010

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



Part No. 011

Dimensions in Millimeters



Material: En 24T or Equivalent

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

Title: Shaft

Issue: 2

Part No. 012

Dimensions in Millimeters

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

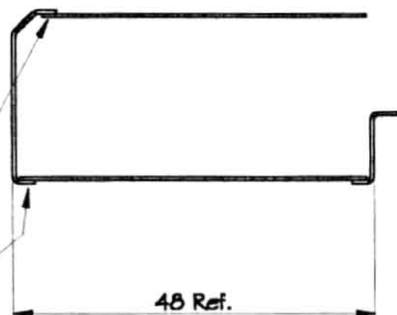
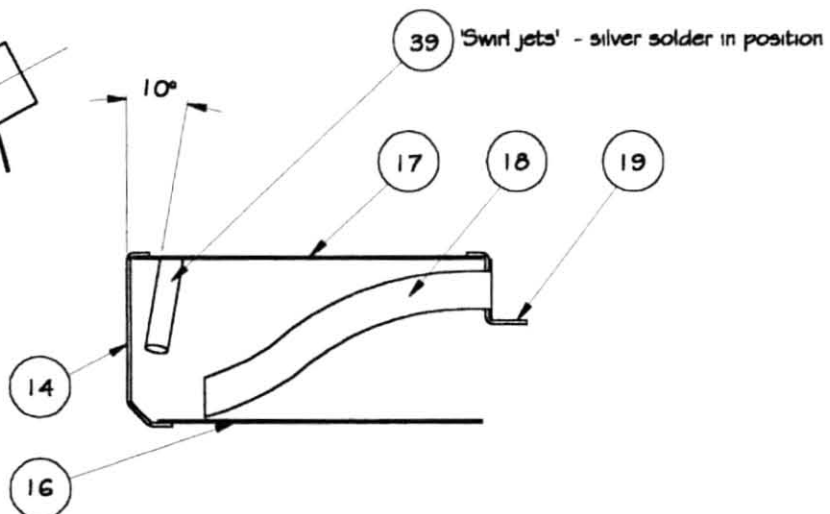
'TOP'

10
Ref.

Outlets of 12 sticks on 54 PCD

Ref. View from front
(End caps omitted for clarity)

These joints to
be spot welded



Material: As details

Drawn: Terry Lee

Third Angle Projection

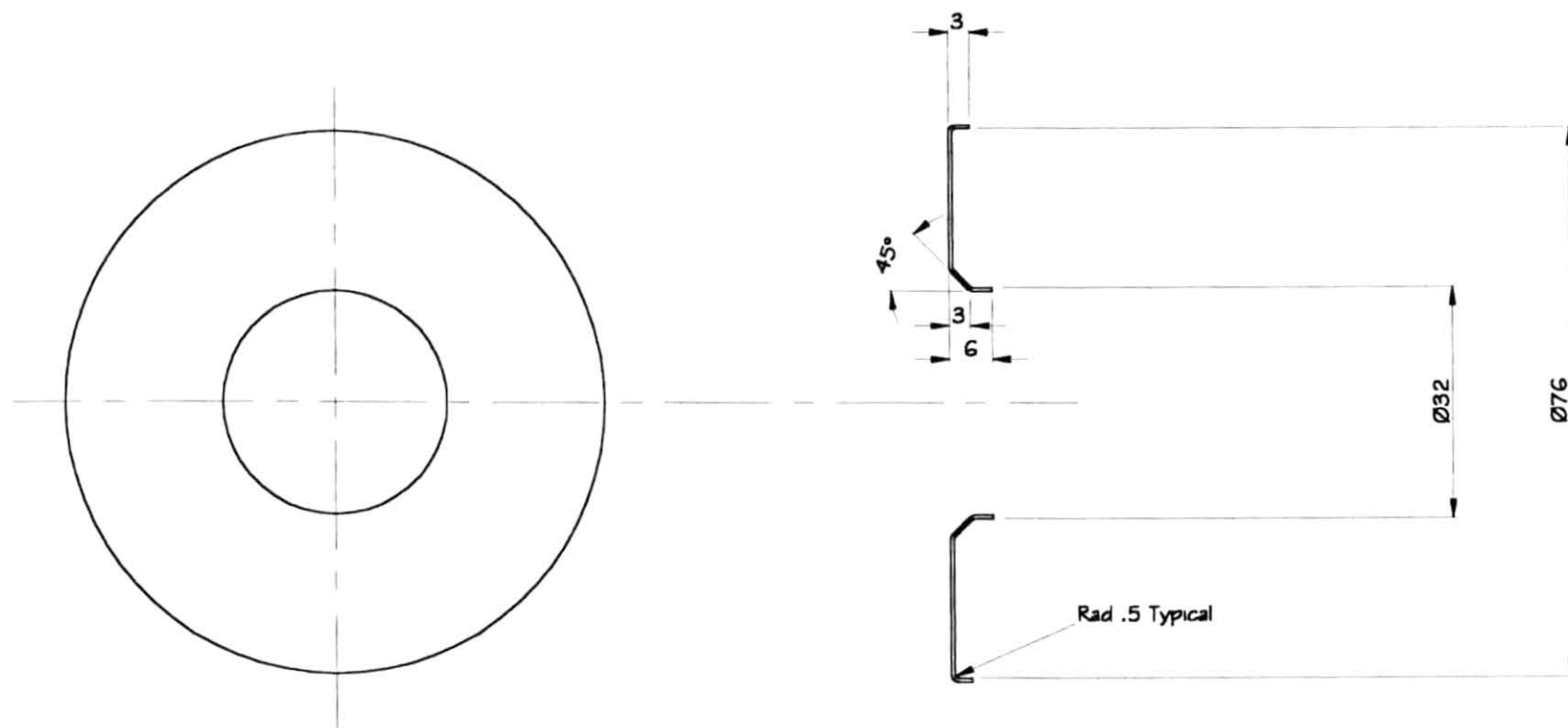
© WREN Turbines

Turbine - MW54

Title: Combustion Chamber Sub - Assy Issue: 4

Part No. 013

Dimensions in Millimeters



Material: Stainless Steel sheet - .4mm Thick

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

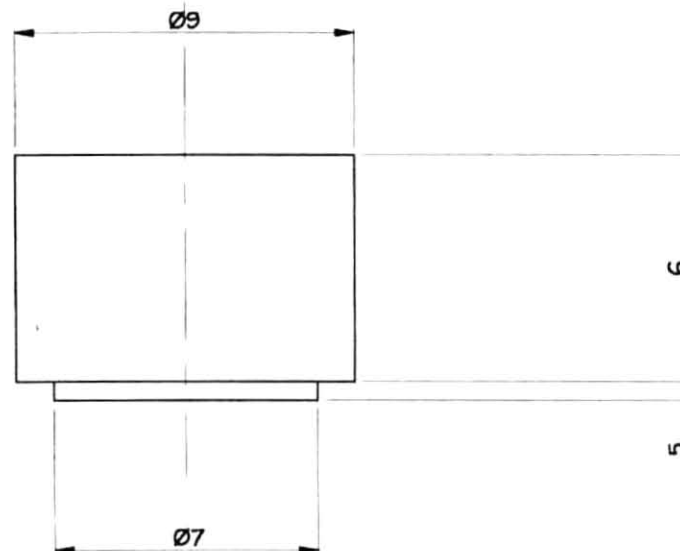
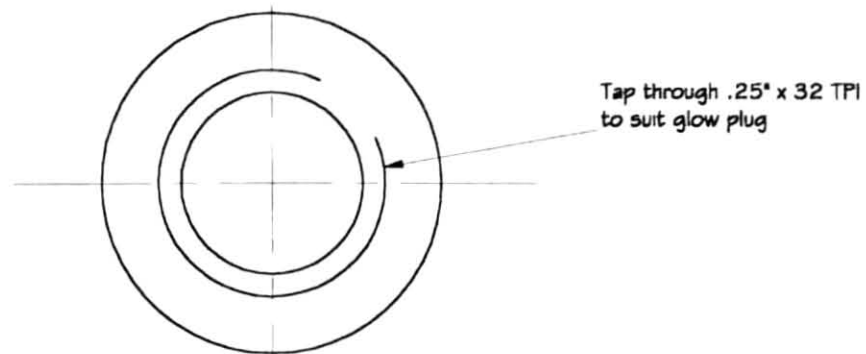
Turbine - MW54

Title: Combustion Chamber Front

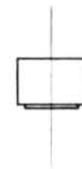
Issue: 1

Part No. 014

Dimensions in Millimeters



Enlarged View Scale 5:1



Actual Size

Material: Stainless Steel

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

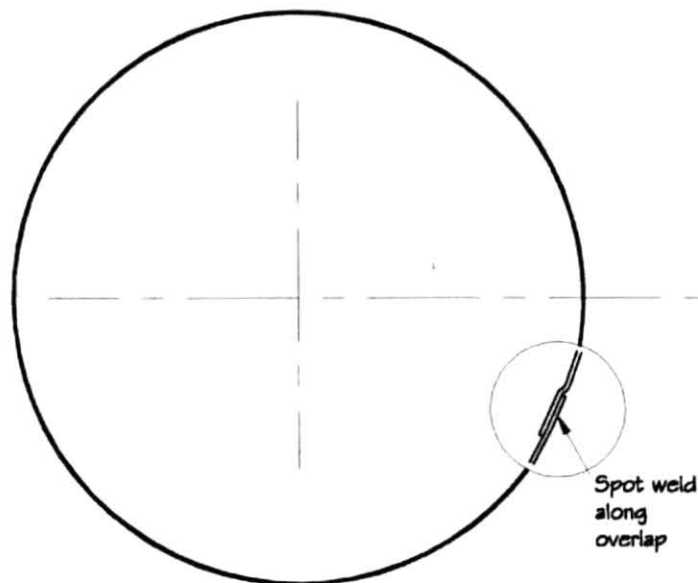
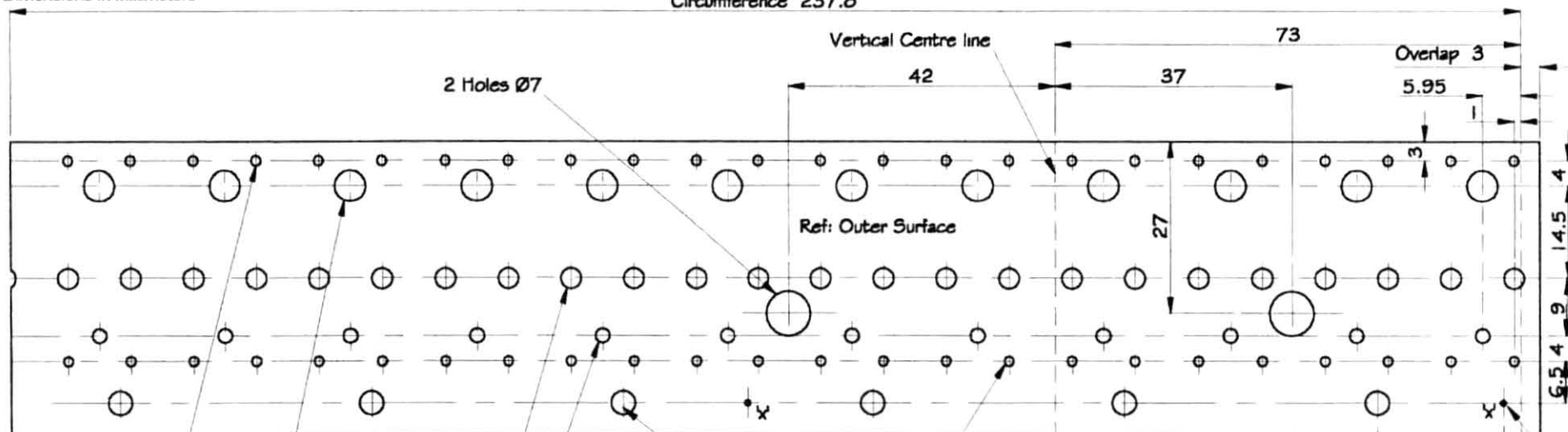
Title: Glow Plug Boss

Issue: 1

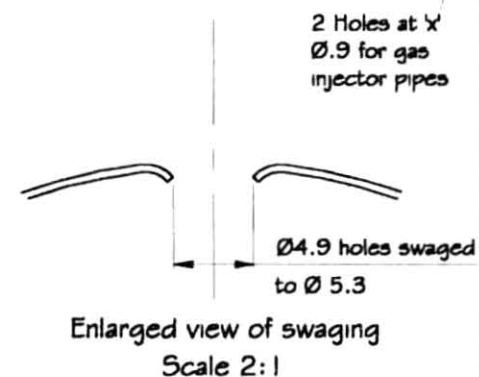
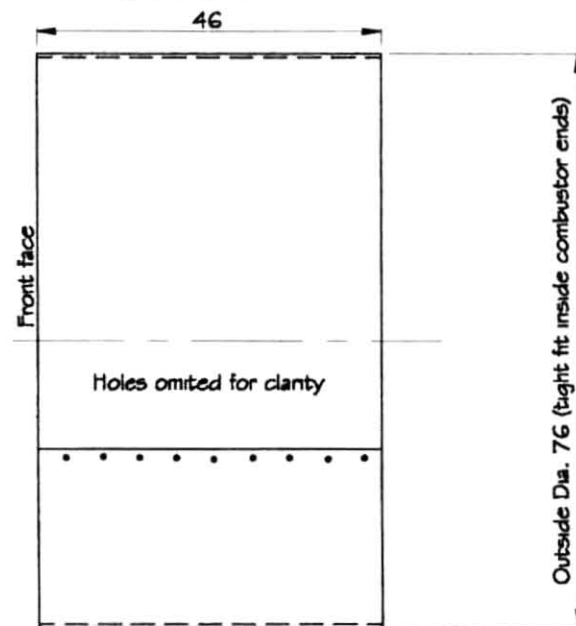
Part No. 015

Dimensions in Millimeters

Circumference 237.8



Ref. View from front



Material: Stainless Steel sheet - .4mm thick

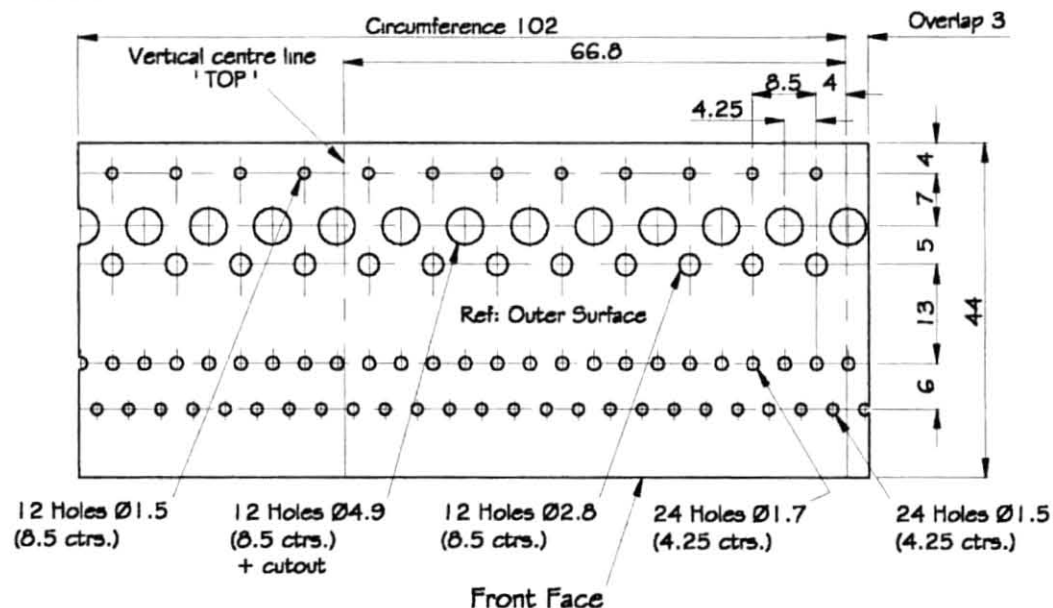
Drawn: Terry Lee Third Angle Projection © Mike Murphy Turbine - MW54

Title: Combustor - Outer Wrapper

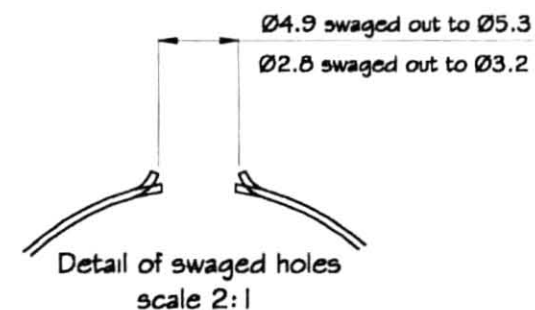
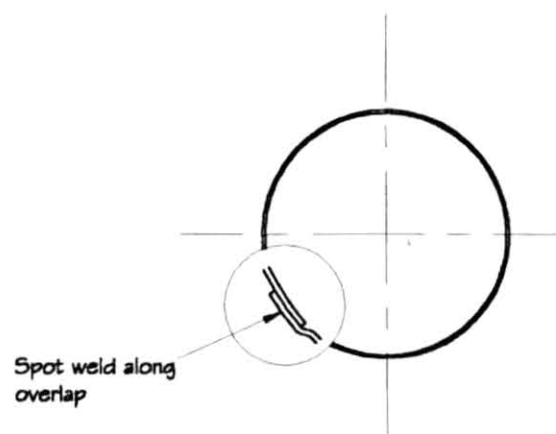
Issue: 4

Part No. 017

Dimensions in Millimeters



Developed Shape



Material: Stainless Steel sheet .4mm thick

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

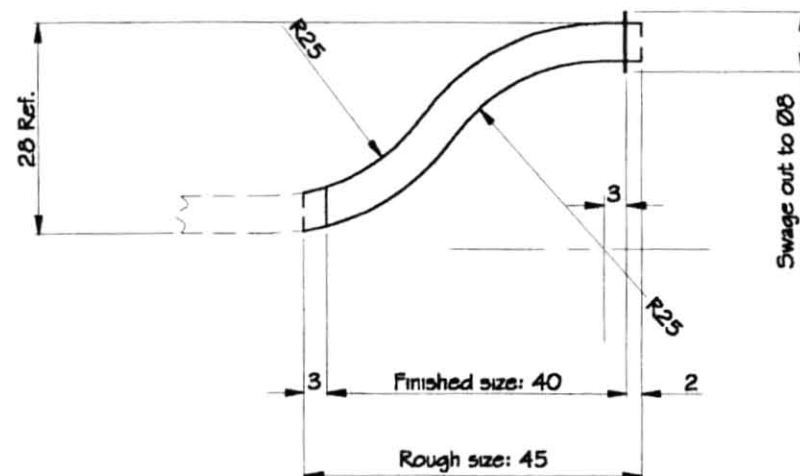
Turbine - MW54

Title: Combustor - Inner Wrapper

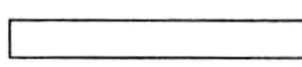
Issue: 2

Part No. 016

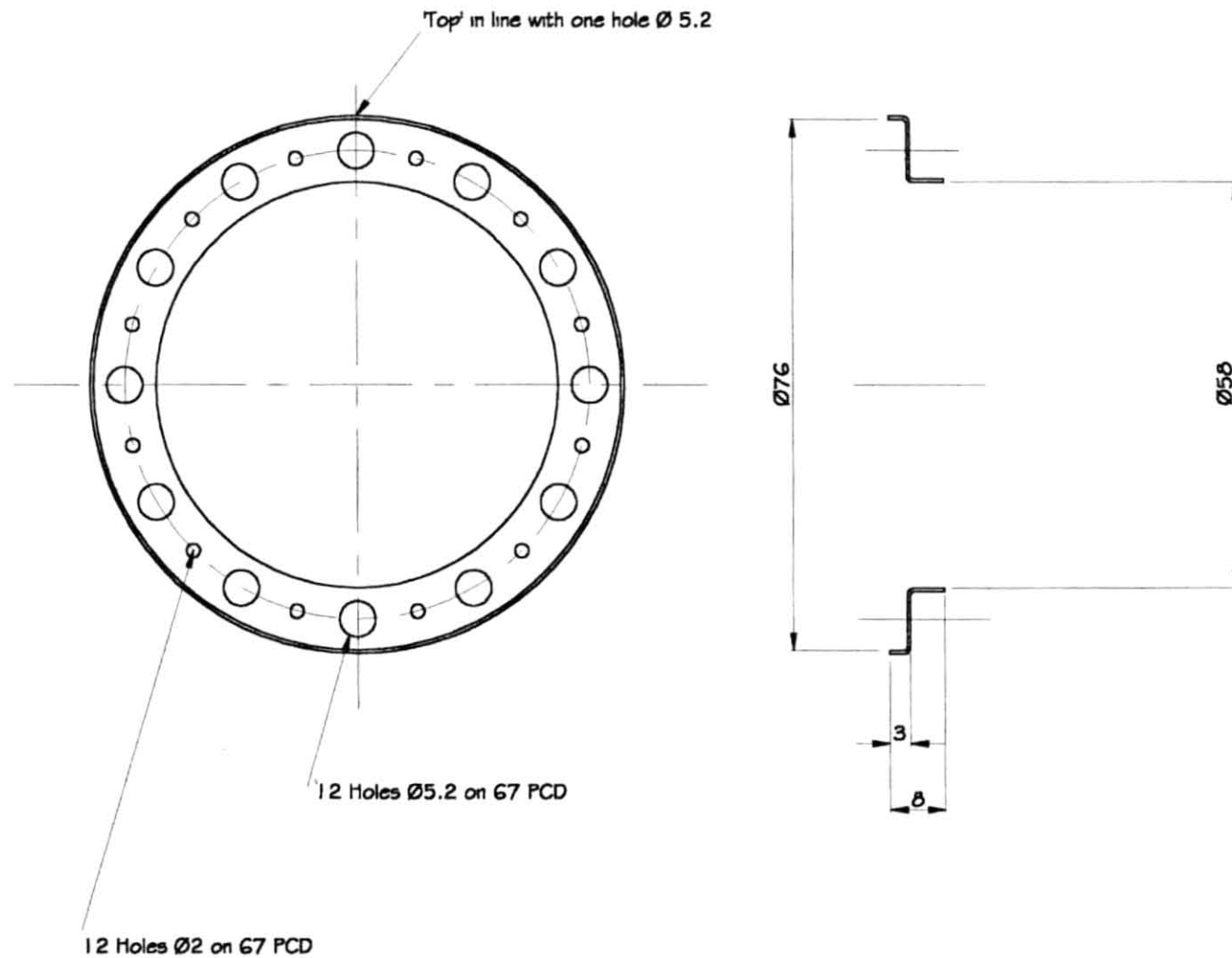
Dimensions in Millimeters



Make from Stainless Steel tube
Ø5 x .3 wall thickness



Dimensions in Millimeters



Material: Stainless Steel sheet - .4mm thick

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

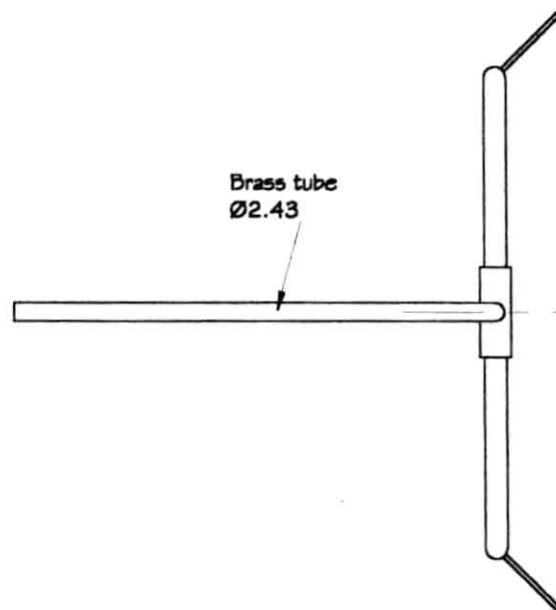
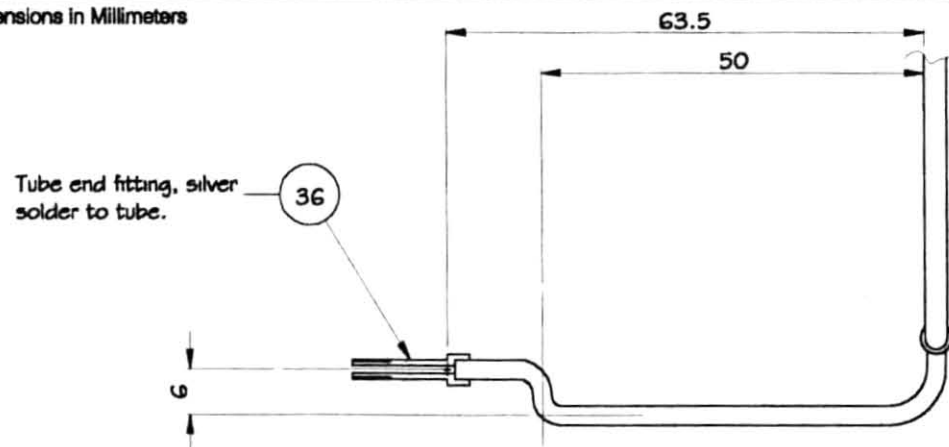
Turbine - MW54

Title: Combustor Rear

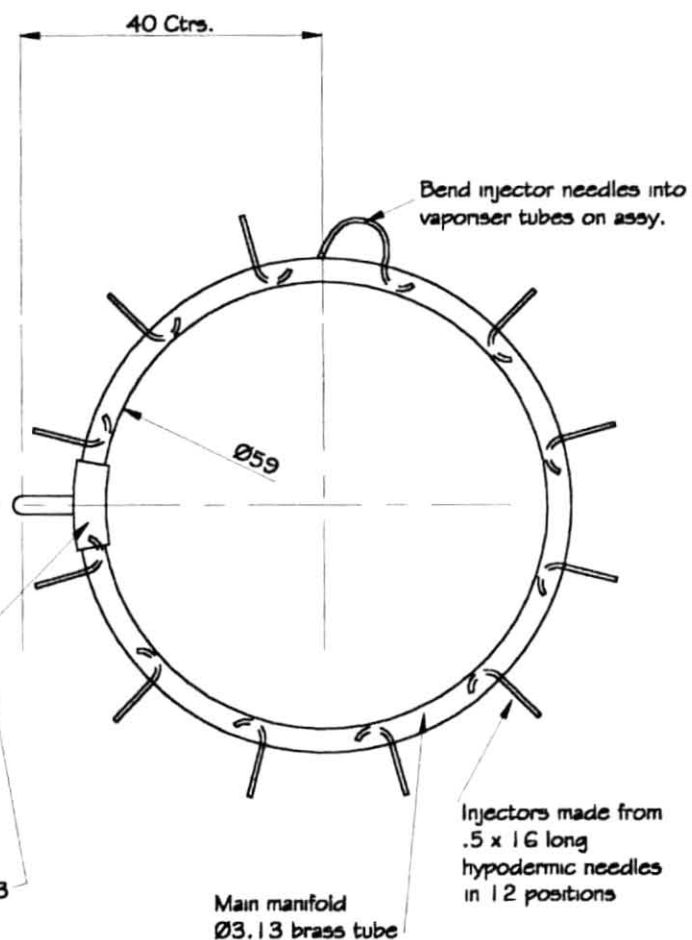
Issue: 2

Part No. 019

Dimensions in Millimeters



Joining tube Ø4.13



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

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

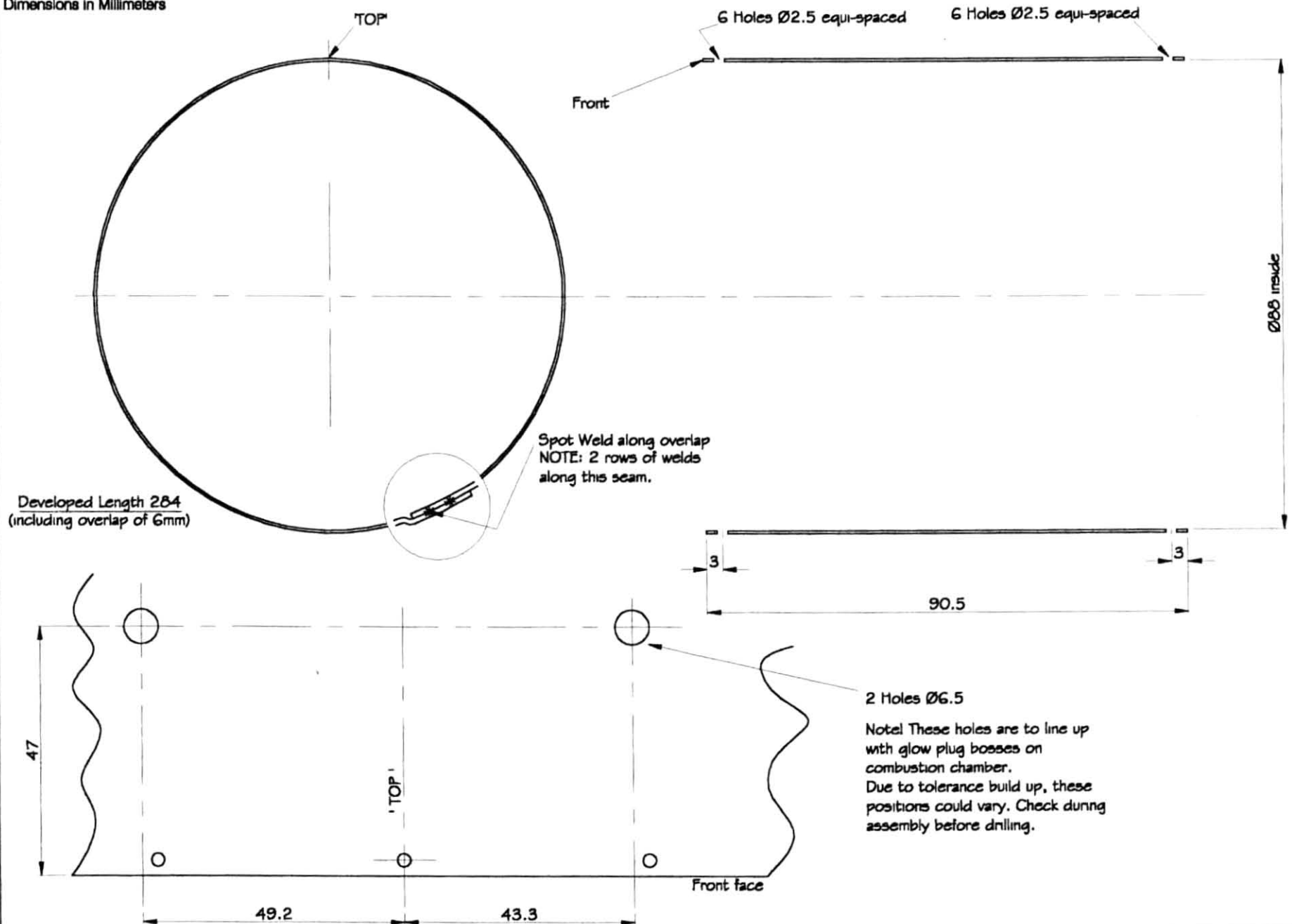
Turbine - MW54

Title: Fuel Pipe Assy.

Issue: 3

Part No. 020

Dimensions in Millimeters



Material: Stainless Steel - .4 thick

Drawn: Terry Lee

Third Angle Projection

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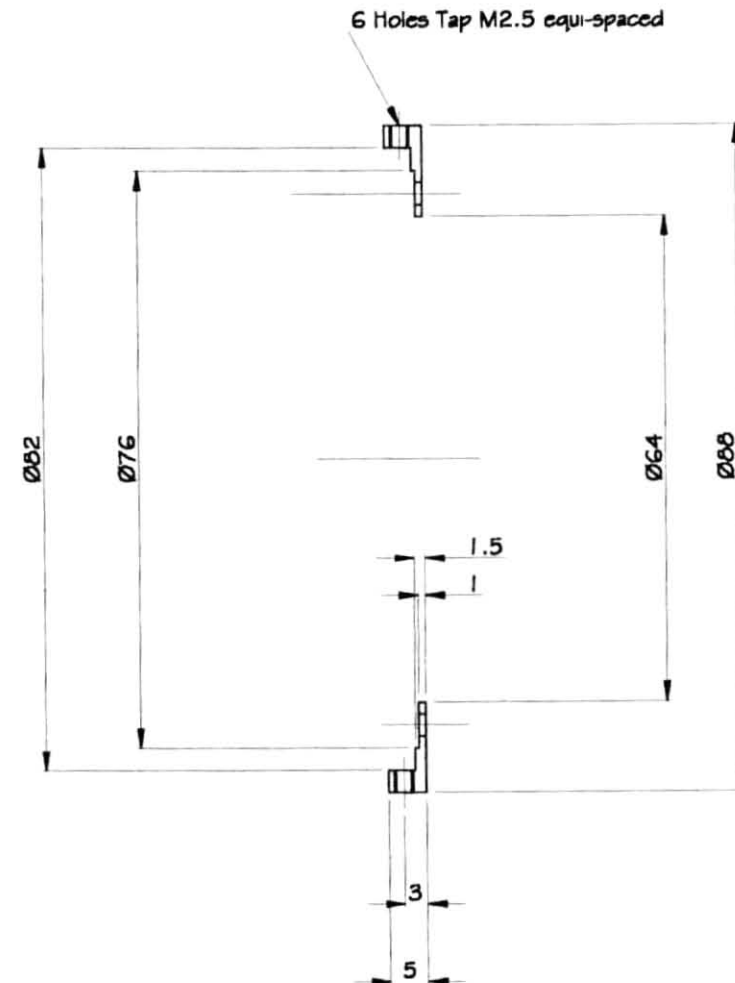
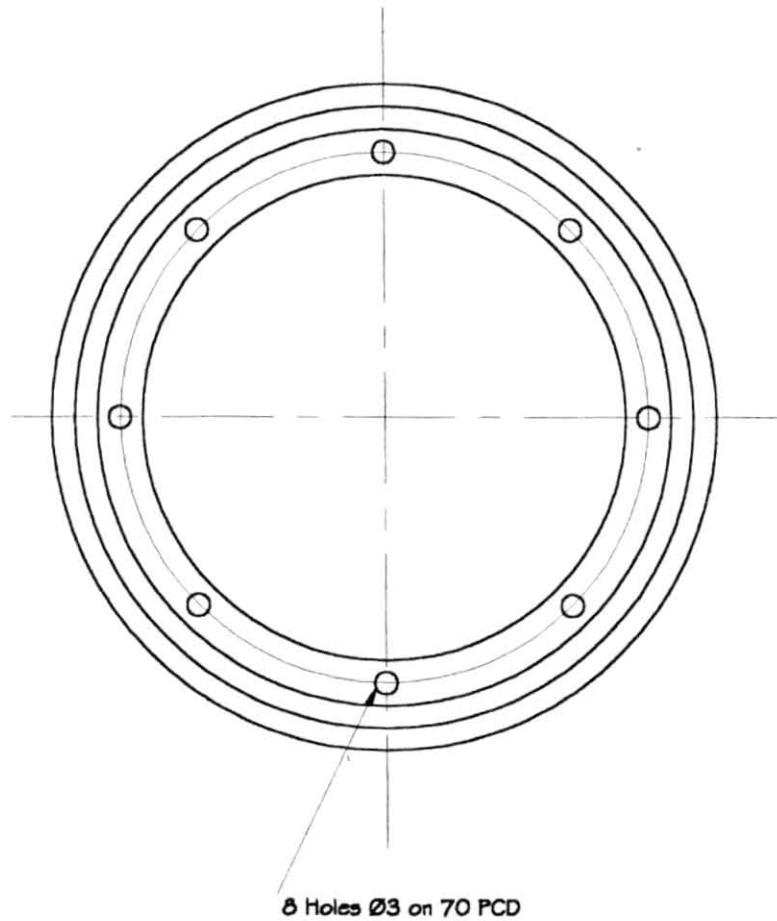
Turbine - MW54

Title: Case Outer

Issue: 3

Part No. 021

Dimensions in Millimeters



Material: Mild Steel

Drawn: Terry Lee

Third Angle Projection

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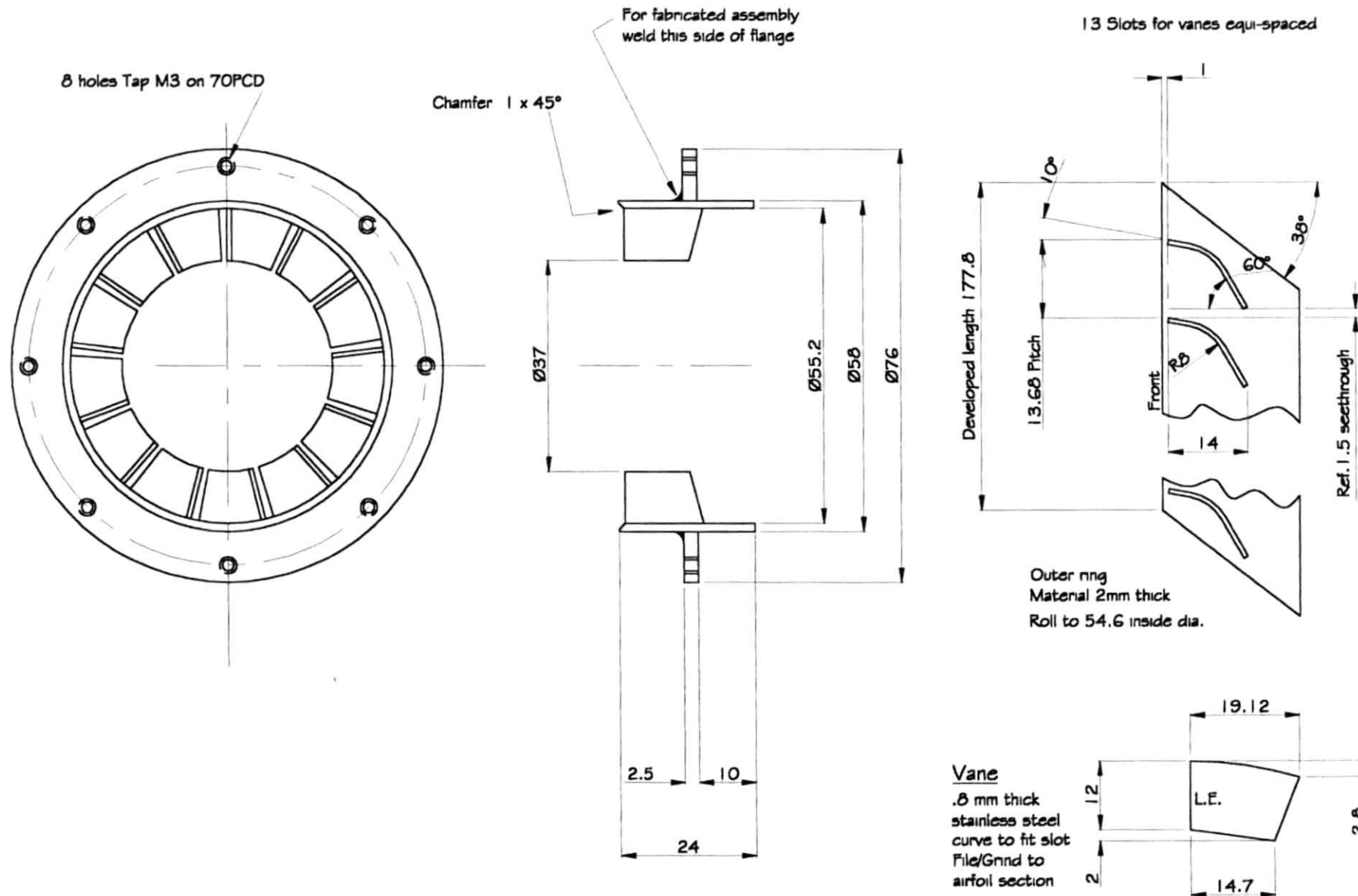
Turbine - MW54

Title: Case Rear

Issue: 3

Part No. 022

Dimensions in Millimeters



Material: Stainless Steel

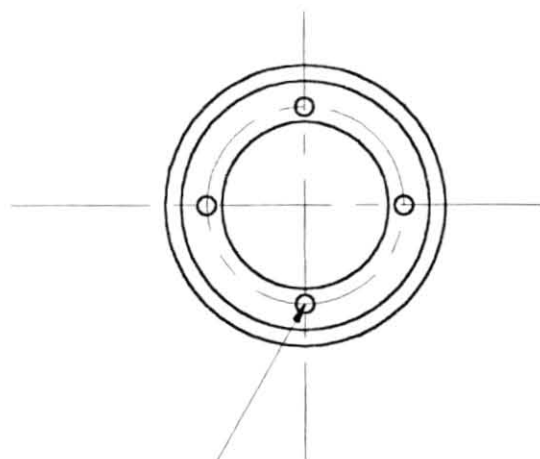
Drawn: Terry Lee Third Angle Projection © WREN Turbines Turbine - MW54

Title: NGV Outer

Issue: 1

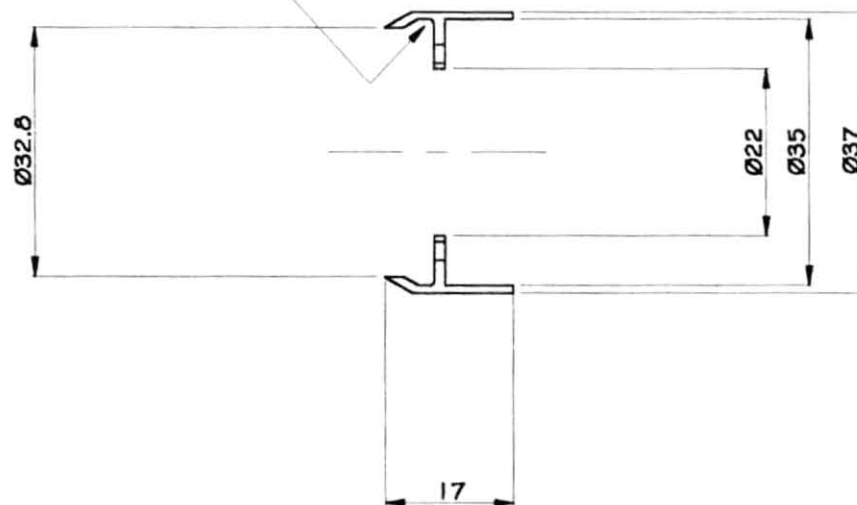
Part No. 023

Dimensions in Millimeters

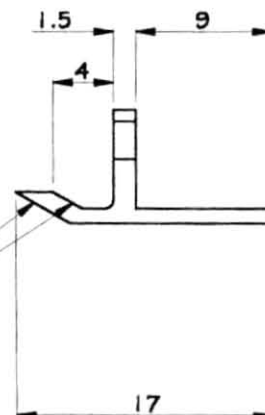


4 Holes $\varnothing 2.5$ On 26 PCD

This portion chambered out
for lightness only



30° Chamfer
both sides



Enlarged view
Scale 2:1

Material: Stainless Steel

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

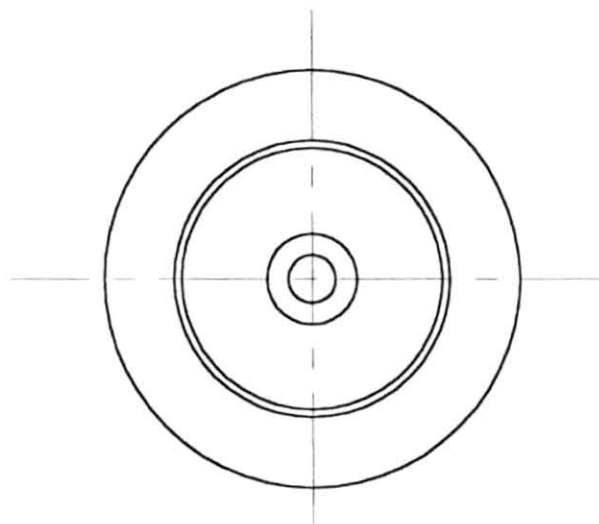
Turbine - MW54

Title: NGV Inner

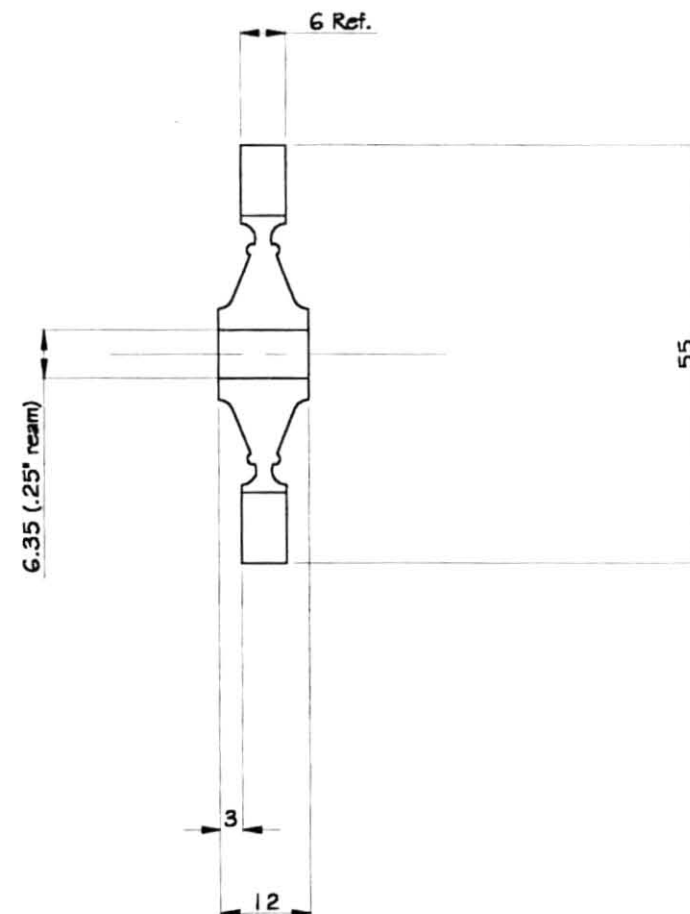
Issue: 2

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

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

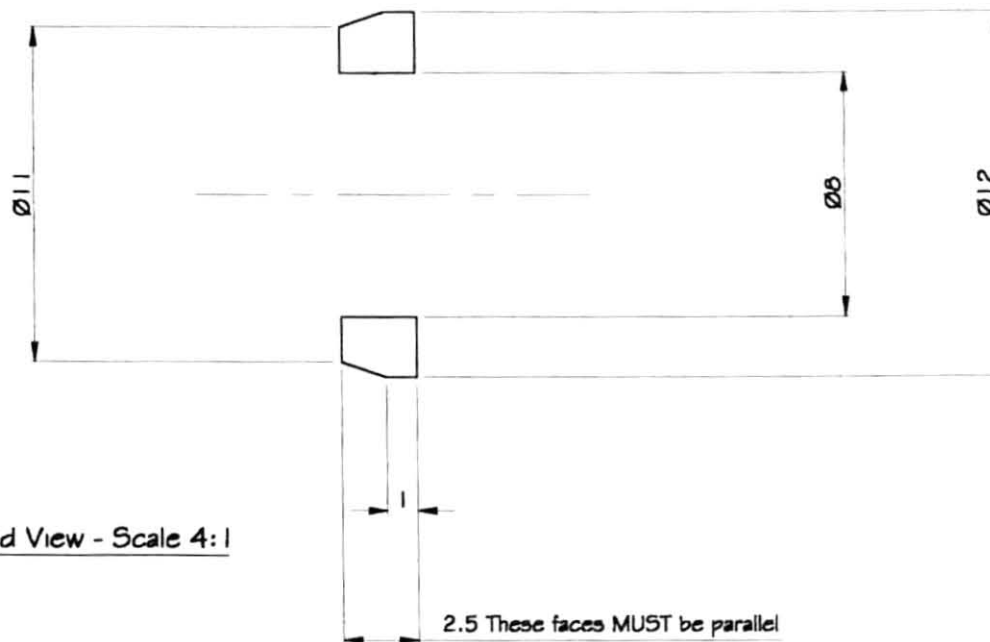
Turbine - MW54

Title: Turbine wheel

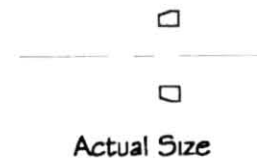
Issue: 1

Part No. 025

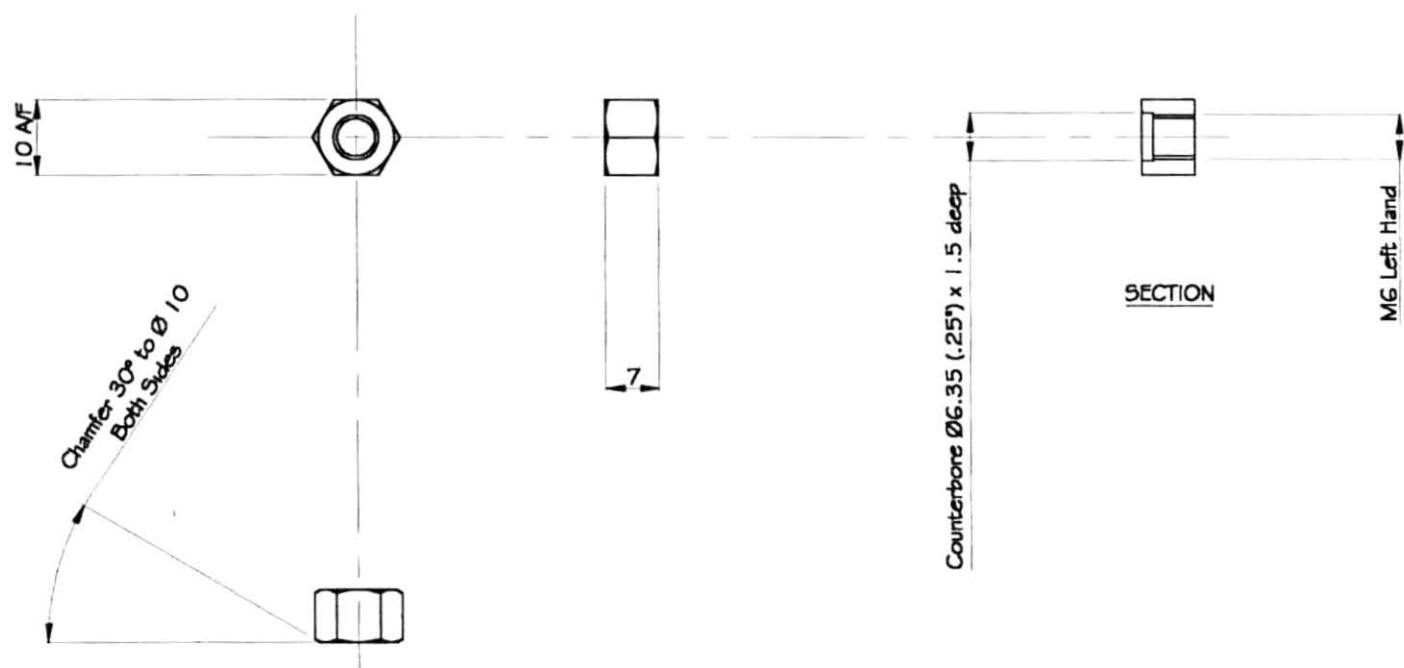
Dimensions in Millimeters



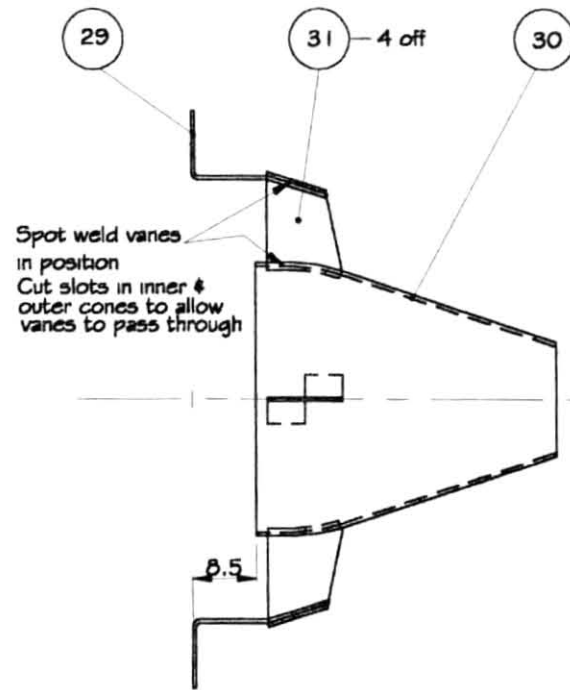
Enlarged View - Scale 4:1



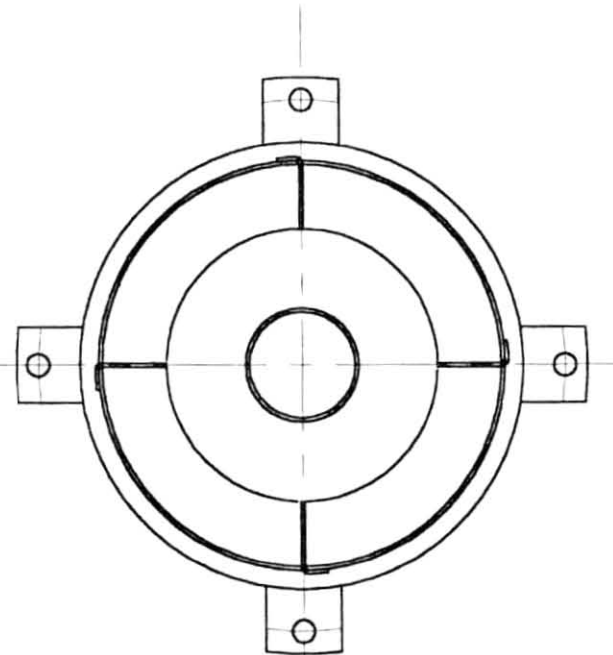
Dimensions in Millimeters



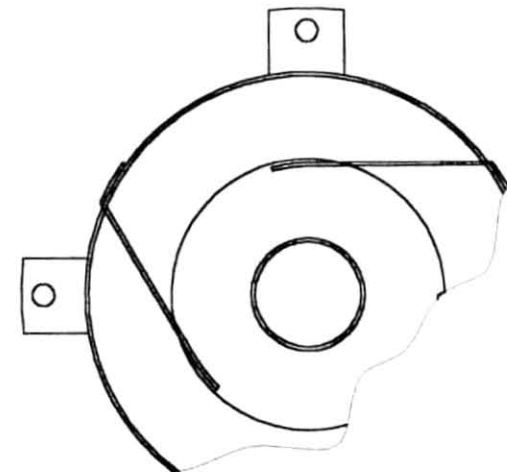
Dimensions in Millimeters



Ensure cone inner and cone outer are concentric.



Alternative tangential vanes in 3 positions spot weld in place



Material: As Details

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

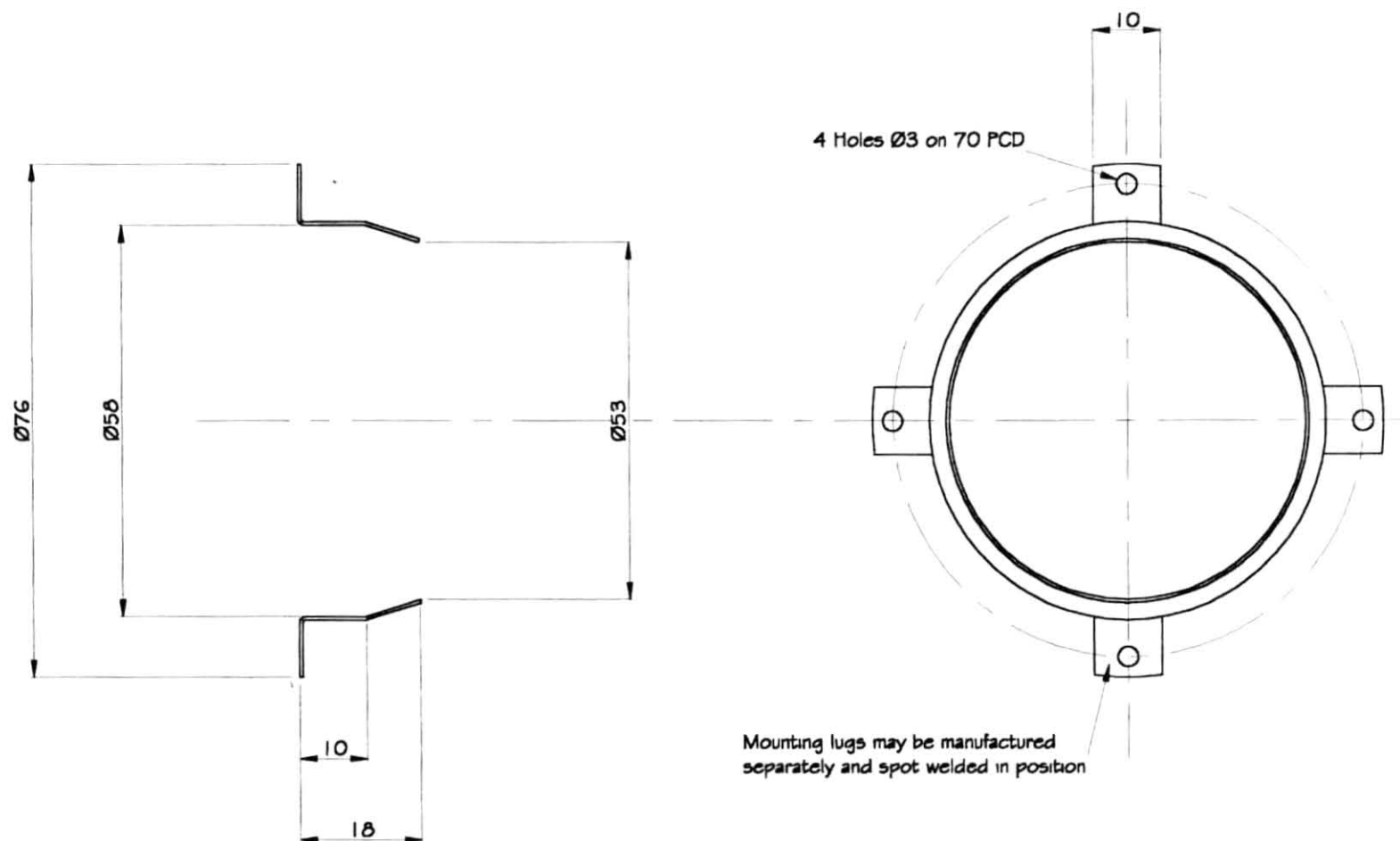
Turbine - MW54

Title: Exhaust Cone Sub Assy.

Issue: 2

Part No. 028

Dimensions in Millimeters



Material: Stainless Steel Sheet

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

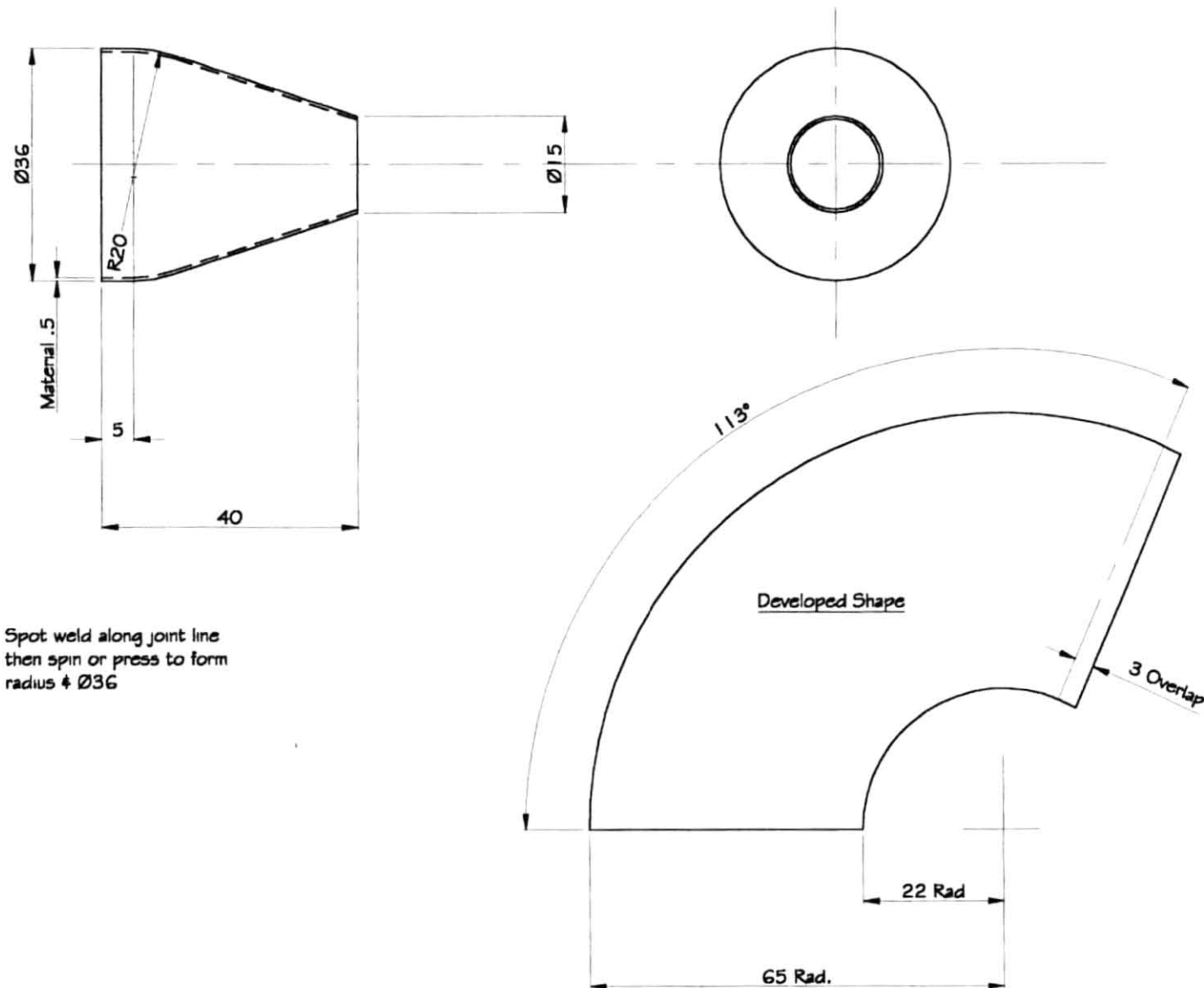
Turbine - MW54

Title: Cone Outer

Issue: 1

Part No. 029

Dimensions in Millimeters



Material: Stainless Steel Sheet

Drawn: Terry Lee

Third Angle Projection

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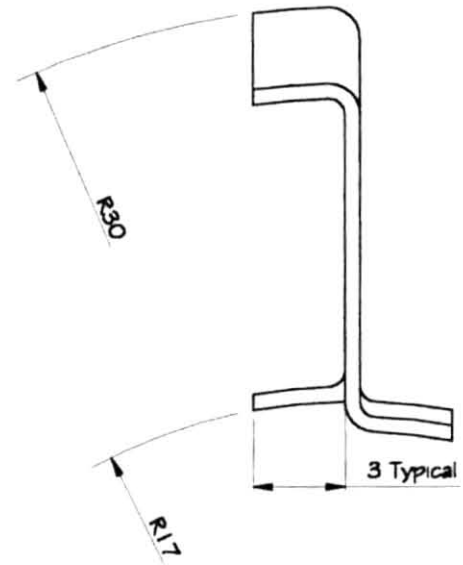
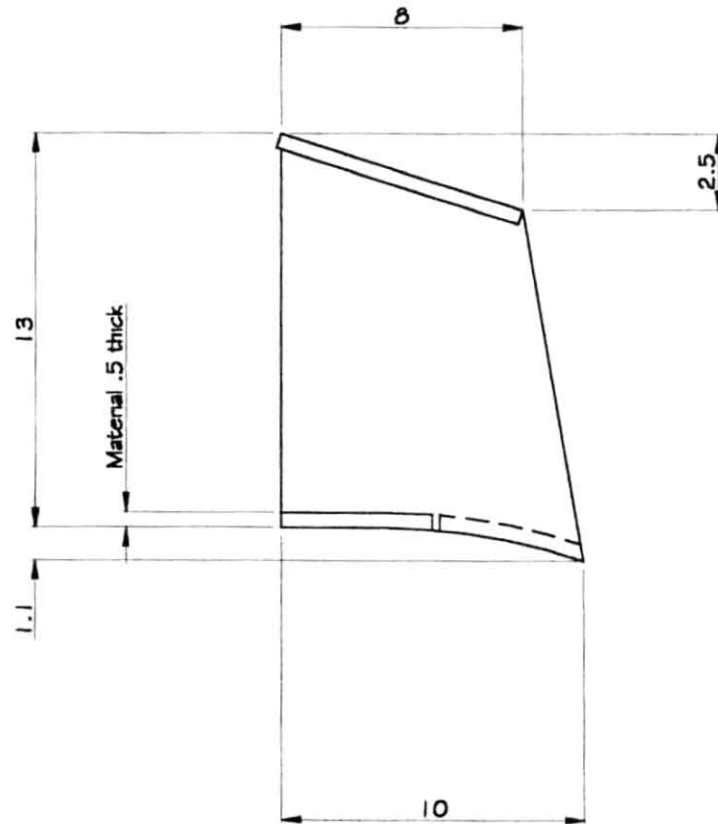
Turbine - MW54

Title: Cone Inner

Issue: 1

Part No. 030

Dimensions in Millimeters

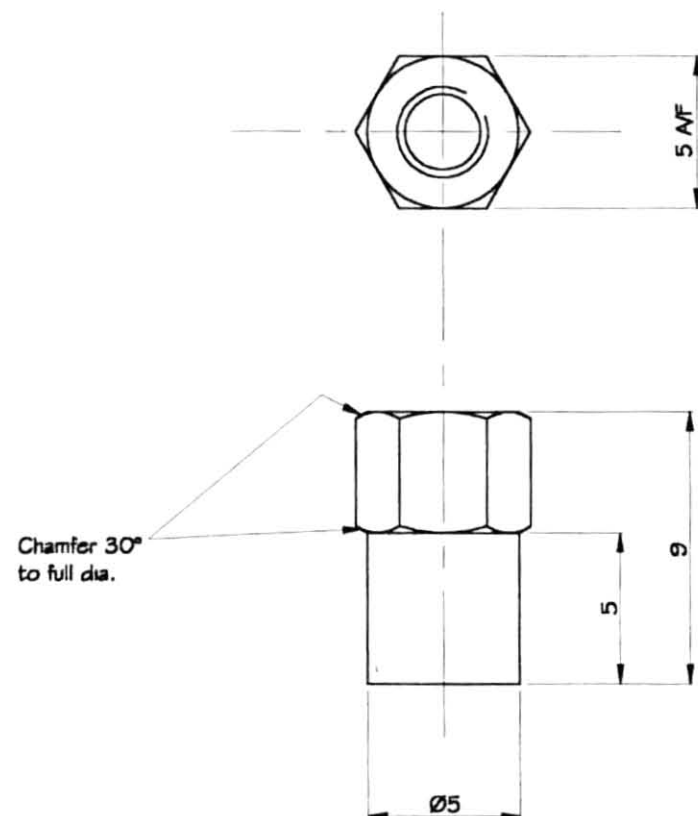


Enlarged View - Scale 4:1

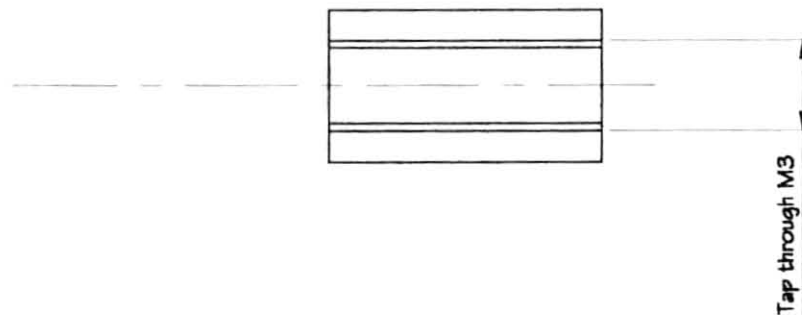


Actual Size

Dimensions in Millimeters



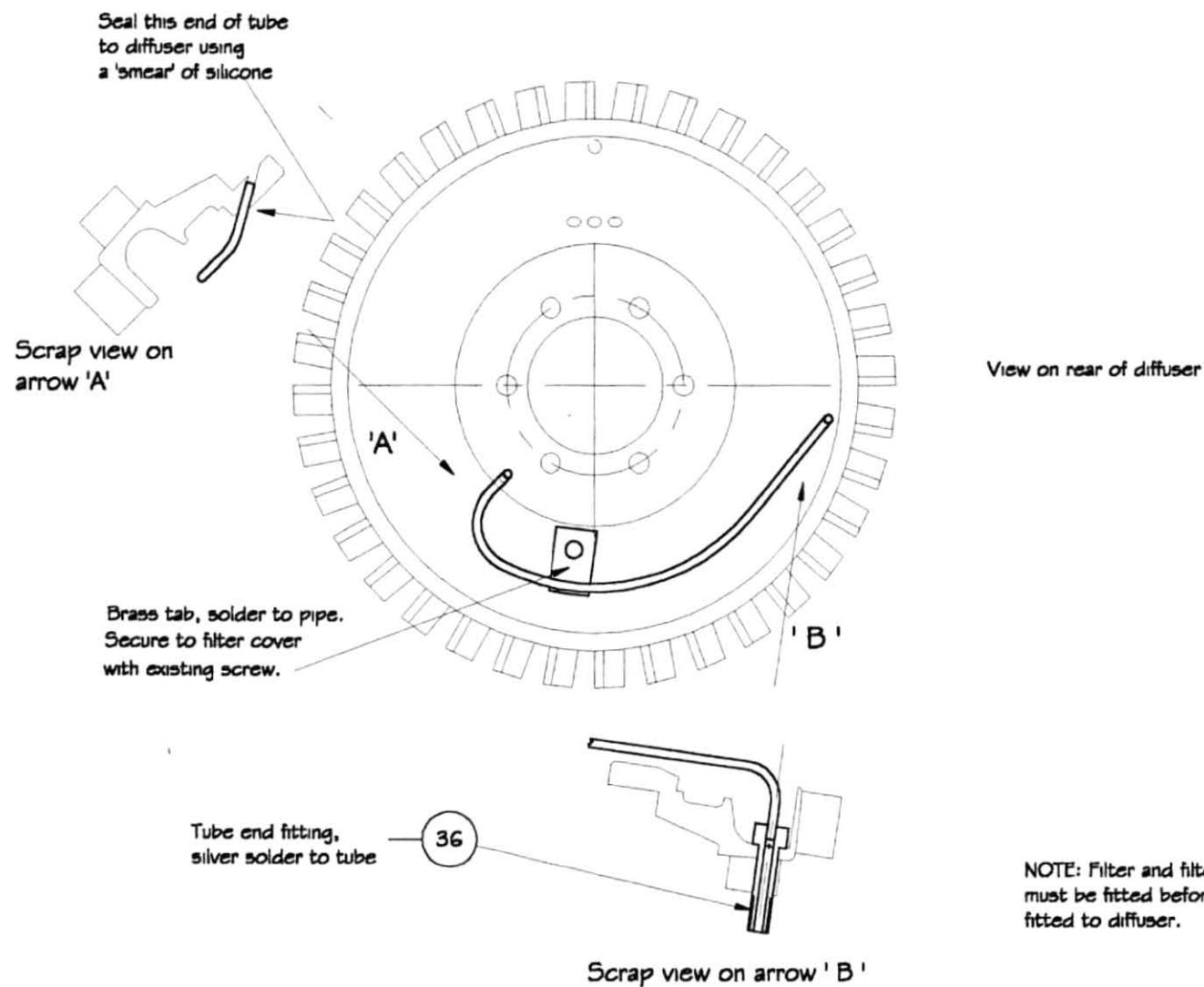
Enlarged view - Scale 4:1



Actual Size

Note: This adaptor is for use with 3 mm 'male' Festo type fittings. If other sizes/types are to be used, adjust dimensions accordingly.

Dimensions in Millimeters



Material - Brass tube 1.6 mm O /Dia.

Material: Brass Tube

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

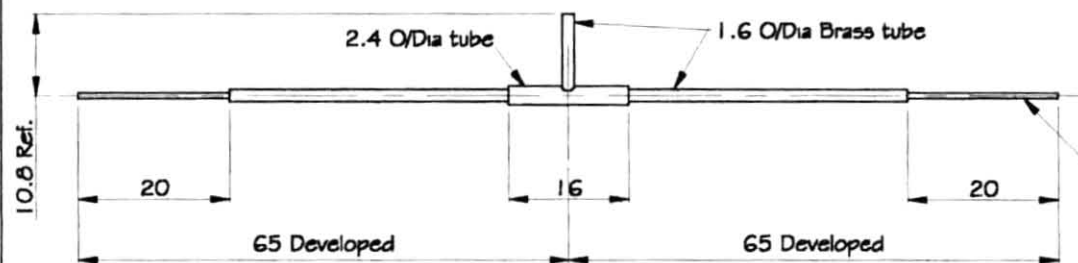
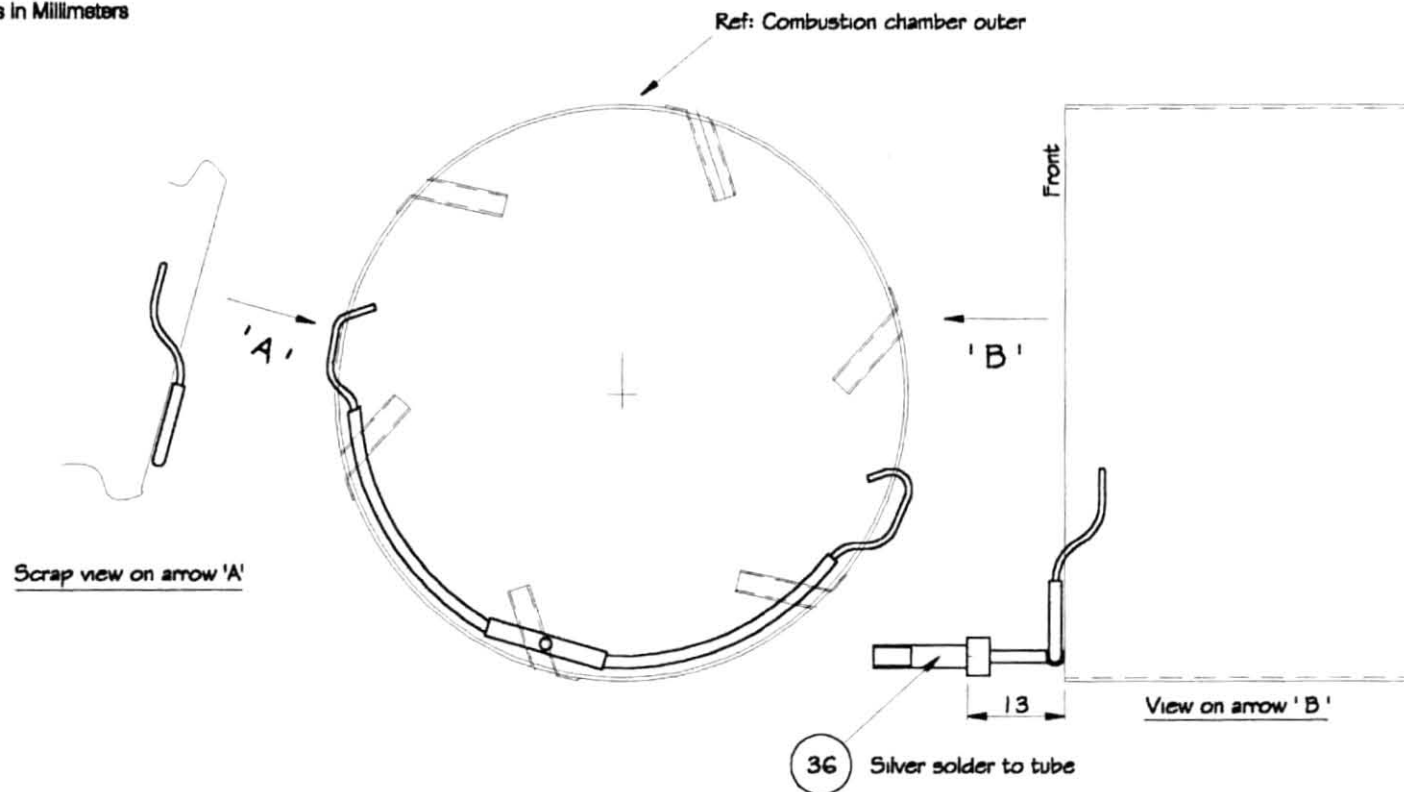
Turbine - MW54

Title: Lubrication pipe

Issue: 2

Part No. 033

Dimensions in Millimeters



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

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

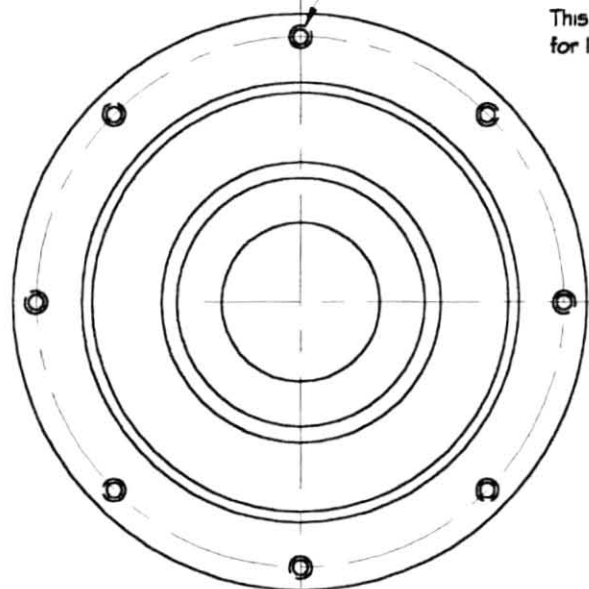
Title: Gas Pipe

Issue: 2

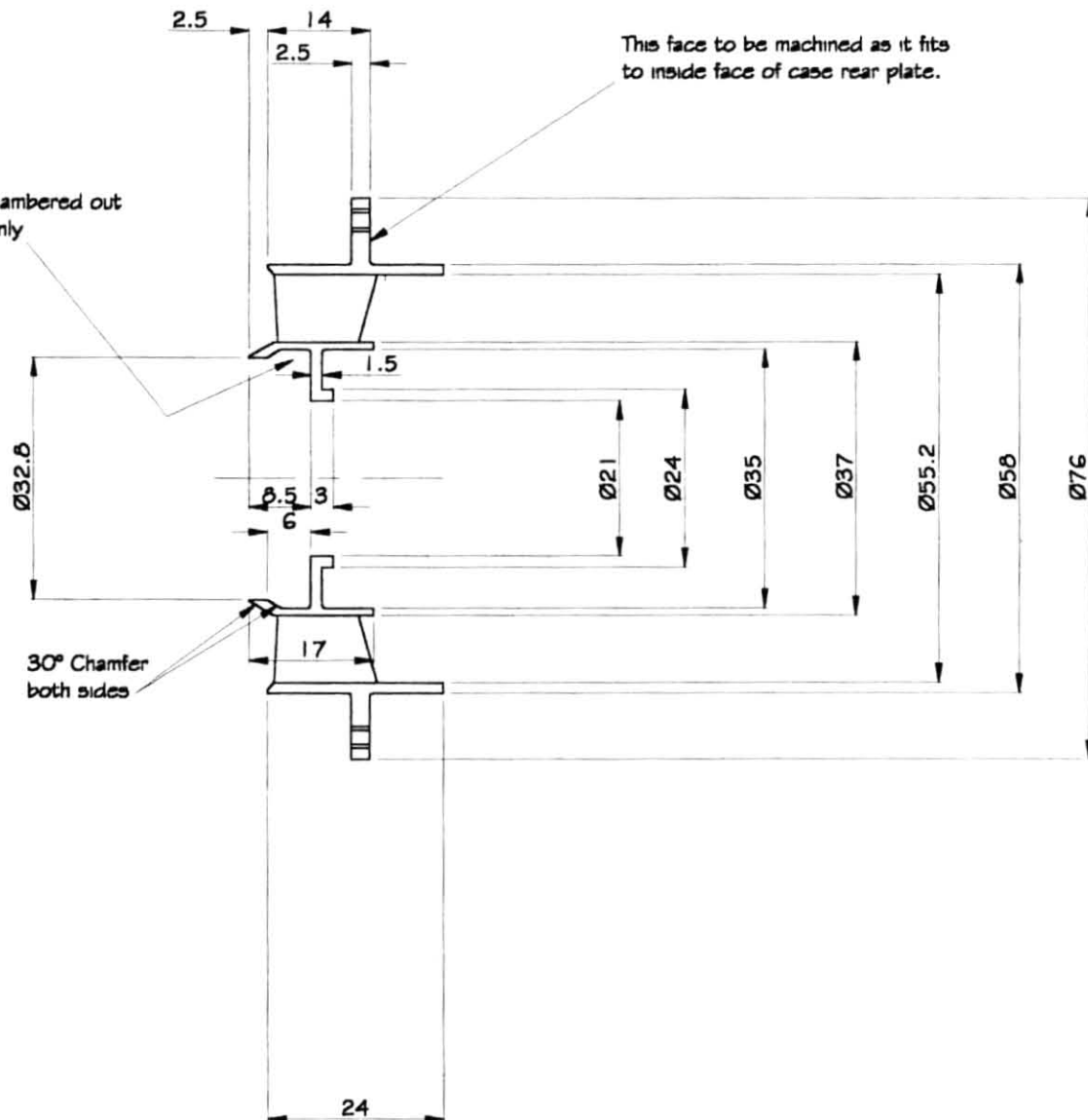
Part No. 034

Dimensions in Millimeters

8 holes Tap M3 on 70 PCD



This portion chambered out for lightness only



Material:

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

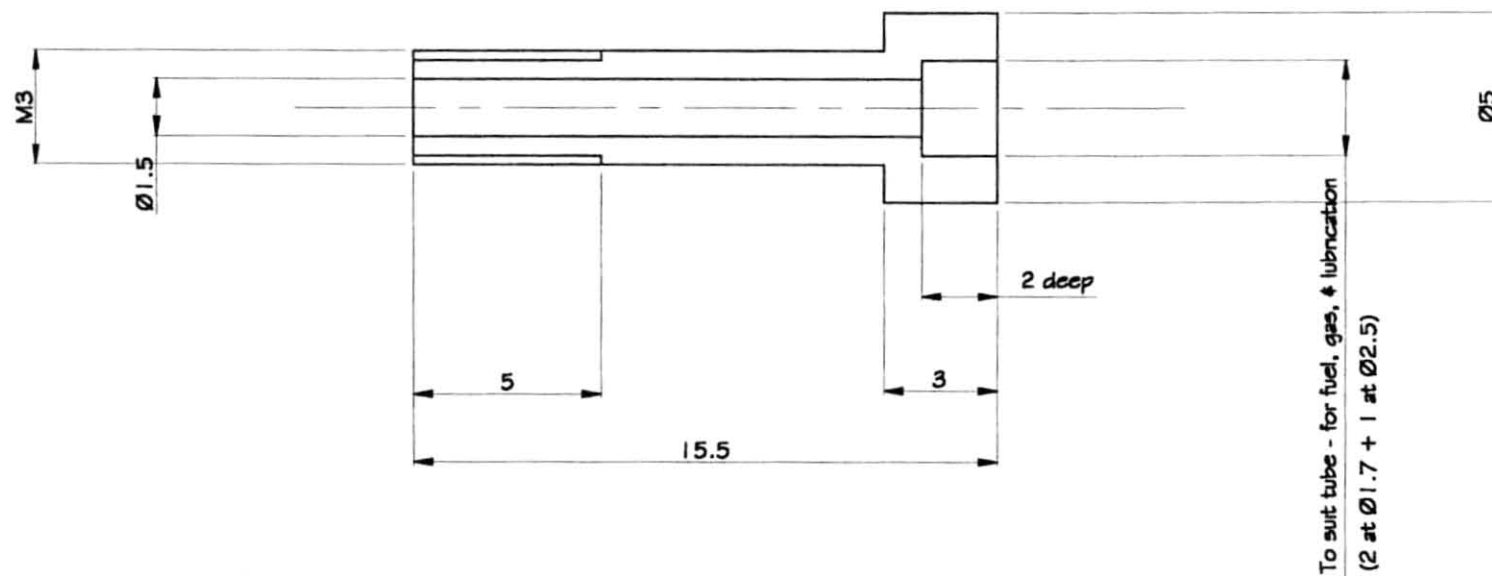
Turbine - MW54

Title: Cast NGV - Machining

Issue: 2

Part No. 035

Dimensions in Millimeters



Enlarged view - Scale 5:1



Actual Size

Material: Stainless Steel

Drawn: Terry Lee

Third Angle Projection

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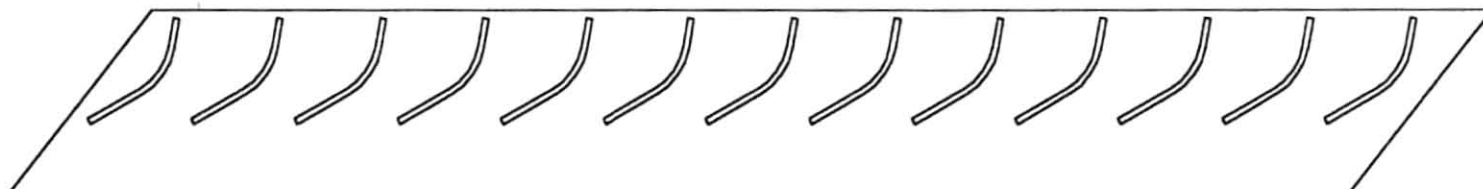
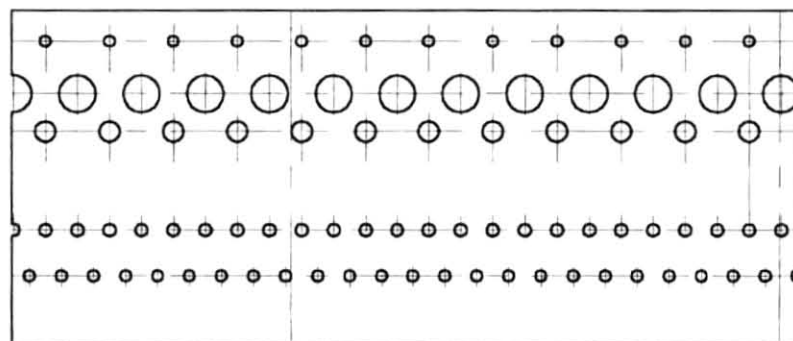
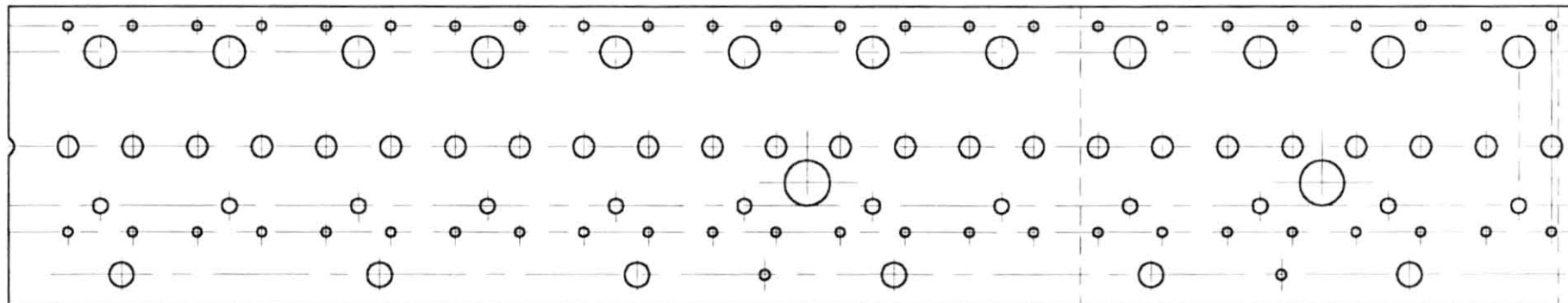
Turbine - MW54

Title: Tube End Fitting

Issue: 3

Part No. 036

Dimensions in Millimeters



Material: See Details

Drawn: Terry Lee

Third Angle Projection

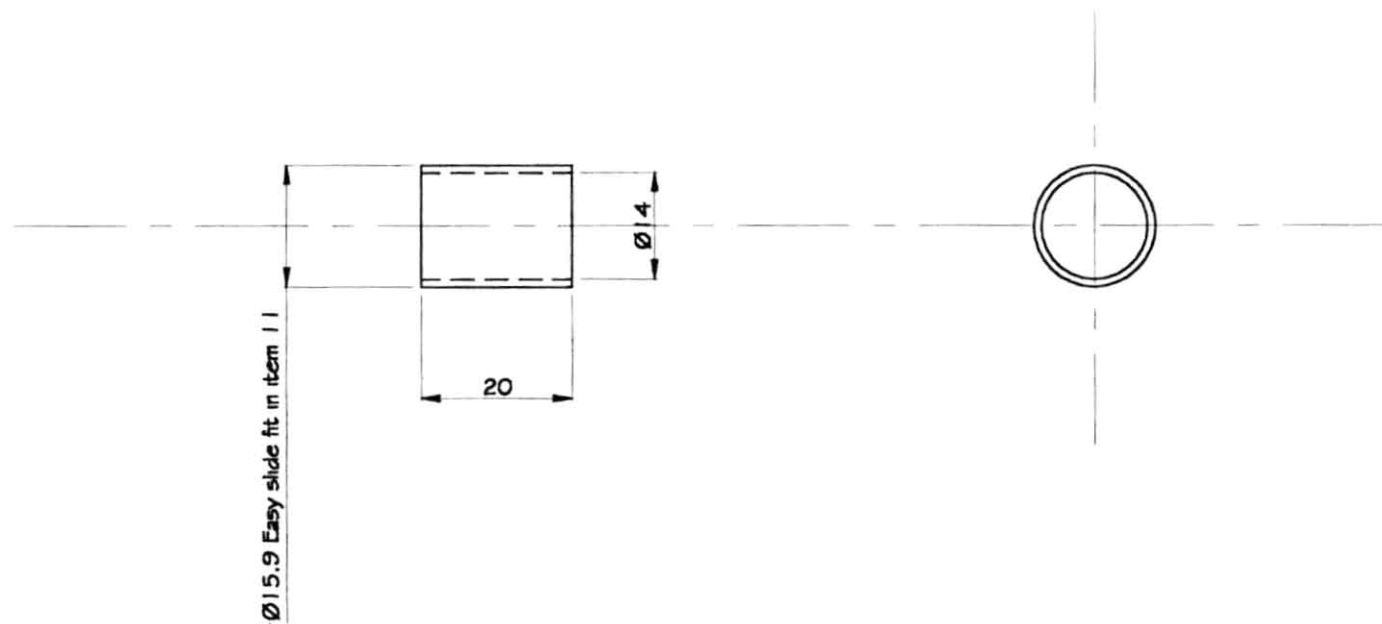
© Mike Murphy Turbine - MW54

Title: Templates

Issue: 1

Part No. 037

Dimensions in Millimeters



Material: Mild steel

Drawn: Terry Lee

Third Angle Projection

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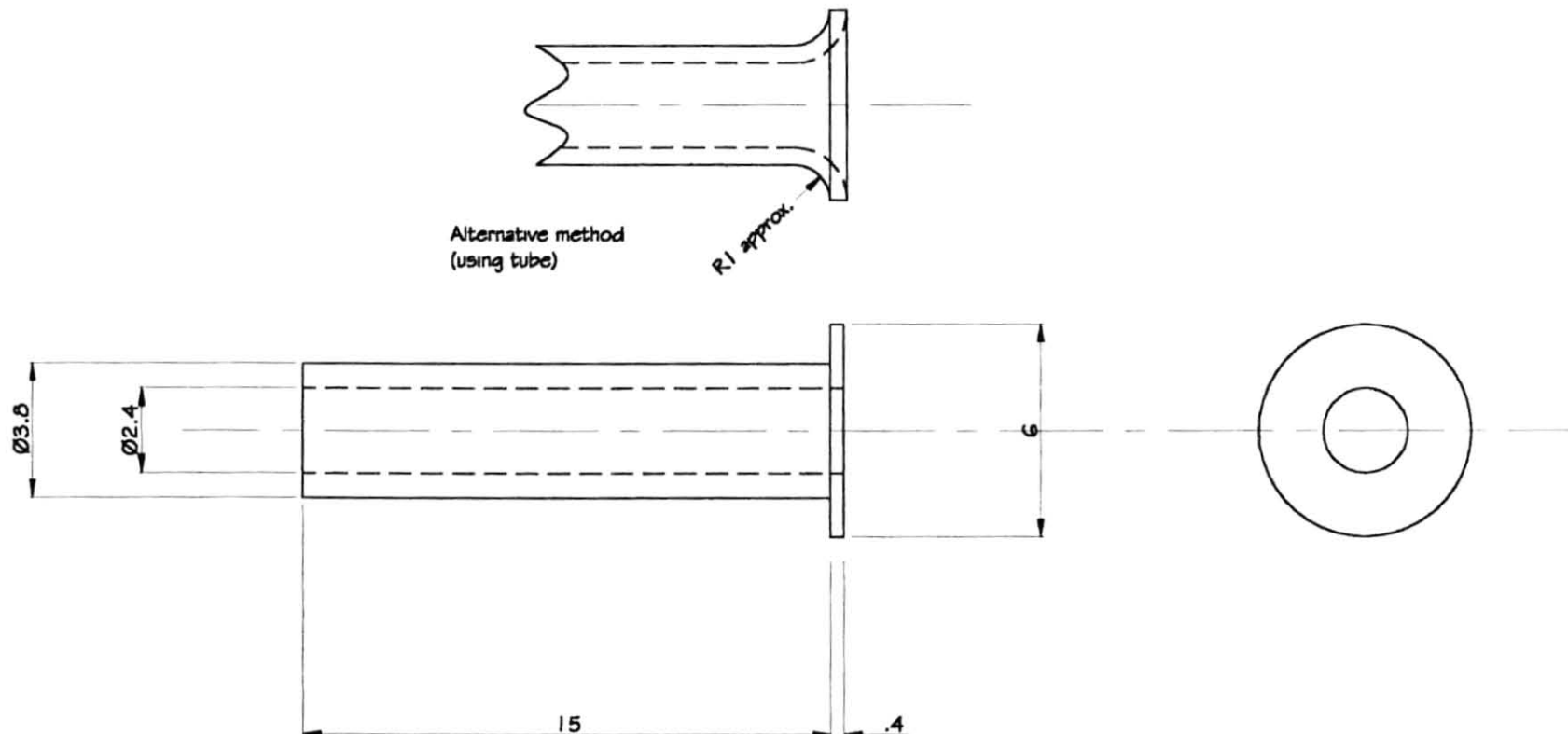
Turbine - MW54

Title: Tube

Issue: 2

Part No. 038

Dimensions in Millimeters



Enlarged view - Scale 5:1

Actual Size

Material: Stainless Steel

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

Title: Swirl Jet

Issue: 2

Part No. 039