

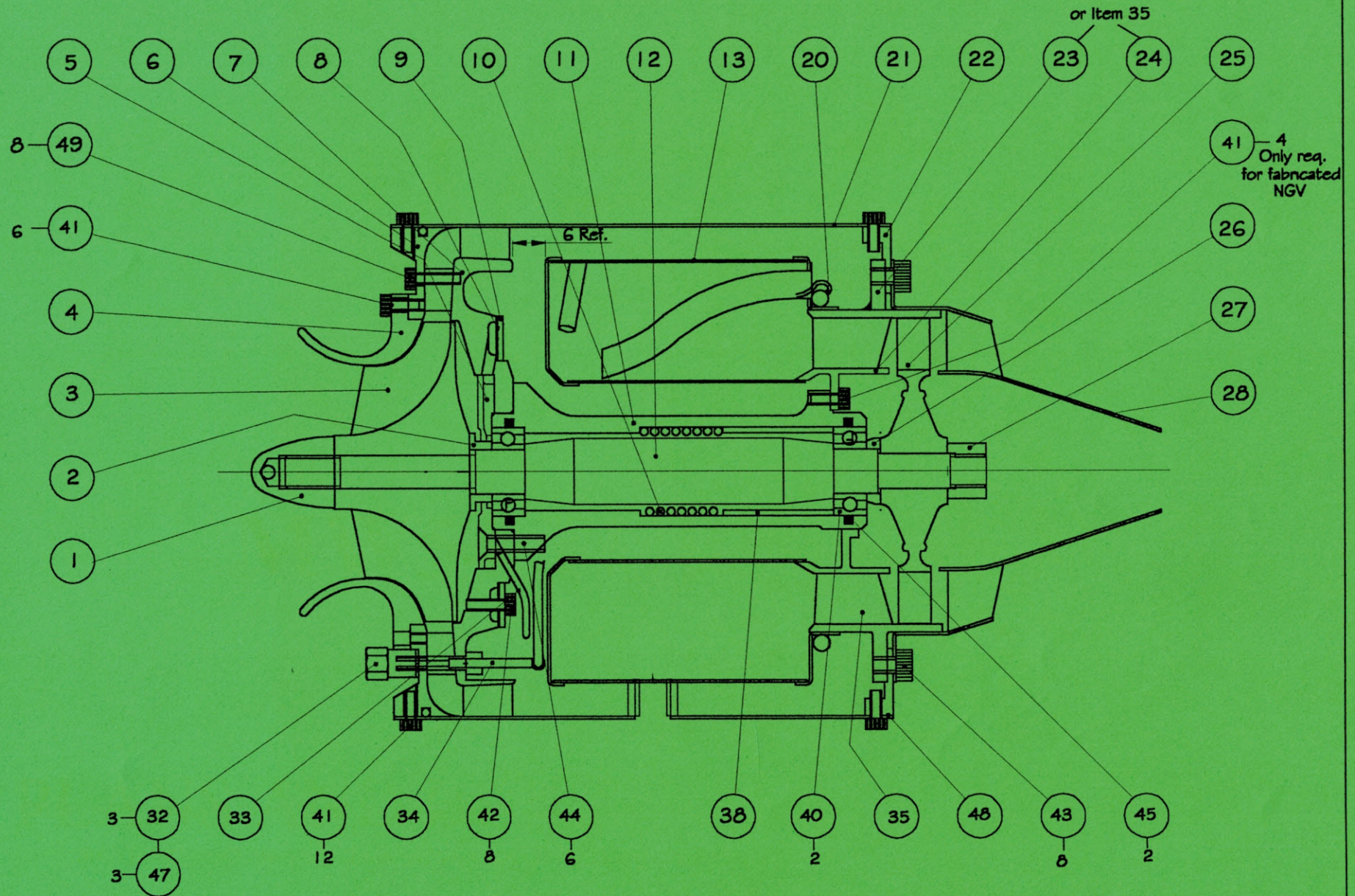
# **MW54 TURBO-JET**

**PLANS AND BUILDING INSTRUCTIONS**

Registered in England, Number 03874991 Registered Office: 2, St. Andrew's Street, Colchester, Essex, CO1 1TT, UK



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

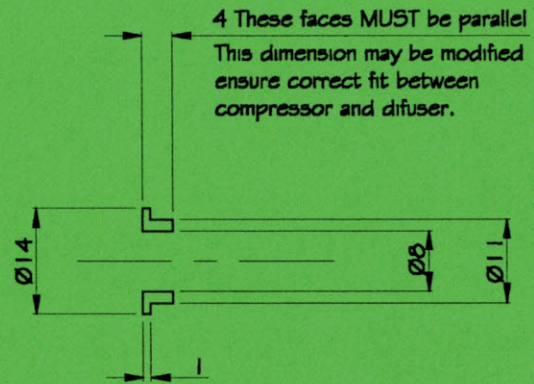
- Some items have an indication 'TOP'. It is suggested you mark this position on the item during manufacture.
- Some groups of holes are marked with the symbol #, this indicates that the relative position between these groups is important.
- All drawings are full size, although some have enlarged views.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

Issue: 4

Item List for MW54  
Sht.2



Dimensions in Millimeters



Actual Size

Material: Mild Steel

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

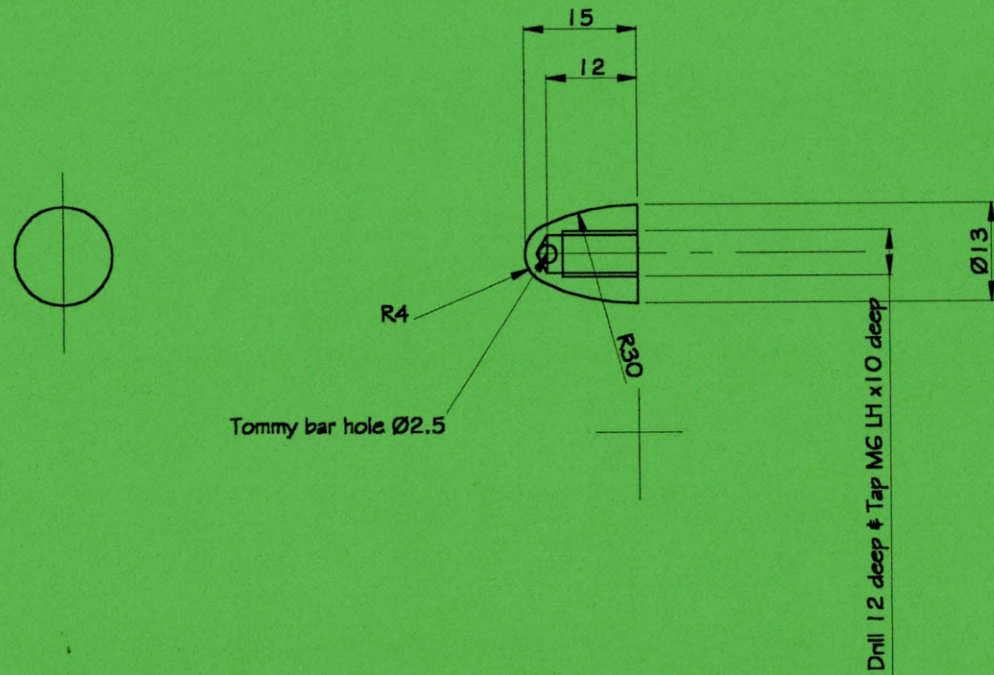
Title: Front Spacer

Issue: 1

Part No. 002



Dimensions in Millimeters



Material: Aluminium alloy

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

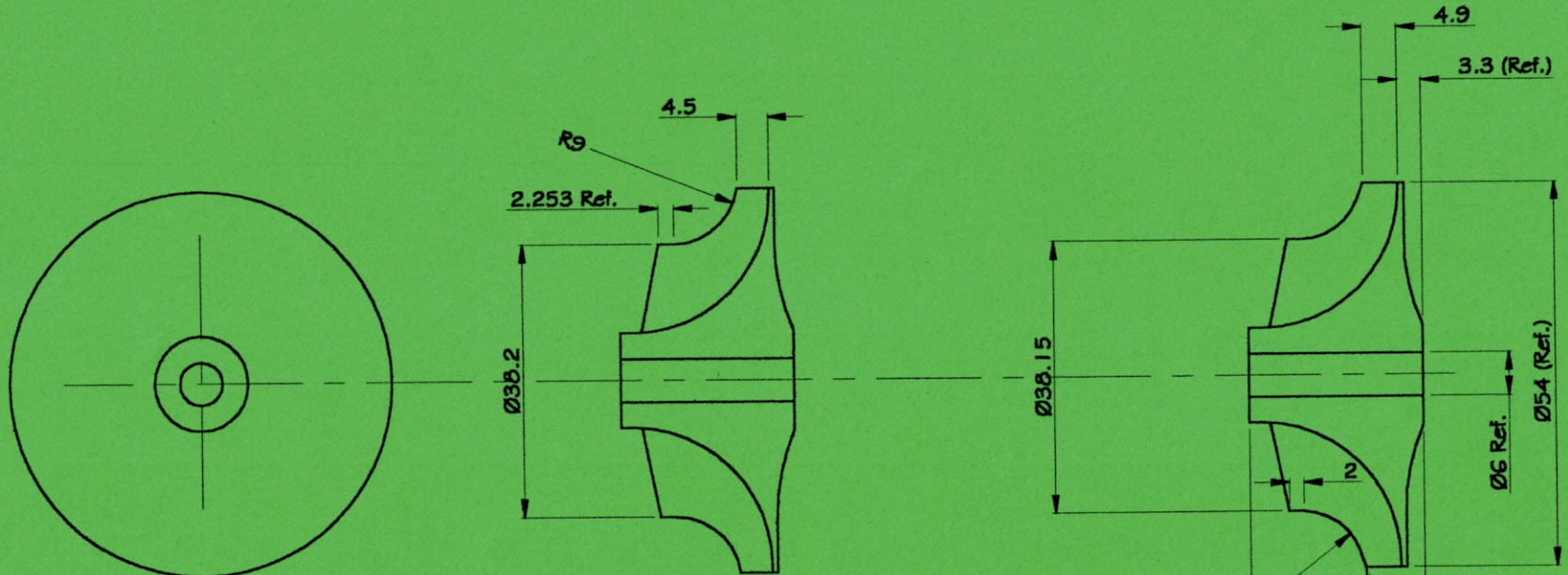
Title: Compressor Nut

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

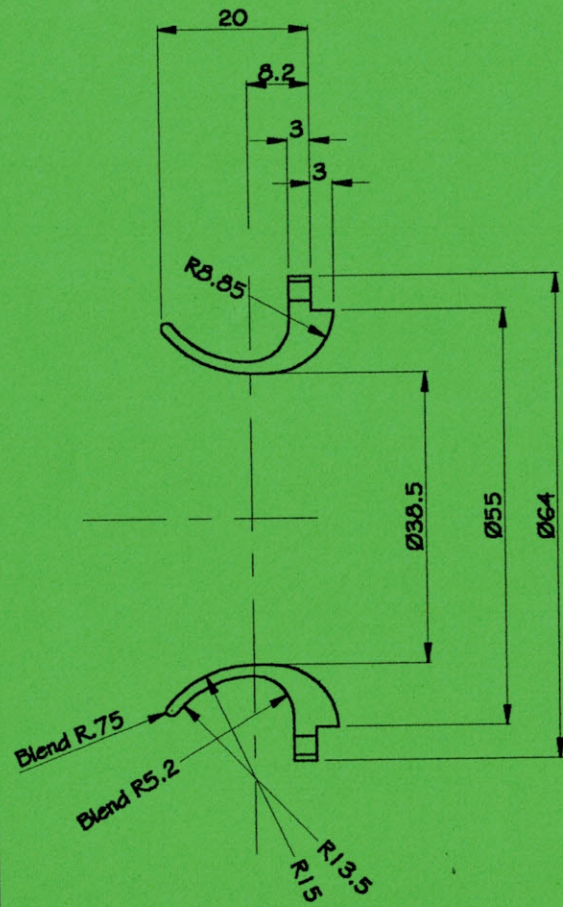
Title: Compressor

Issue: 5

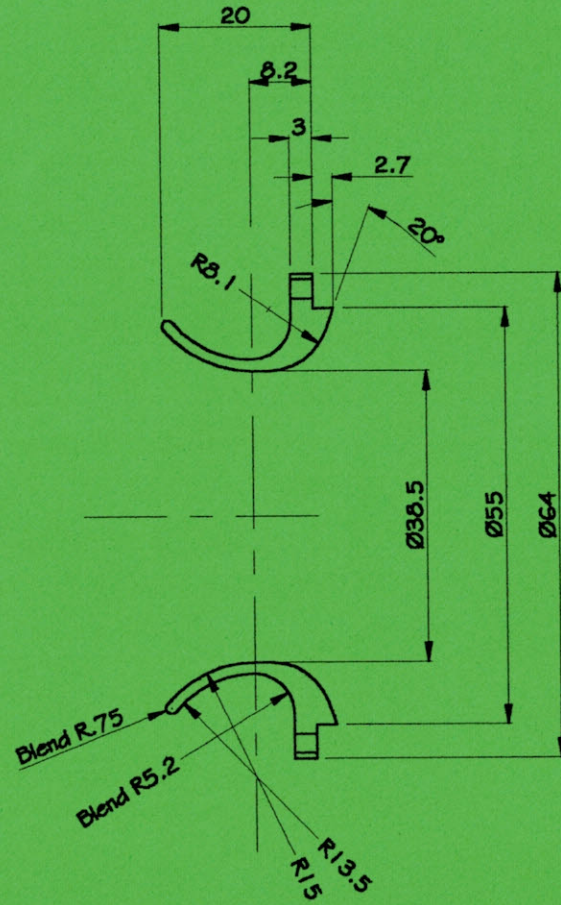
Part No. 003



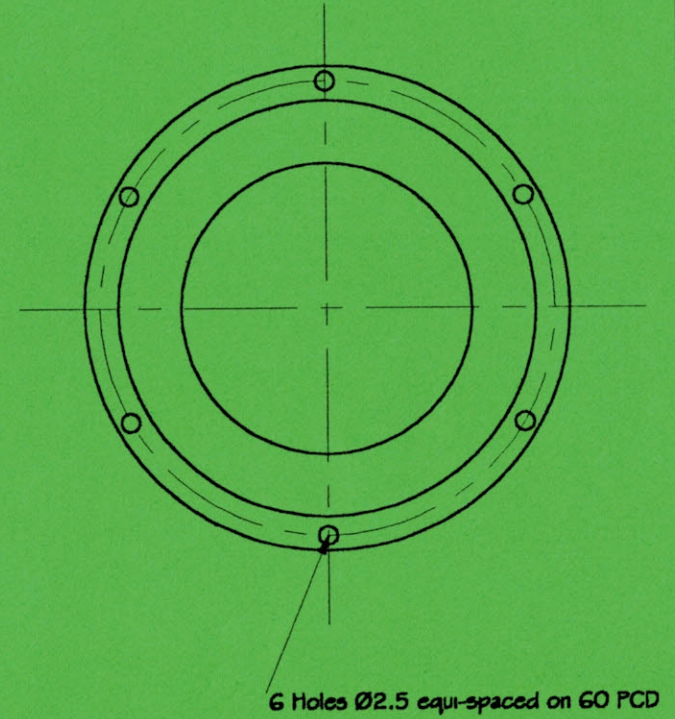
Dimensions in Millimeters



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

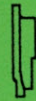
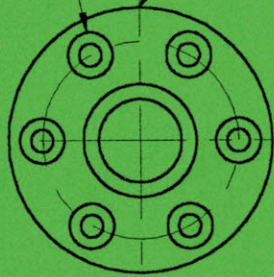
Part No. 004



Dimensions in Millimeters

6 Holes  $\varnothing 3$  - Csk  $\varnothing 6 \times 45^\circ$   
on 26 PCD

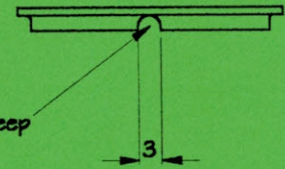
TOP



Actual size

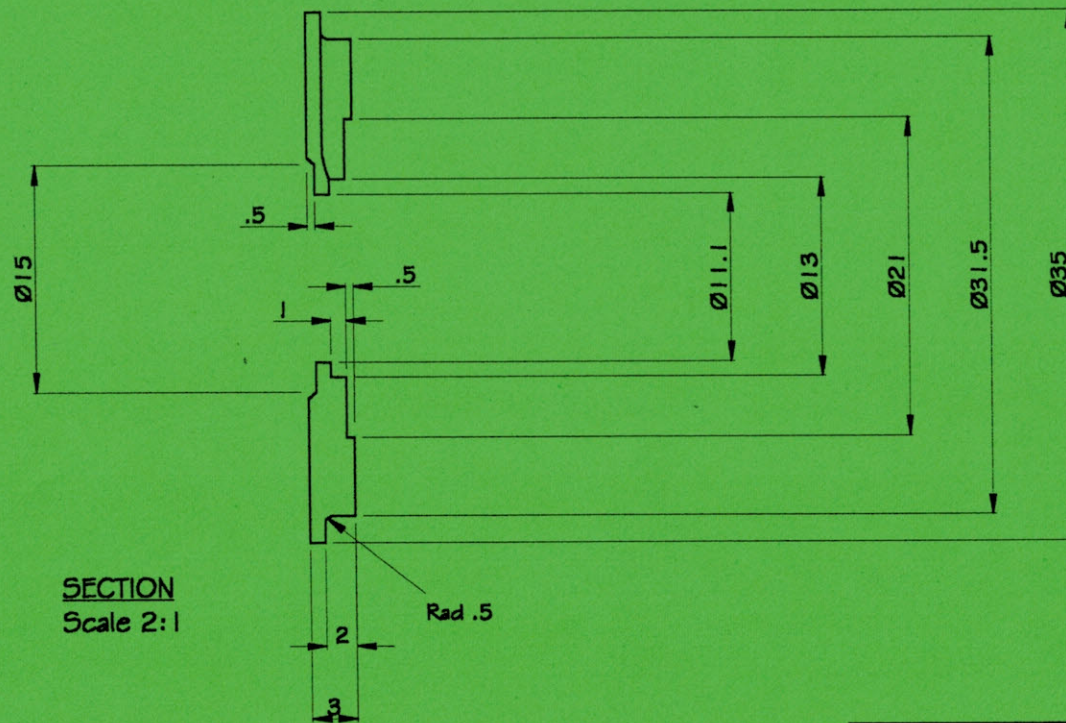
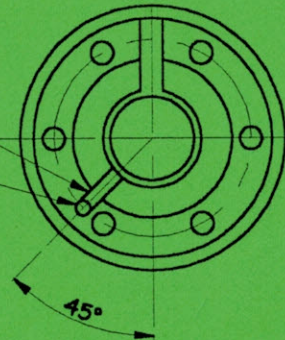
Groove for cooling air 2 deep

3



Groove for lubrication  
2 wide x 1 deep

Drill  $\varnothing 2 \times 1.5$  deep



Material: Aluminium alloy

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

Title: Shaft Seal

Issue: 2

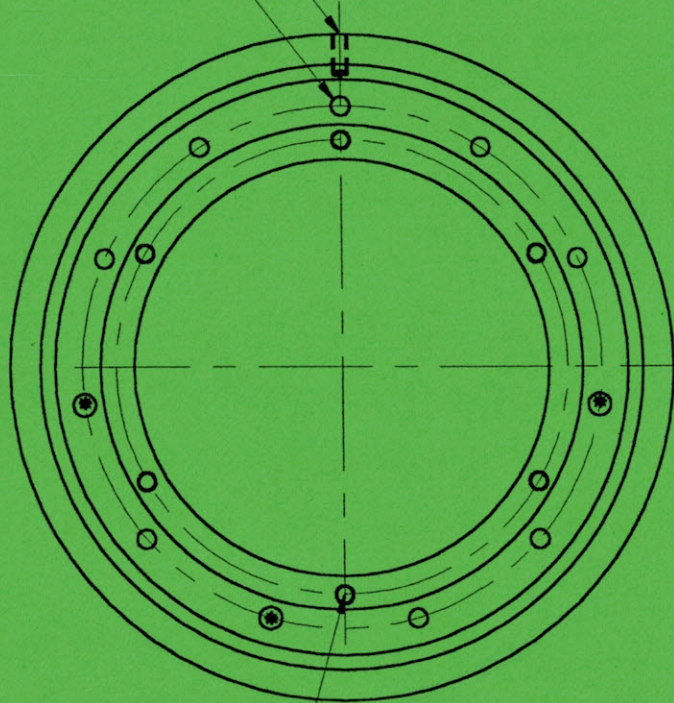
Part No. 005



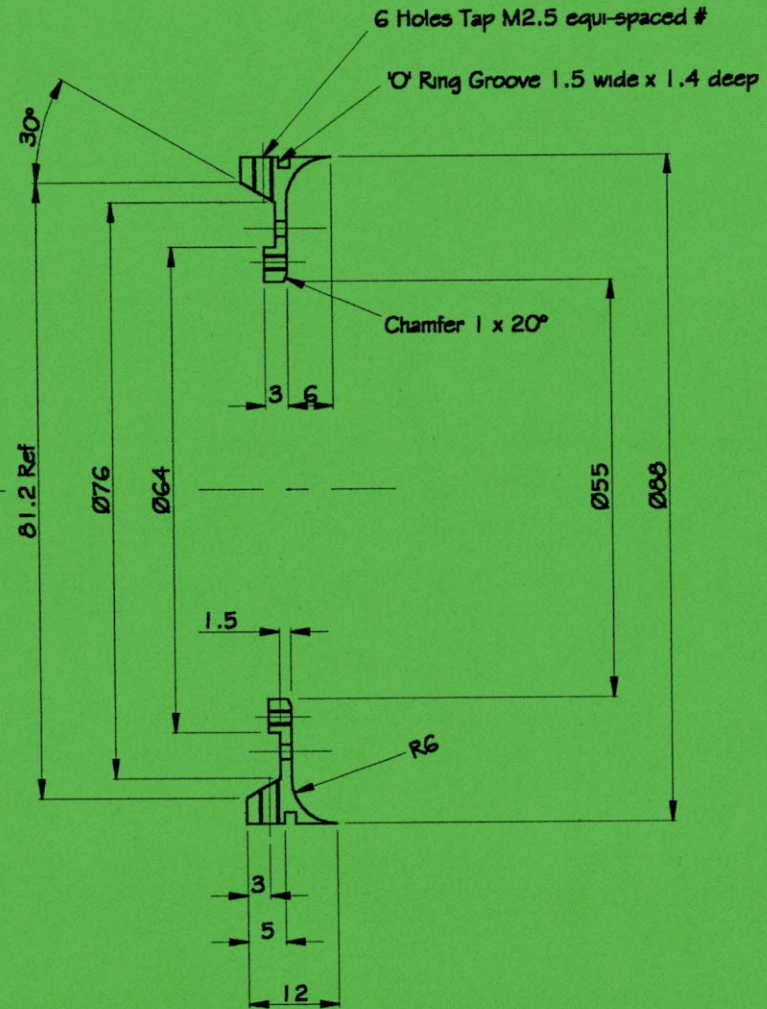
Dimensions in Millimeters

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

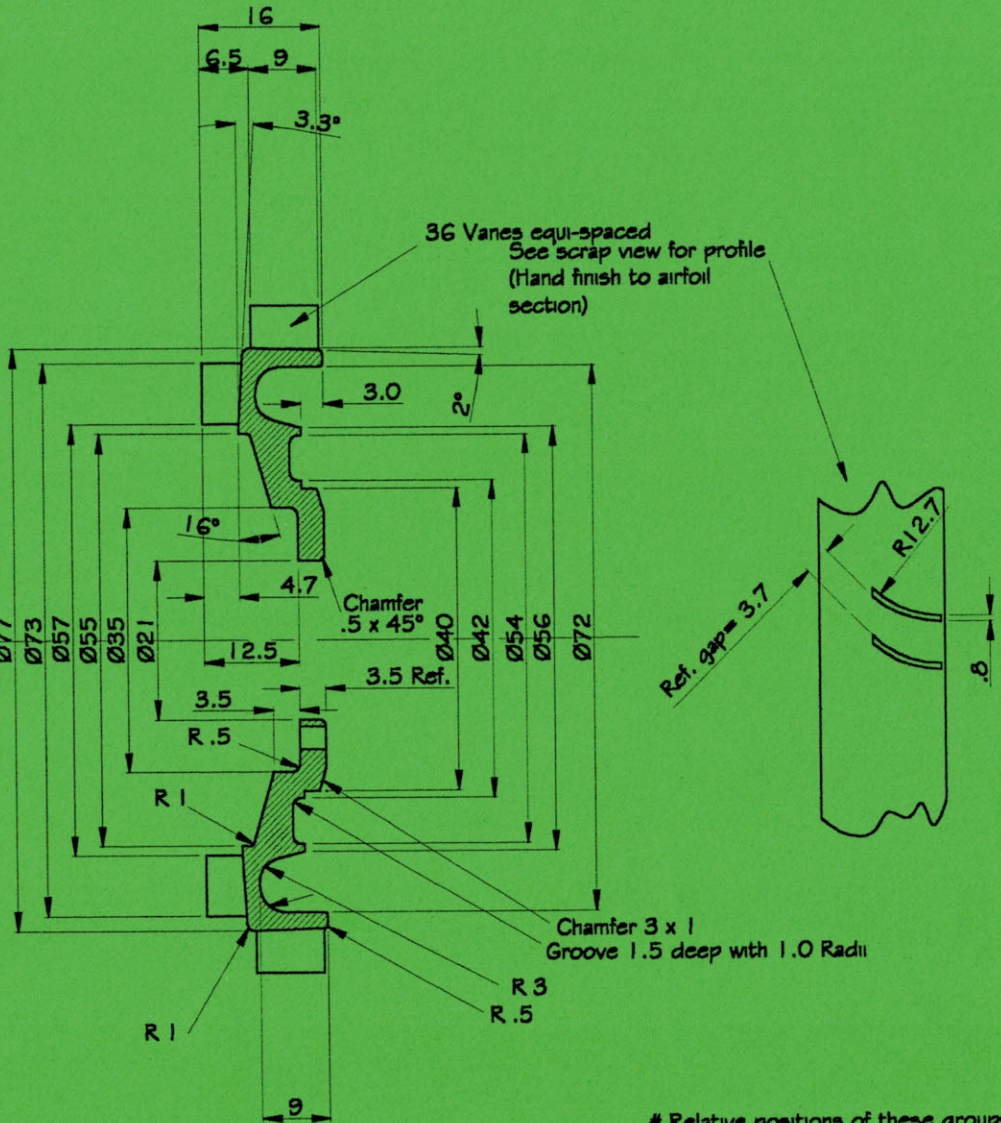
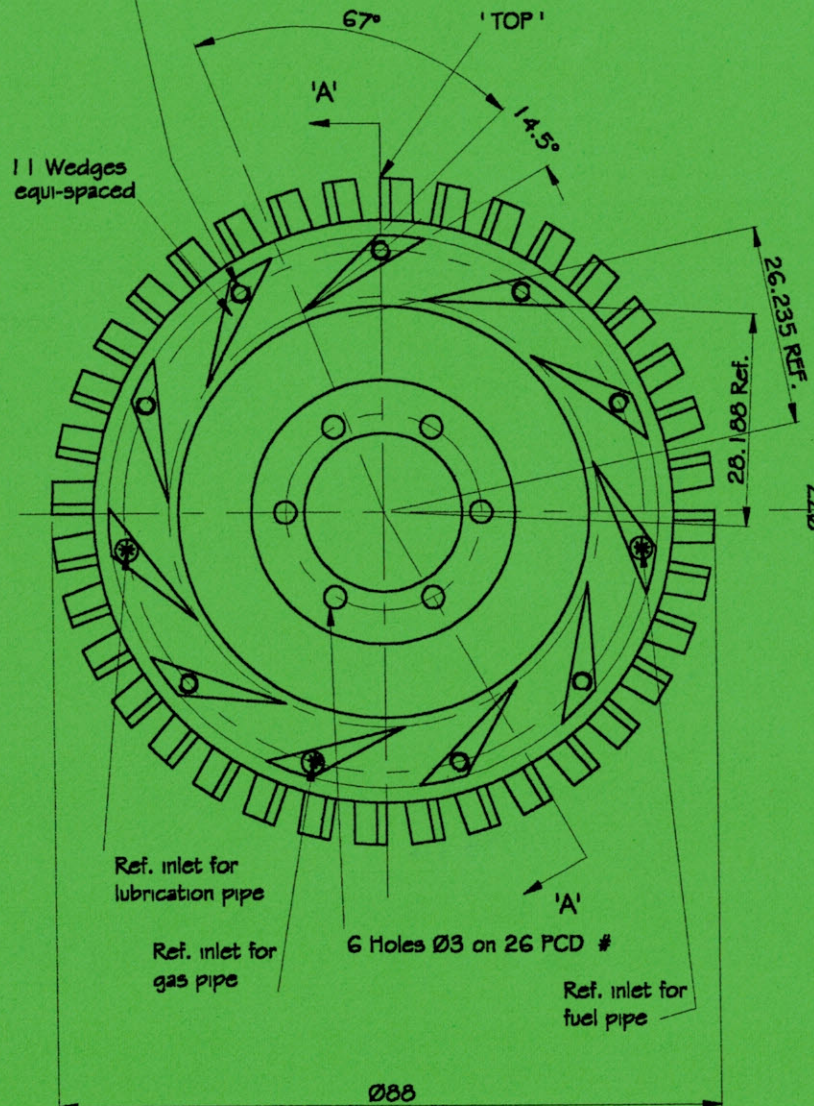
Issue: 4

Part No. 006



Dimensions in Millimetres

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



Section 'A-A'

NOTE: Background lines omitted for clarity

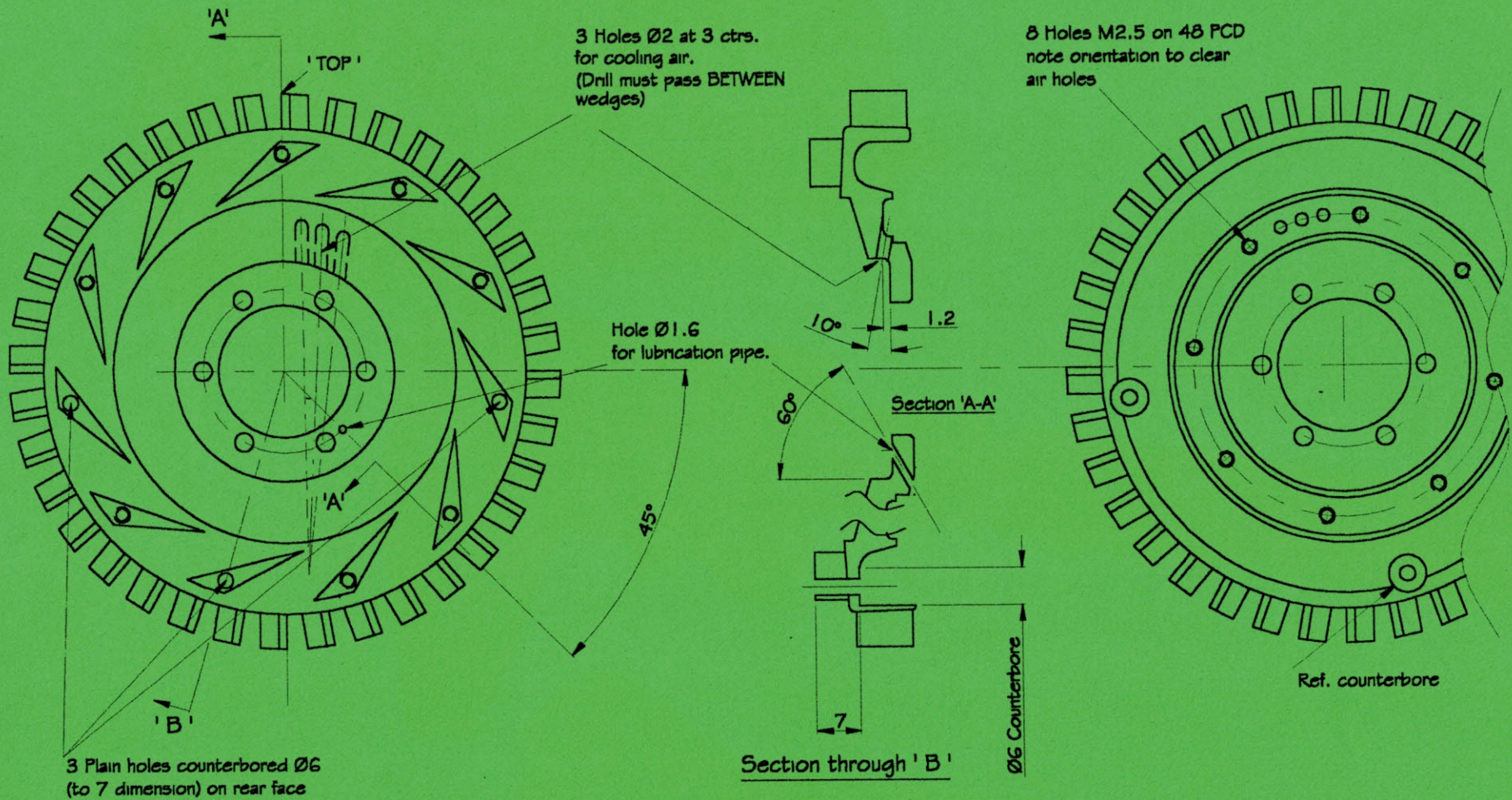
# Relative positions of these groups of holes is important.

NOTE: See sheet 2 for more detail.

Material: Aluminium Alloy



Dimensions in Millimetres



Material: Aluminium Alloy

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

Title: Diffuser - Sht. 2

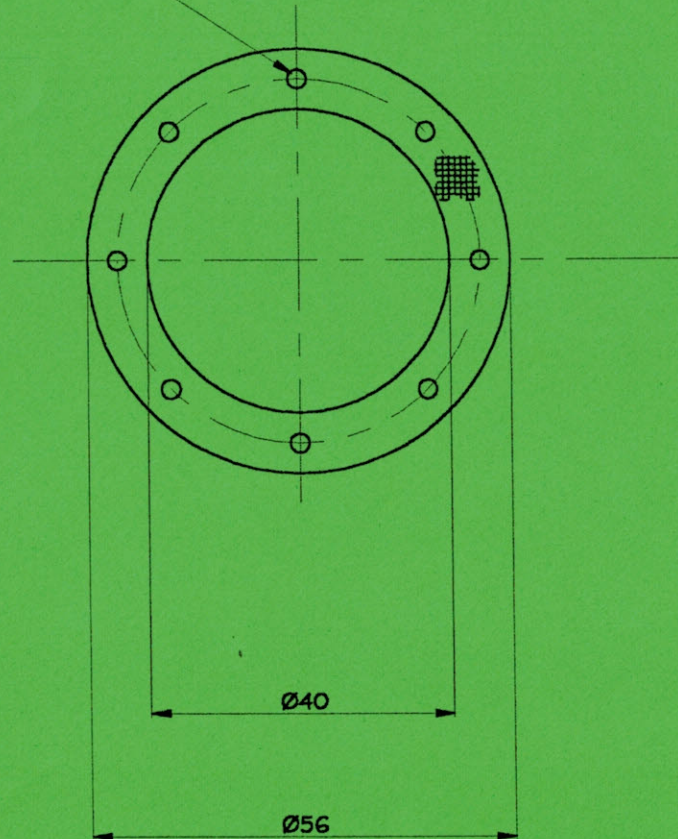
Issue: 3

Part No. 007



Dimensions in Millimeters

8 Holes  $\text{\O}2.5$  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

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

Title: Filter

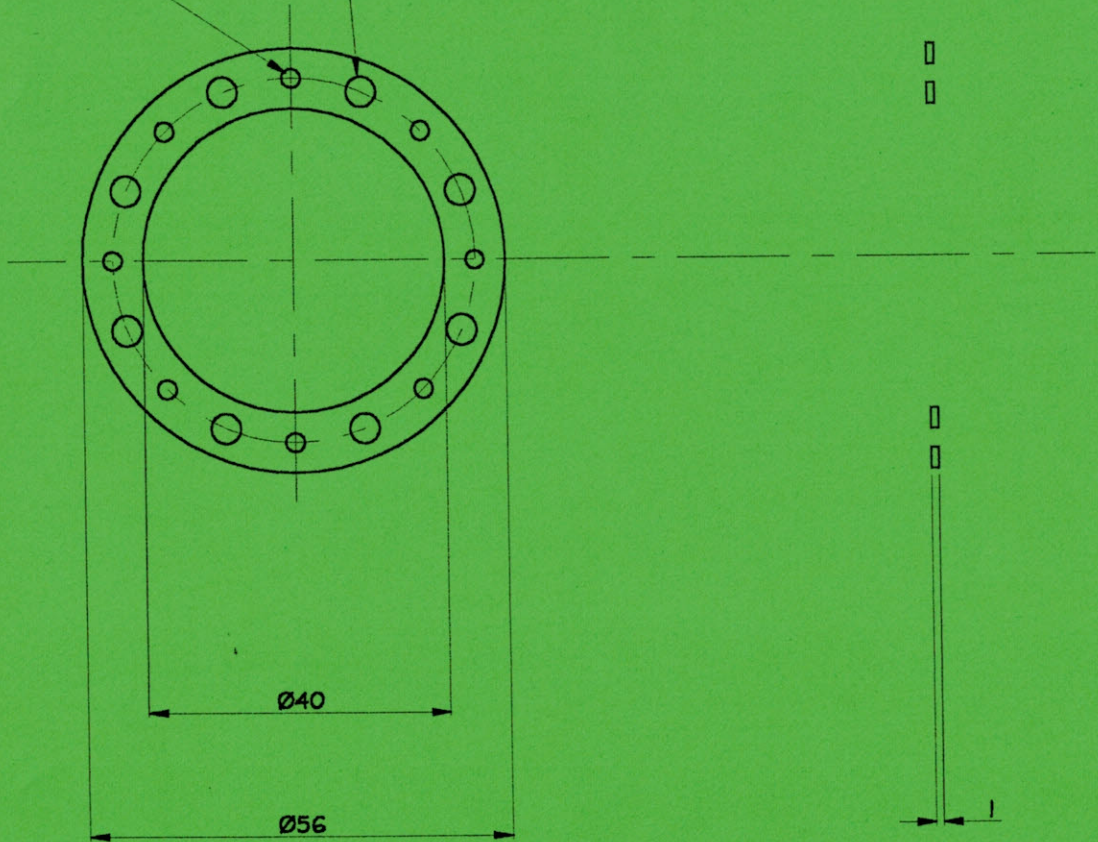
Issue: 2

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

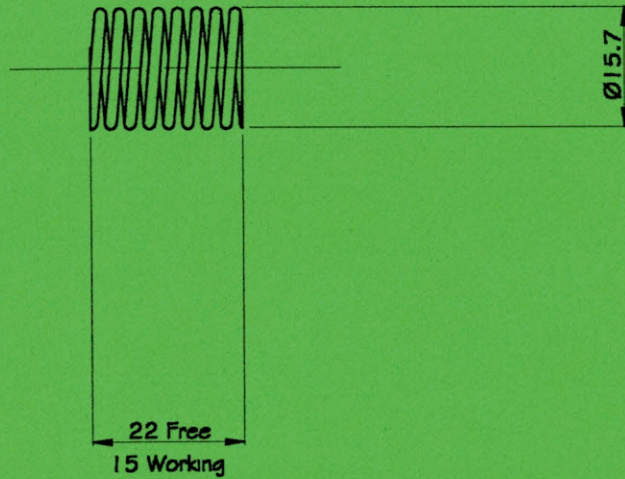
Title: Filter Cover

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

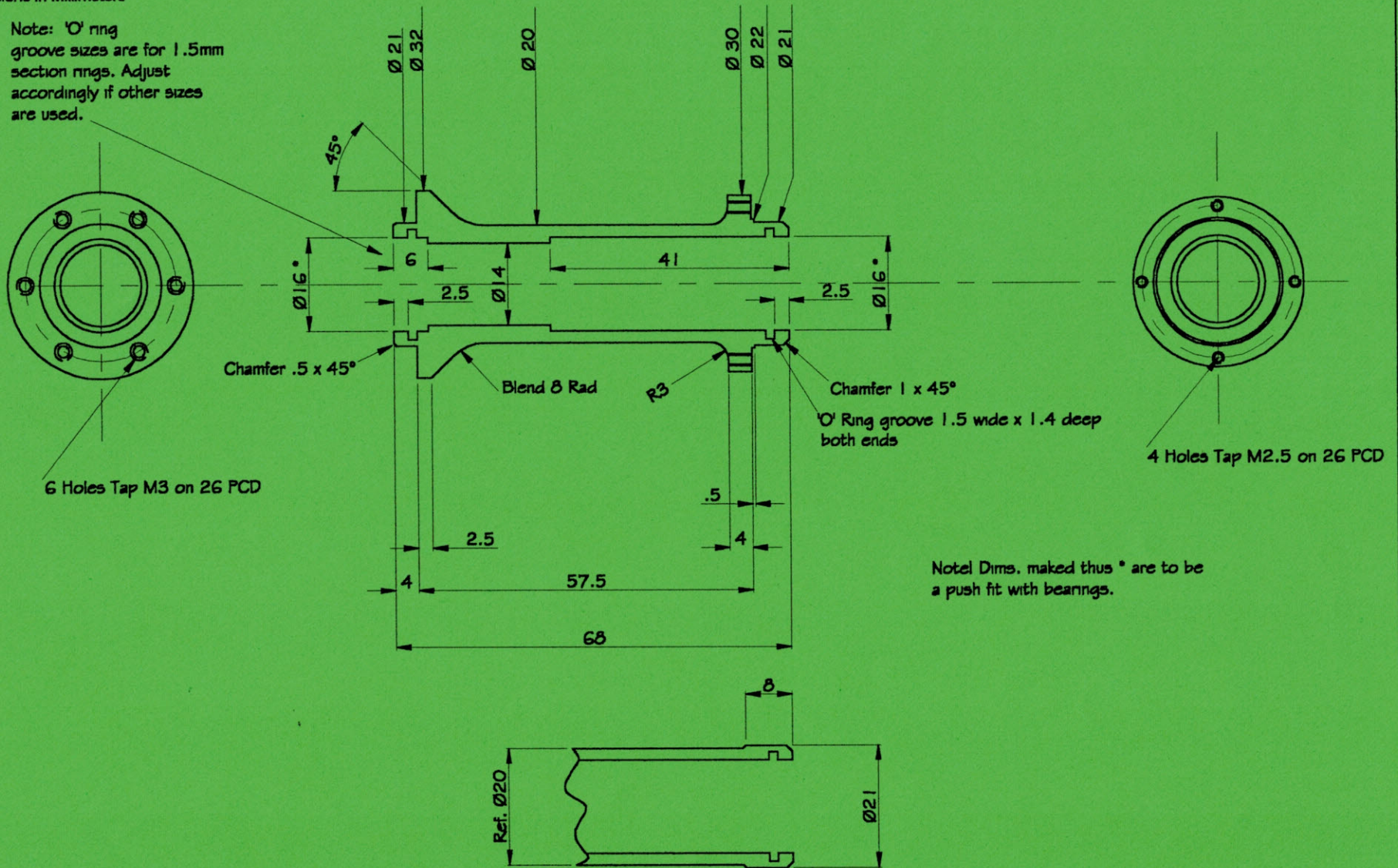
Issue: 2

Part No. 010



Dimensions in Millimeters

Note: 'O' 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: Aluminium Alloy

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

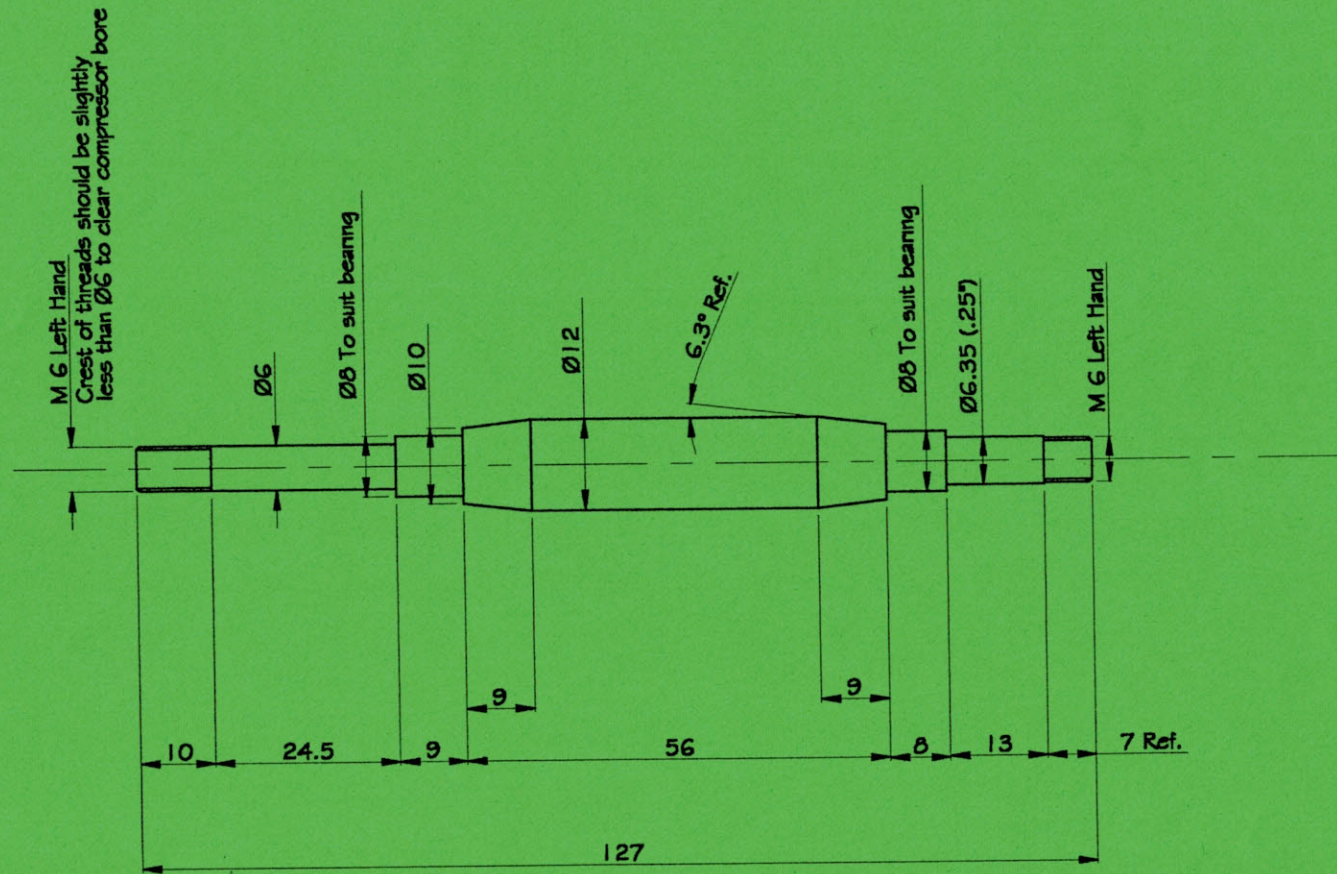
Title: Shaft Tunnel

Issue: 3

Part No. 011



Dimensions in Millimeters



Material: En 24T or Equivalent

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

Title: Shaft

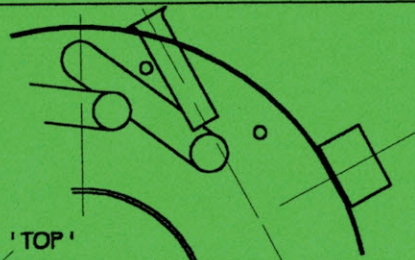
Issue: 2

Part No. 012



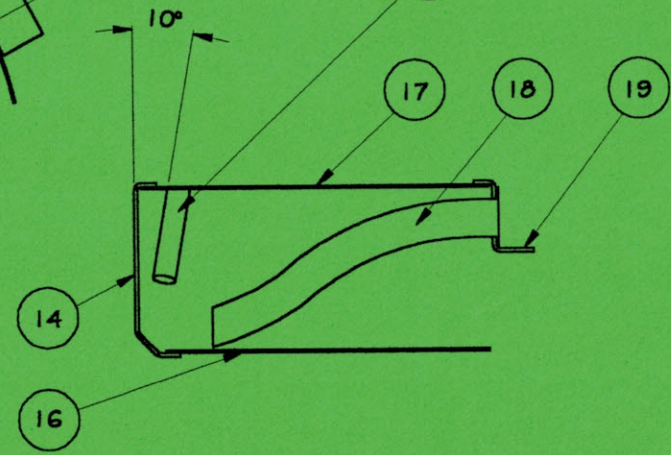
Dimensions in Millimeters

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

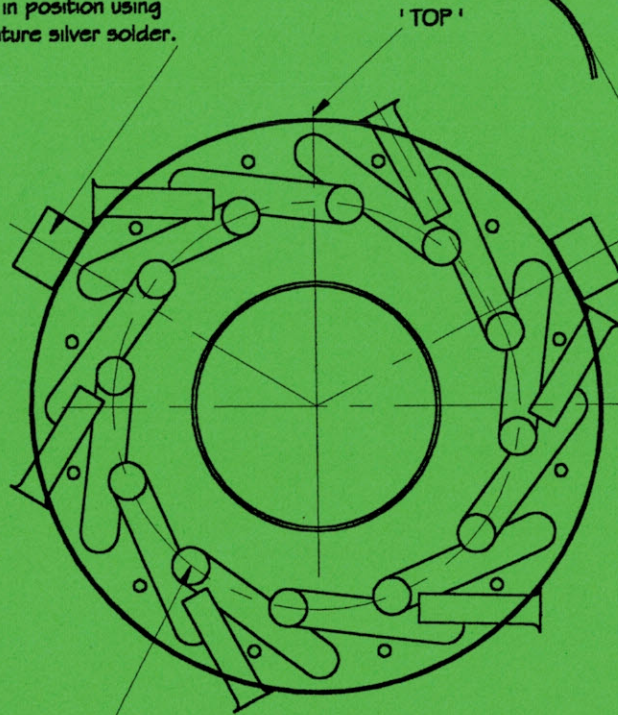


10 Ref.

39 'Swirl jets' - silver solder in position



48 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

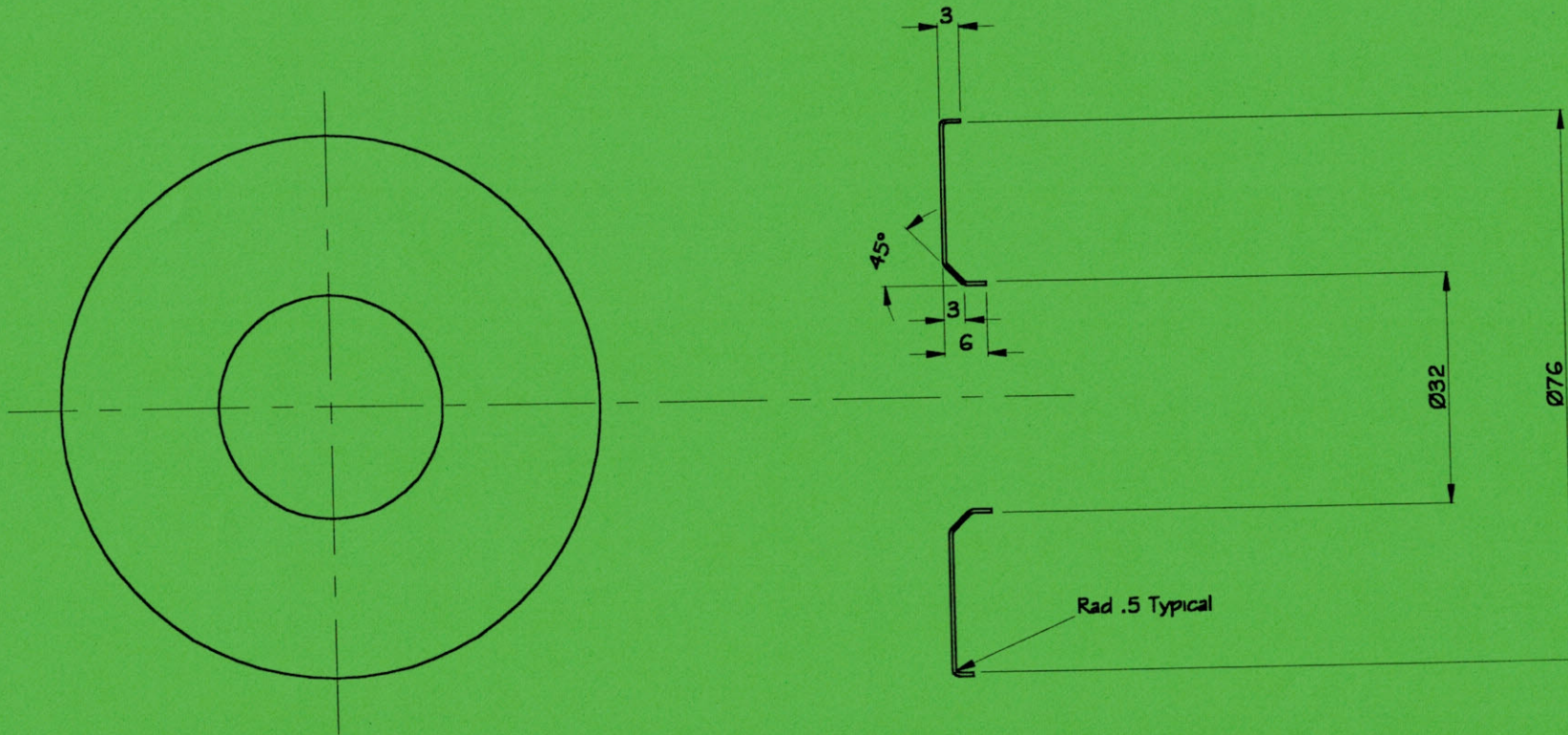
Turbine - MW54

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

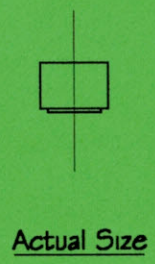
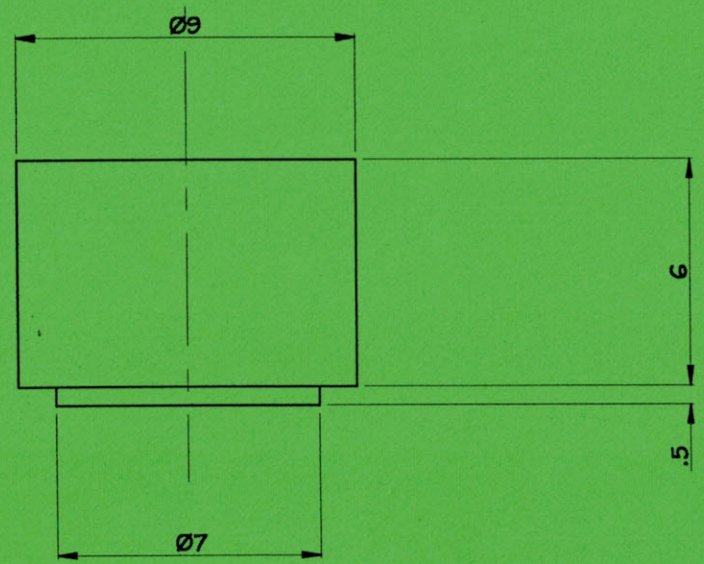
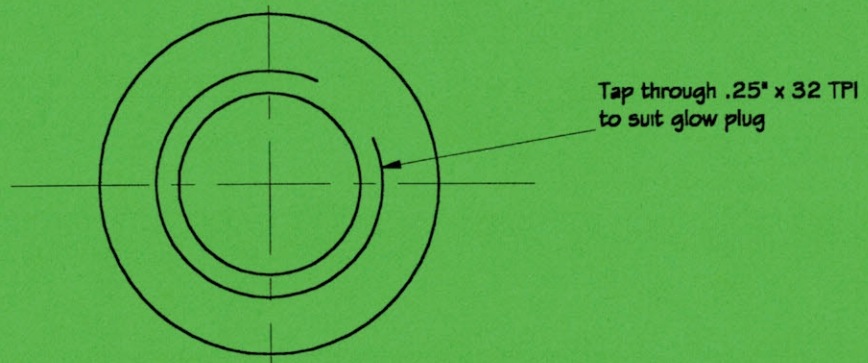
Title: Combustion Chamber Front

Issue: 1

Part No. 014



Dimensions in Millimeters



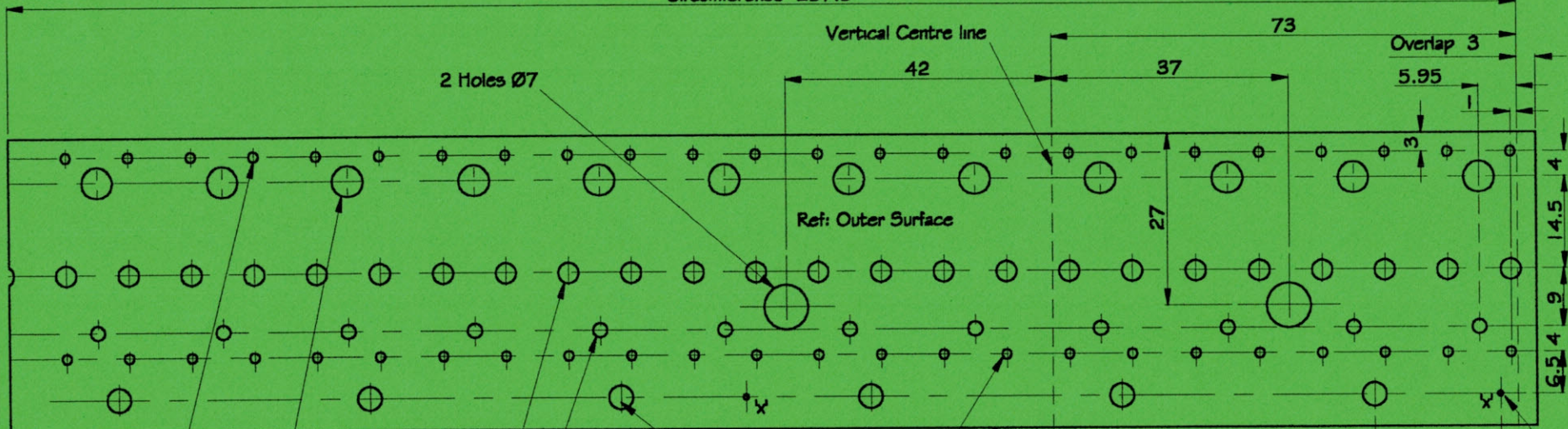
Enlarged View Scale 5:1

Material: Stainless Steel	
Drawn: Terry Lee	Third Angle Projection
© WREN Turbines	Turbine - MW54
Title: Glow Plug Boss	Issue: 1
Part No. 015	

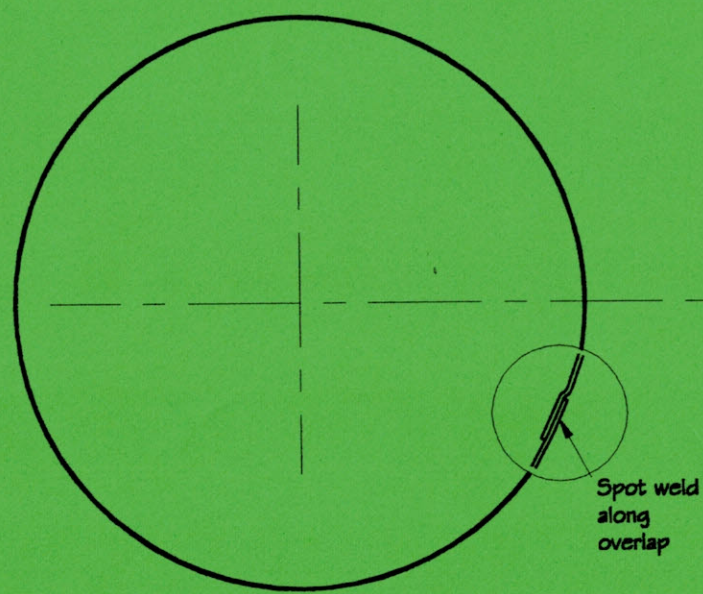


Dimensions in Millimeters

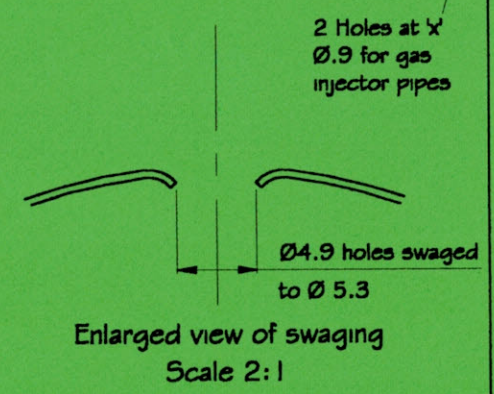
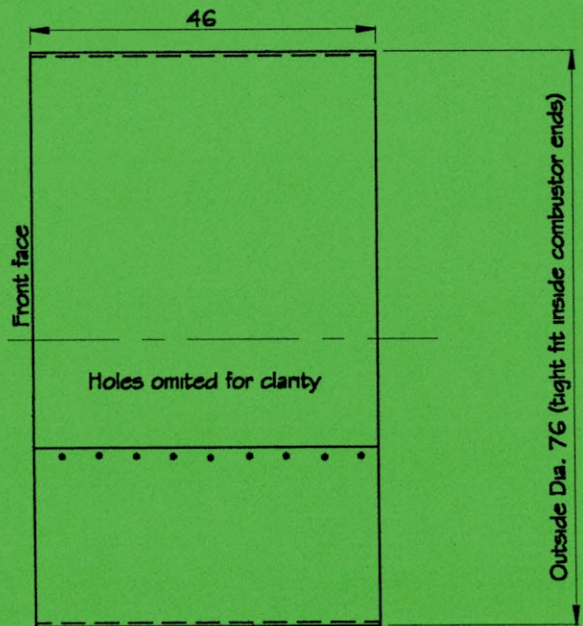
Circumference 237.8



24 Holes  $\varnothing 1.5$  (9.9 ctrs.)  
 12 Holes  $\varnothing 4.9$  (19.8 ctrs.)  
 24 Holes  $\varnothing 3.25$  (9.9 ctrs.) + cutout in overlap  
 12 Holes  $\varnothing 2.3$  (19.8 ctrs.)  
 6 Holes  $\varnothing 3.8$  (39.6 ctrs.)  
 24 Holes  $\varnothing 1.5$  (9.9 ctrs.)  
 Front Face  
**Developed Shape**



Ref. View from front

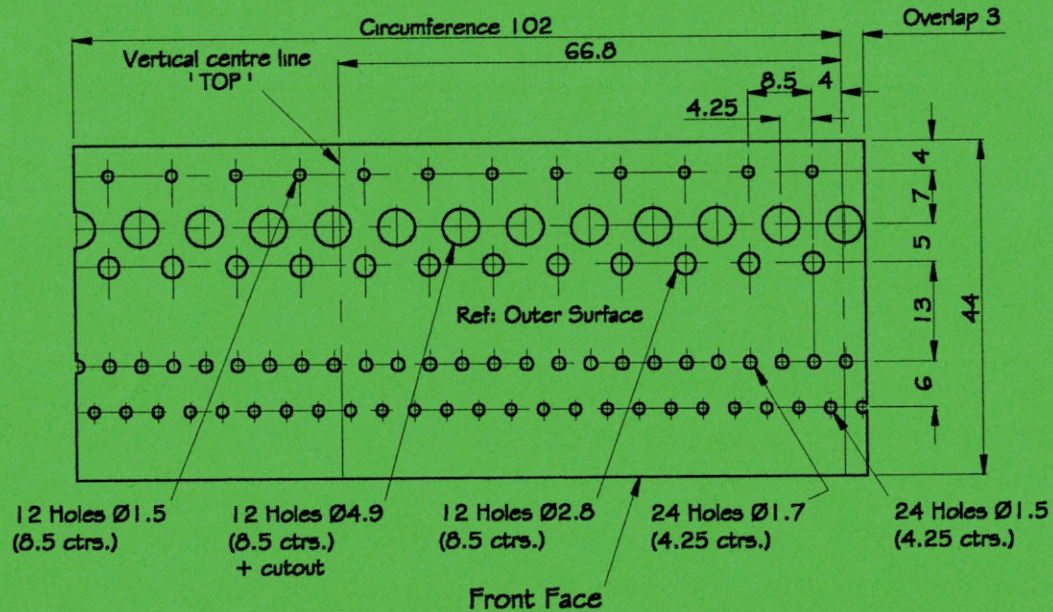


Material: Stainless Steel sheet - .4mm thick  
 Title: Combustor - Outer Wrapper  
 Issue: 4  
 Part No. 017

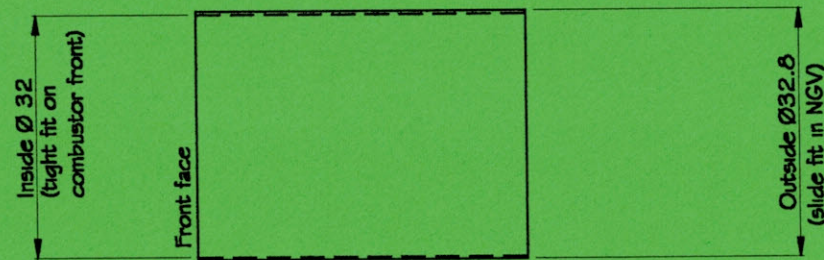
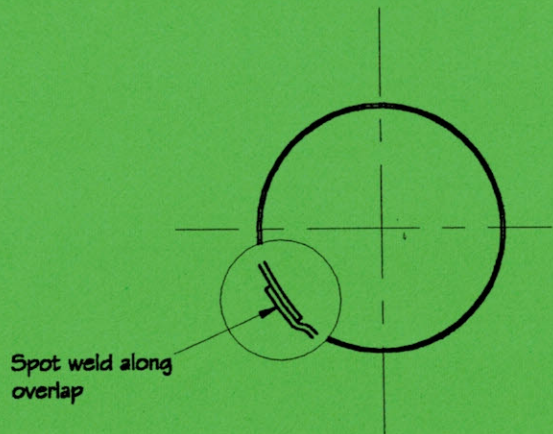
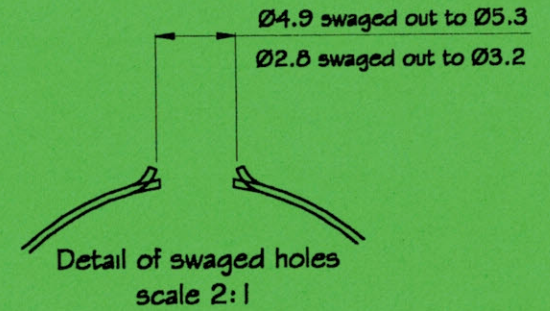
Drawn: Terry Lee  
 Third Angle Projection  
 © Mike Murphy  
 Turbine - MW54



Dimensions in Millimeters



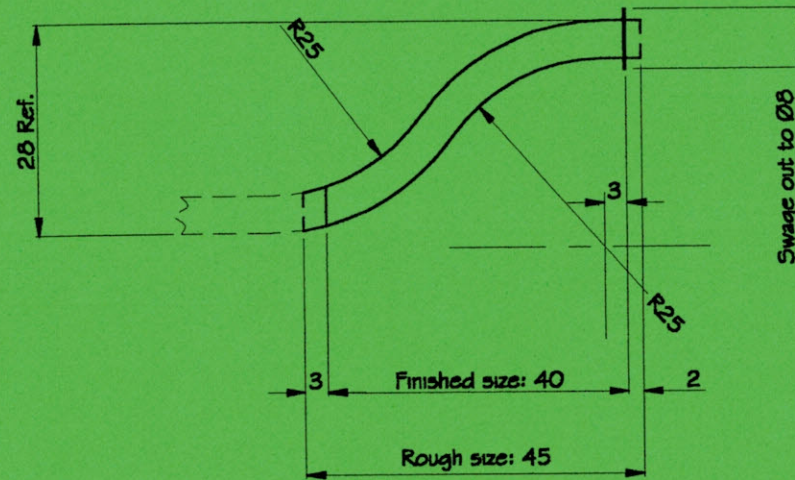
Developed Shape



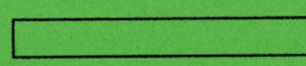
Material: Stainless Steel sheet .4mm thick



Dimensions in Millimeters



Make from Stainless Steel tube  
 $\varnothing 5 \times .3$  wall thickness



Material: See Above

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

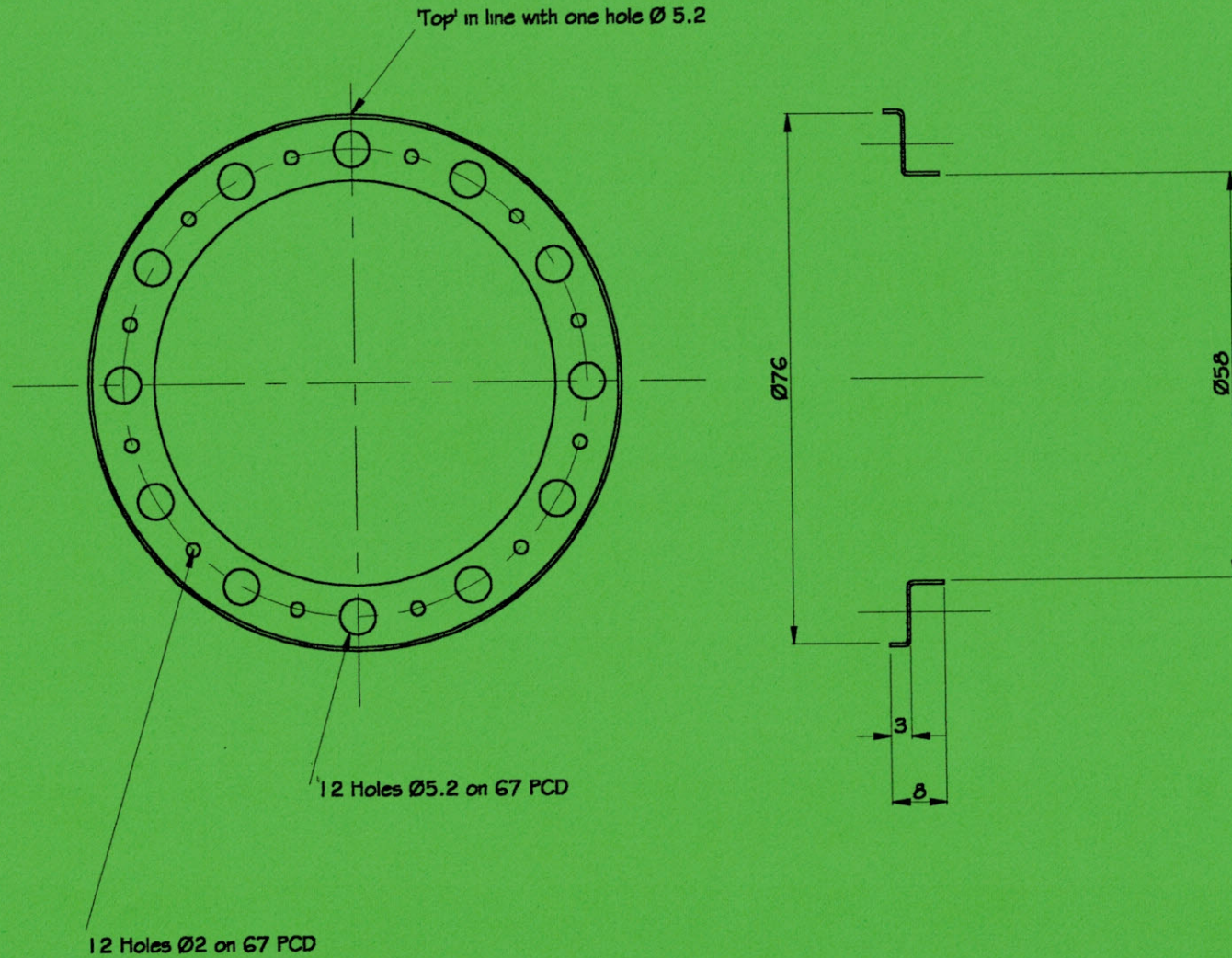
Title: Vaporiser Tube

Issue: 3

Part No. 018



Dimensions in Millimeters



Material: Stainless Steel sheet - .4mm thick

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

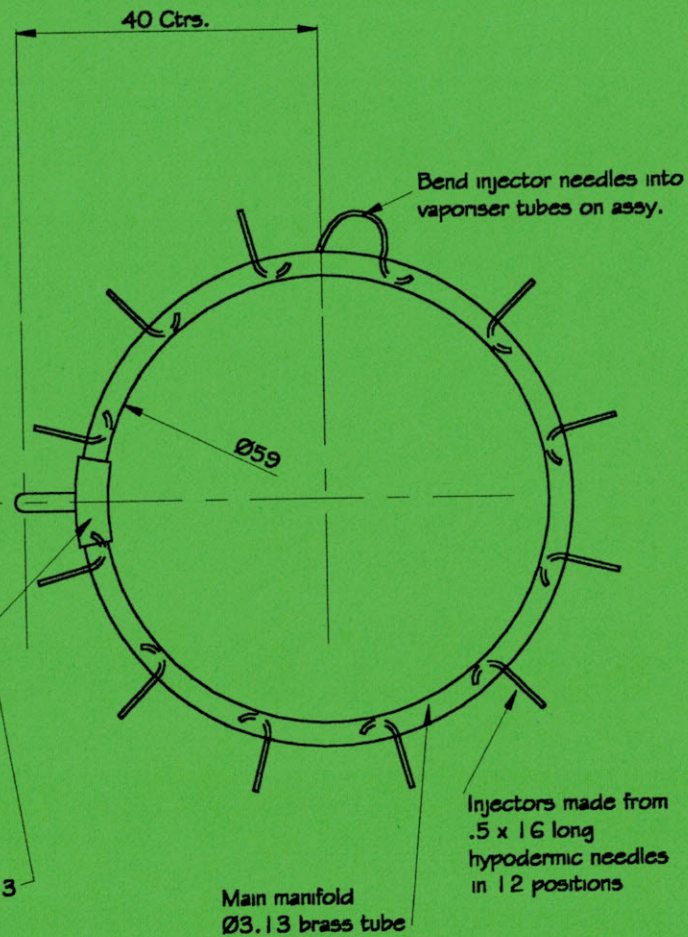
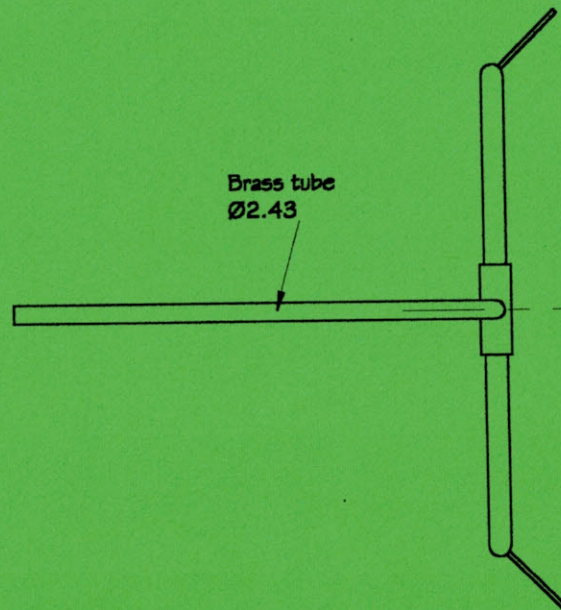
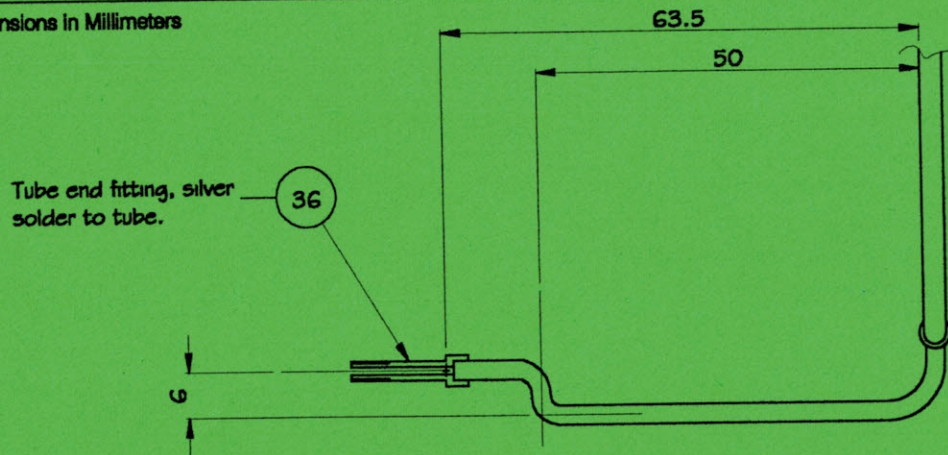
Title: Combustor Rear

Issue: 2

Part No. 019



Dimensions in Millimeters



**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

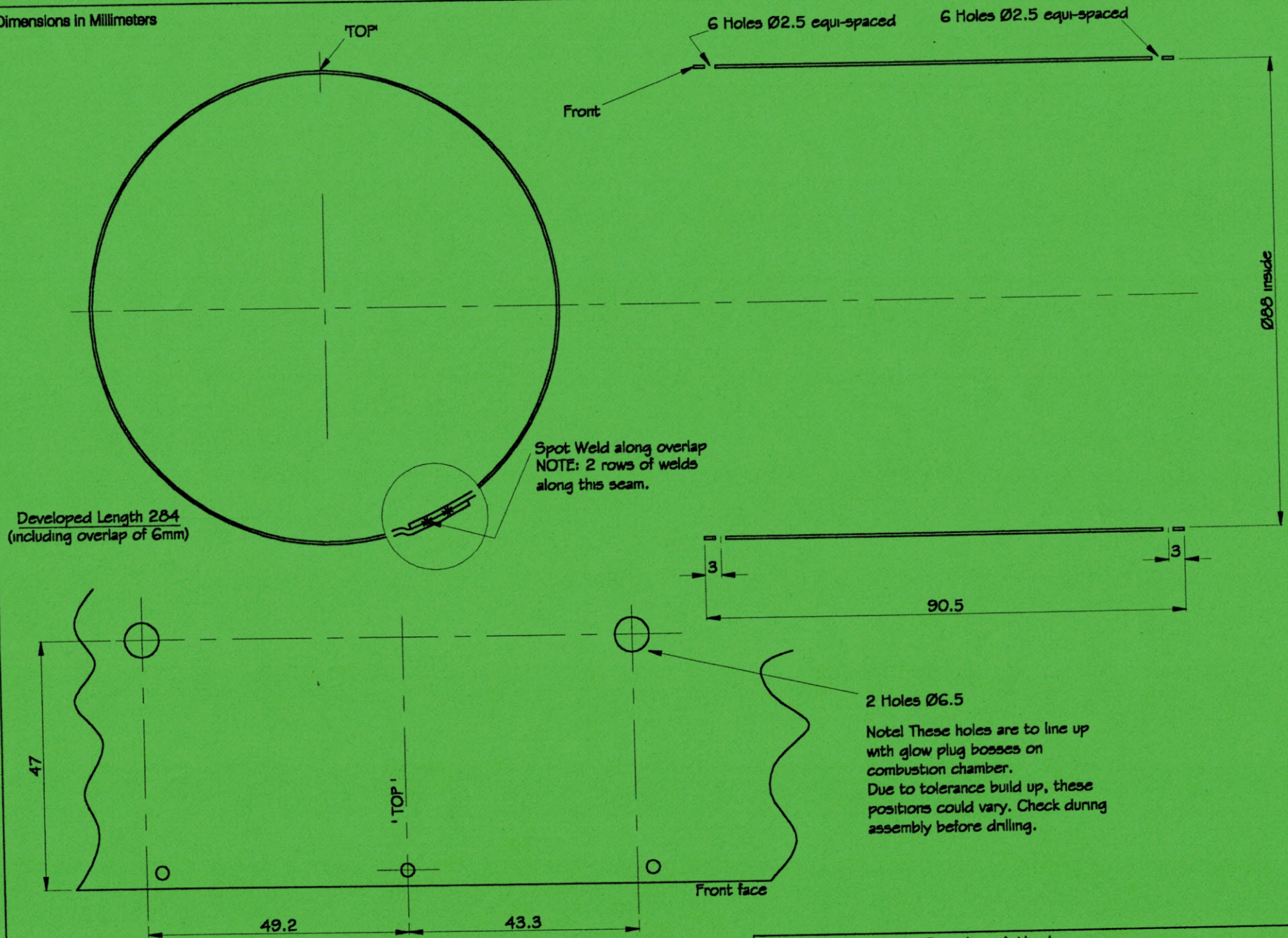
Title: Fuel Pipe Assy.

Issue: 3

Part No. 020



Dimensions in Millimeters



Material: Stainless Steel - .4 thick

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

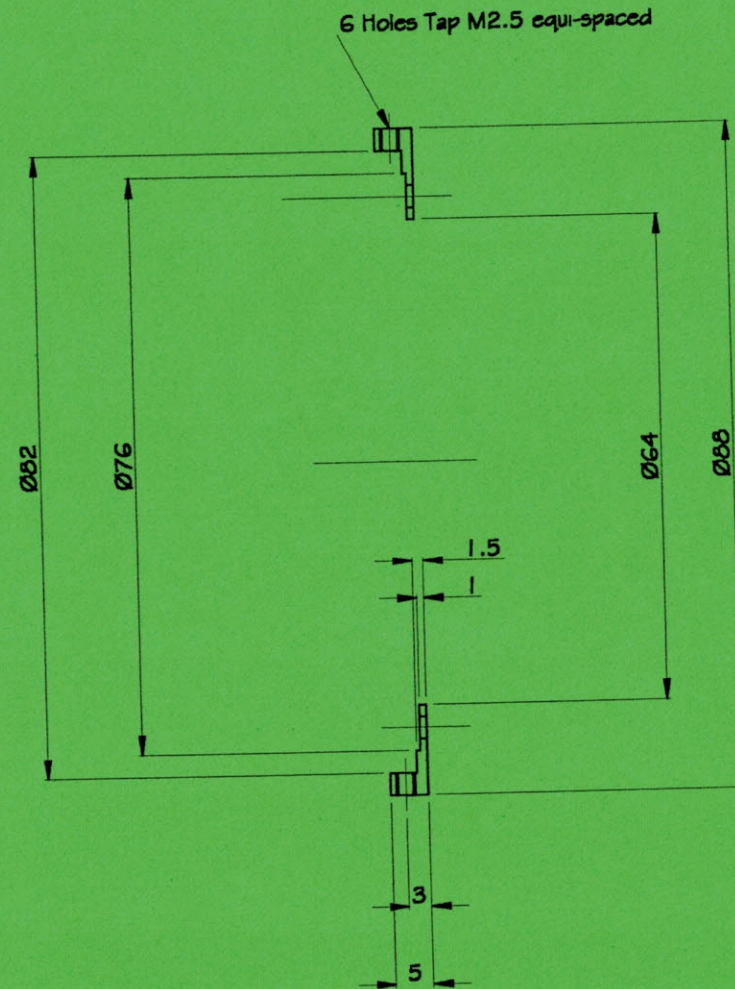
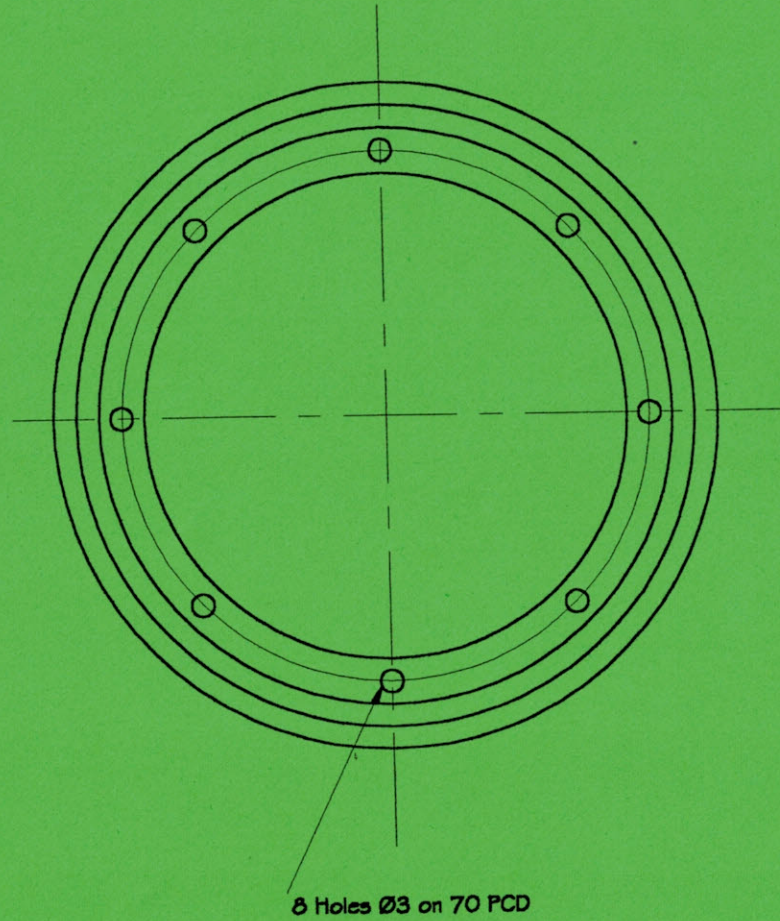
Title: Case Outer

Issue: 3

Part No. 021



Dimensions in Millimeters



Material: Mild Steel

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

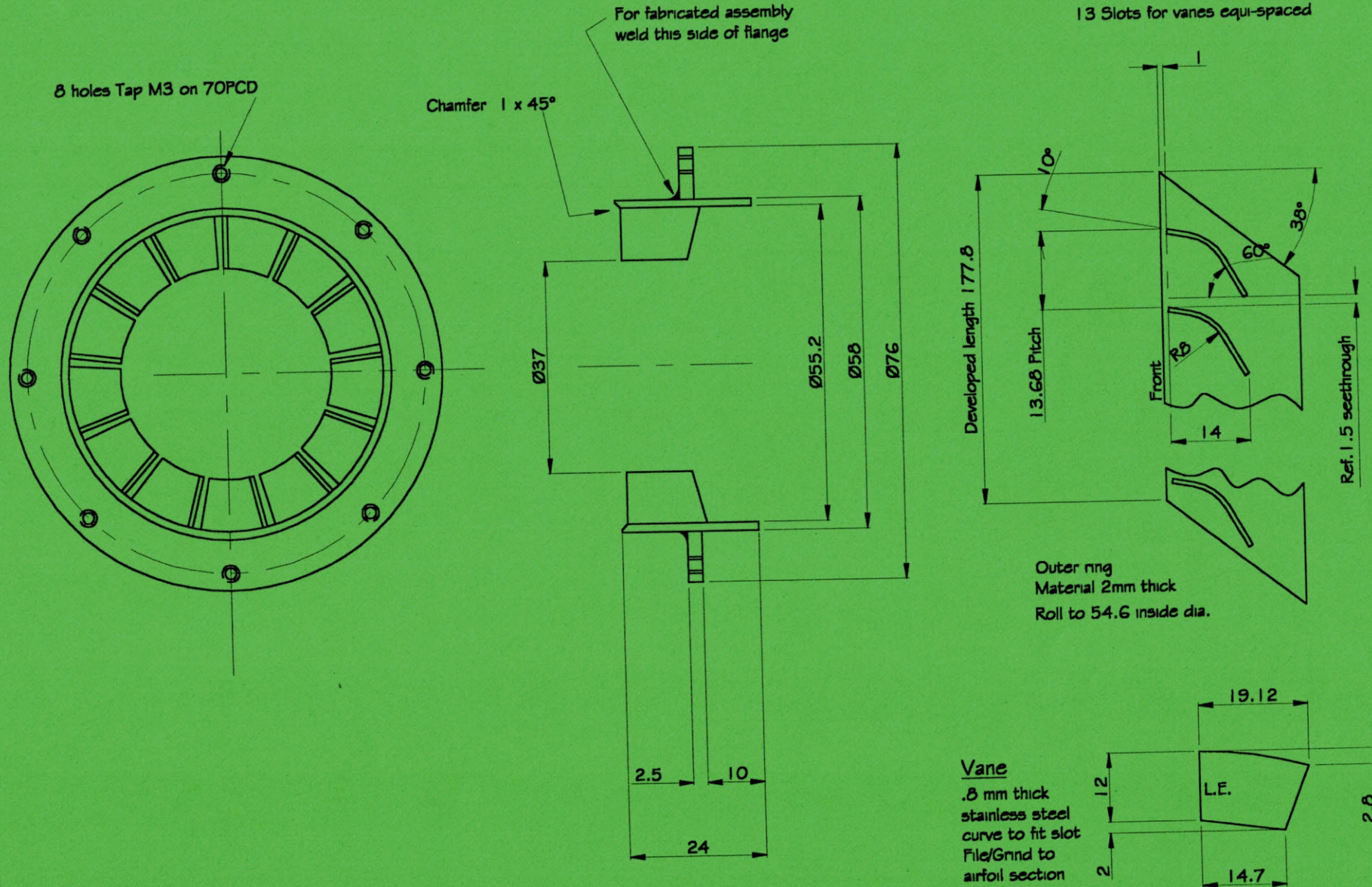
Title: Case Rear

Issue: 3

Part No. 022



Dimensions in Millimeters



Material: Stainless Steel

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

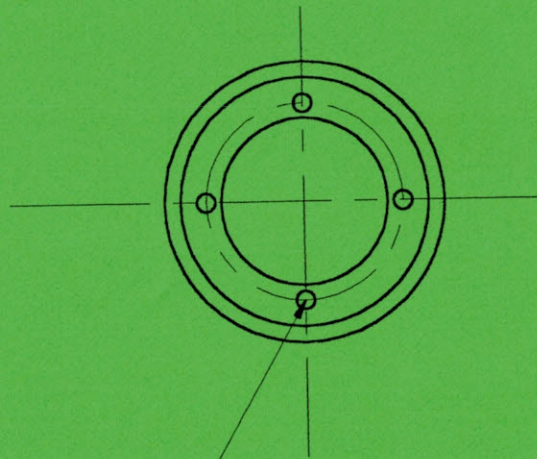
Title: NGV Outer

Issue: 1

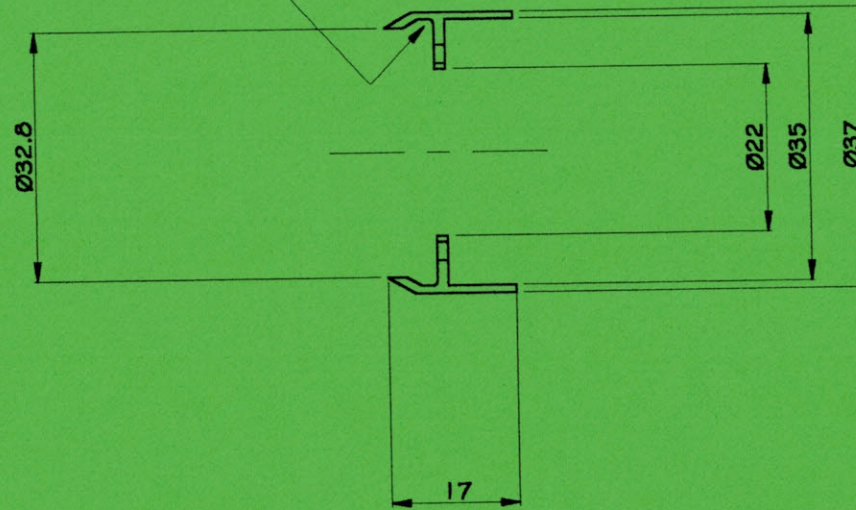
Part No. 023



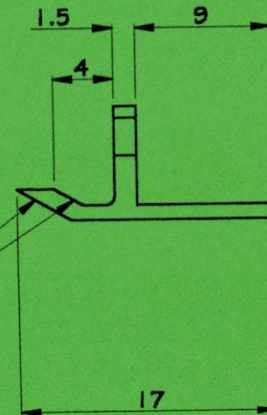
Dimensions in Millimeters



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

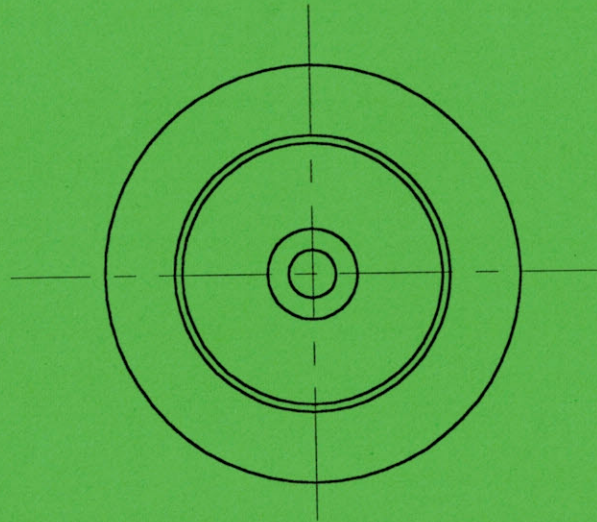
Title: NGV Inner

Issue: 2

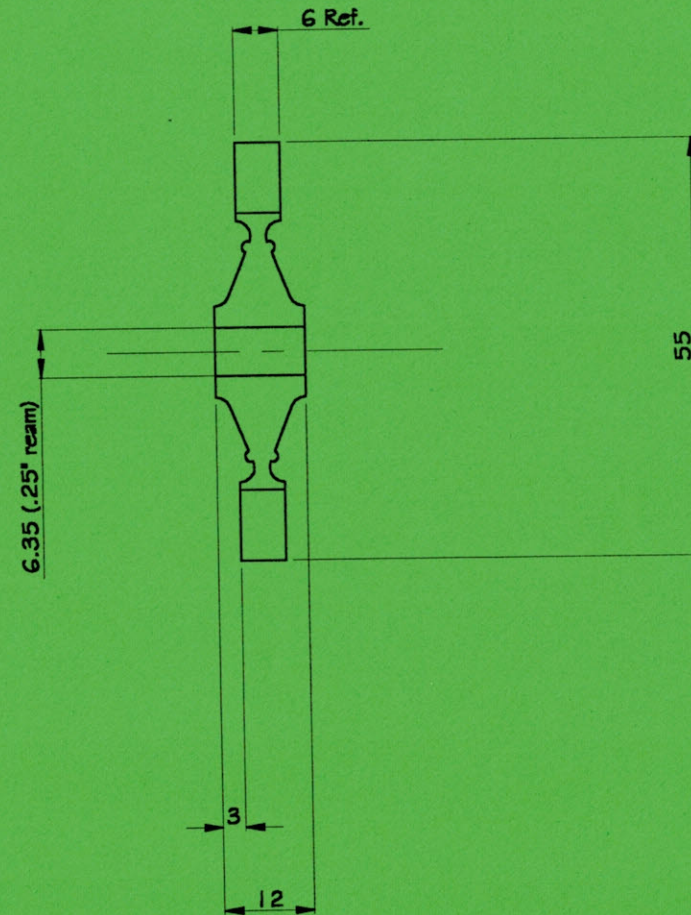
Part No. 024



Dimensions in Millimeters



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



Material: Inconel

Title: Turbine wheel

Issue: 1

Part No. 025

Drawn: Terry Lee

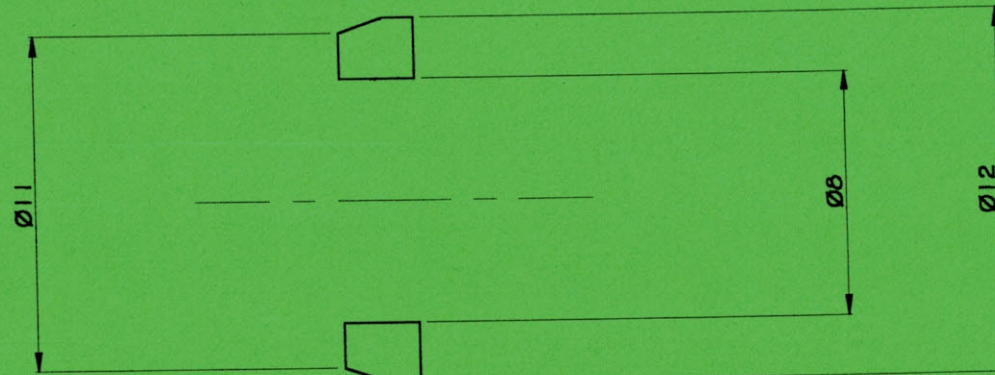
Third Angle Projection

© WREN Turbines

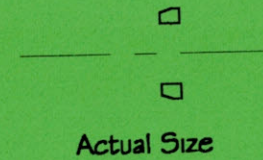
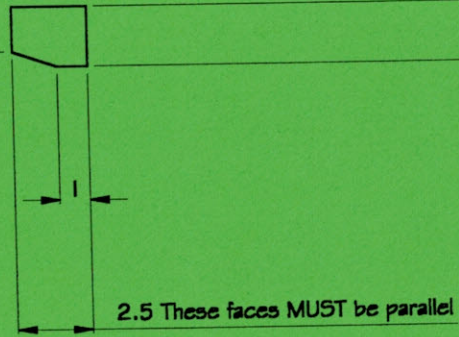
Turbine - MW54



Dimensions in Millimeters



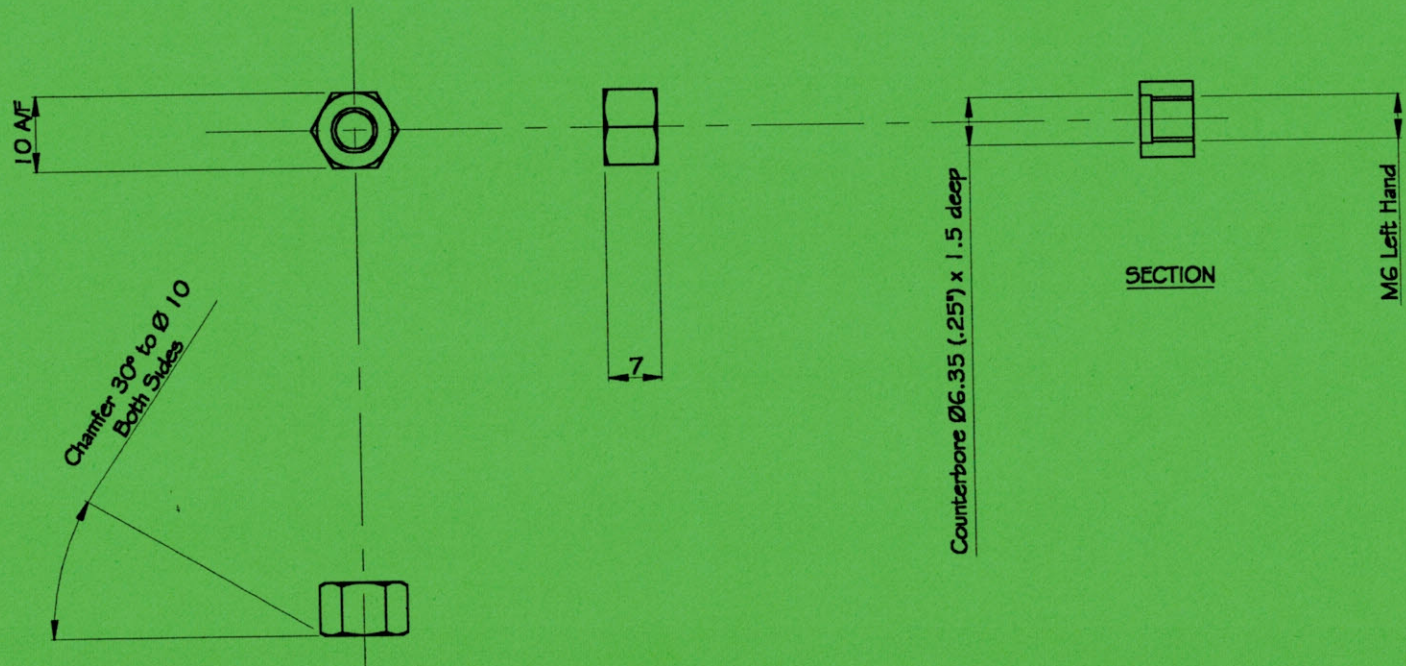
Enlarged View - Scale 4:1



Actual Size



Dimensions in Millimeters



Material: Stainless Steel

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

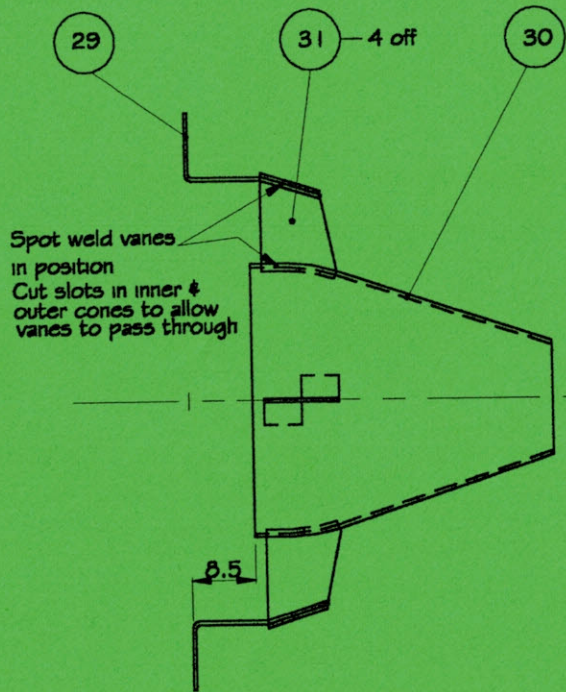
Title: Turbine Nut

Issue: 1

Part No. 027

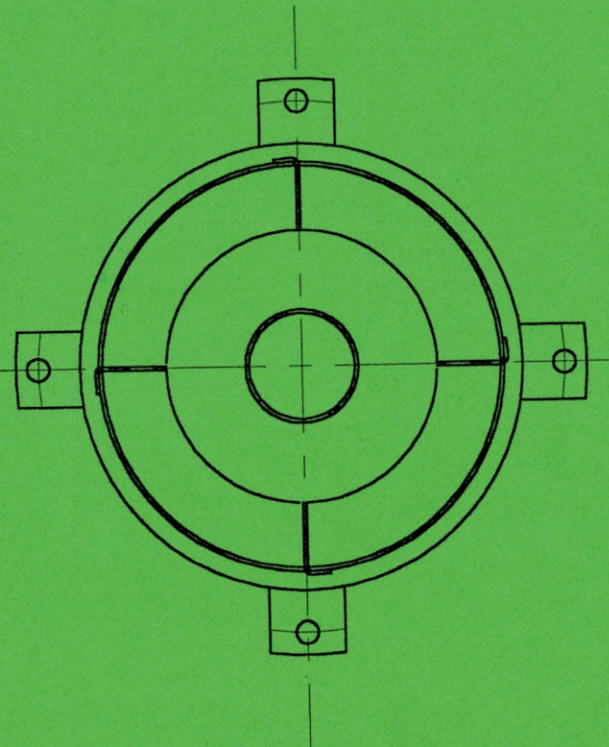


Dimensions in Millimeters

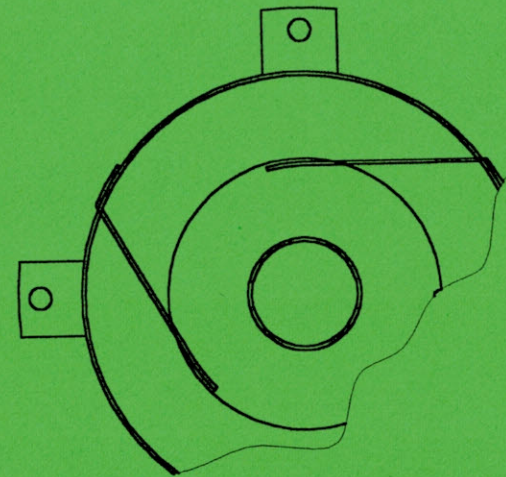


Spot weld vanes  
in position  
Cut slots in inner &  
outer cones to allow  
vanes to pass through

Ensure cone inner and cone outer  
are concentric.

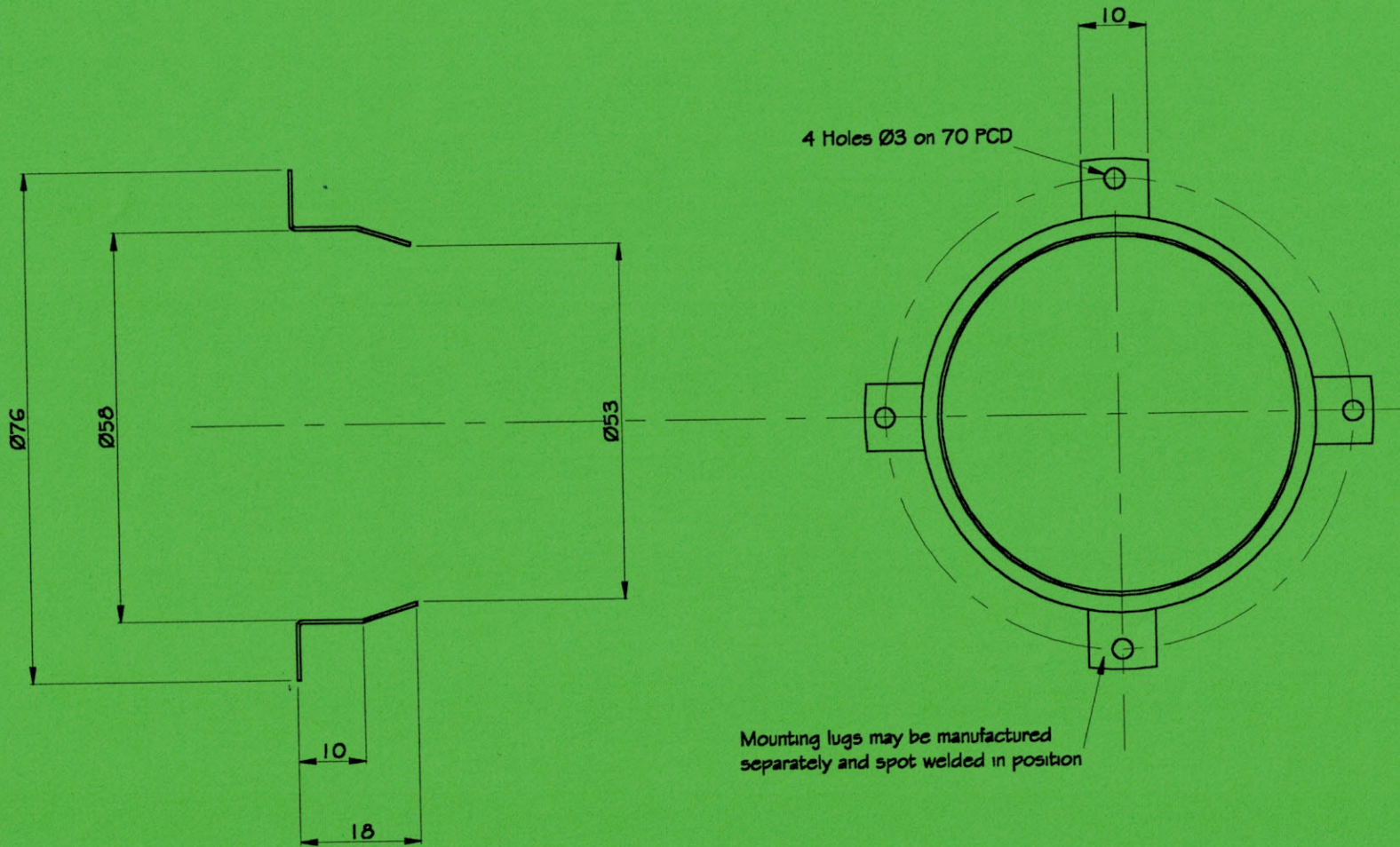


Alternative tangential  
vanes in 3 positions  
spot weld in place





Dimensions in Millimeters



Material: Stainless Steel Sheet

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

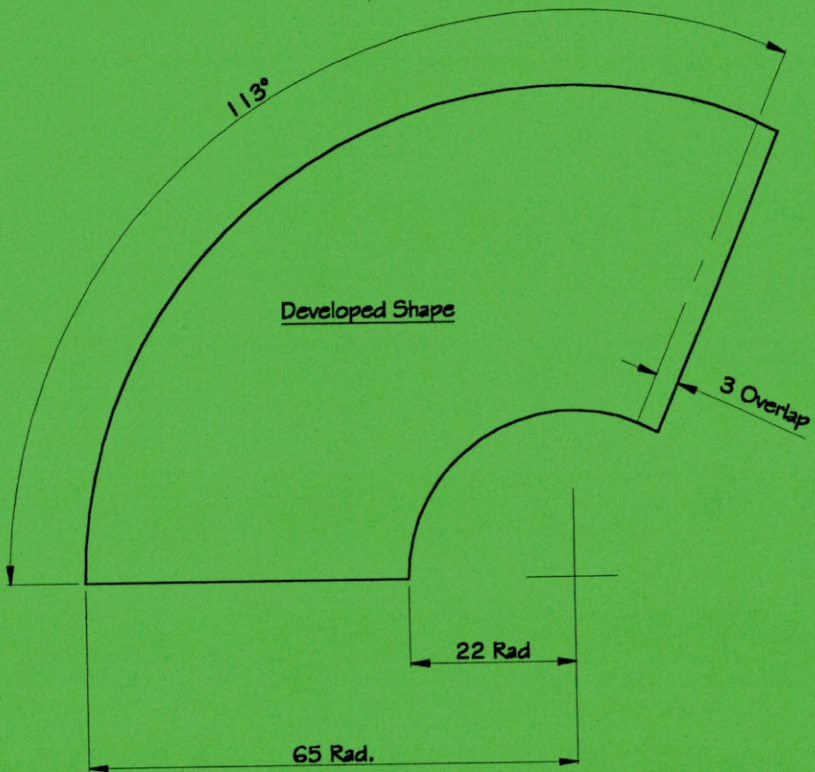
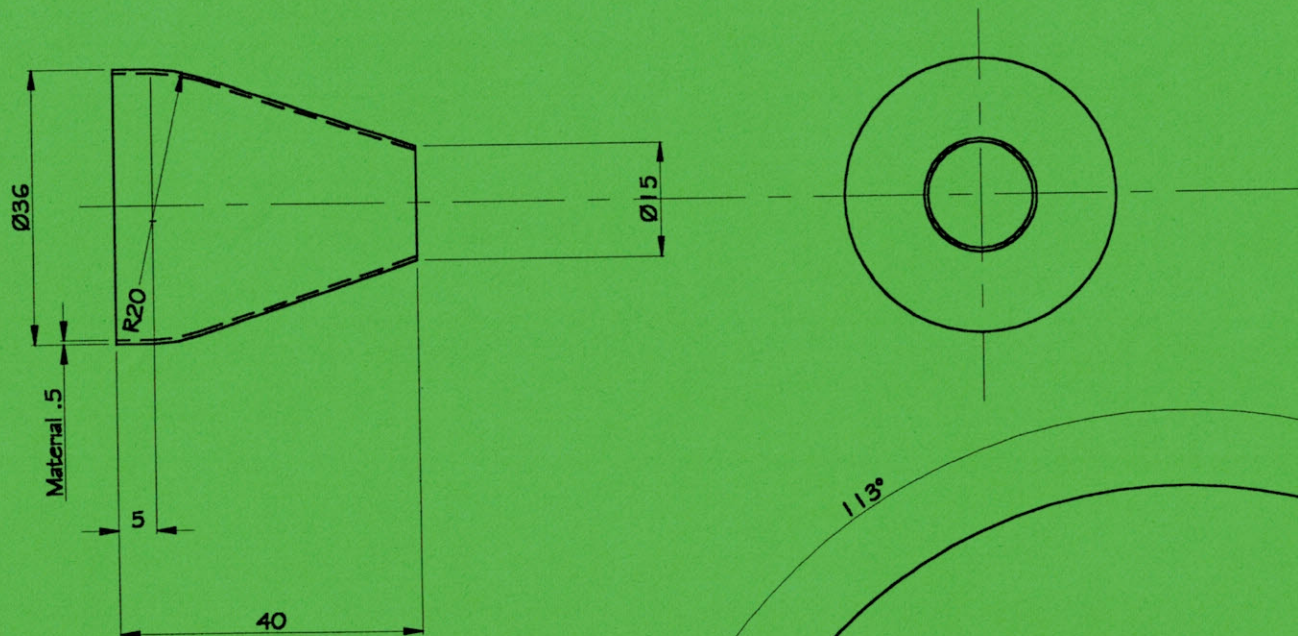
Title: Cone Outer

Issue: 1

Part No. 029



Dimensions in Millimeters



Spot weld along joint line  
then spin or press to form  
radius & Ø36

Material: Stainless Steel Sheet

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

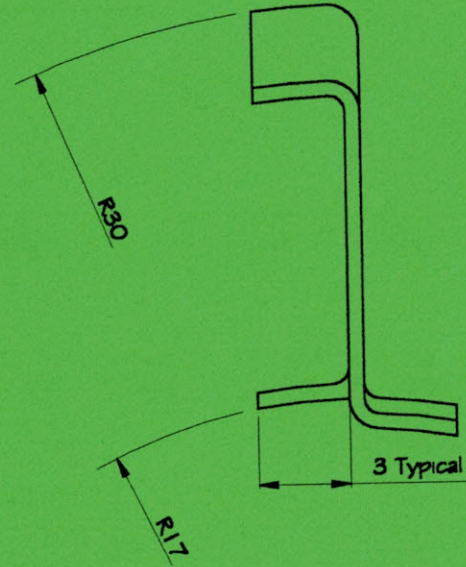
Title: Cone Inner

Issue: 1

Part No. 030



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

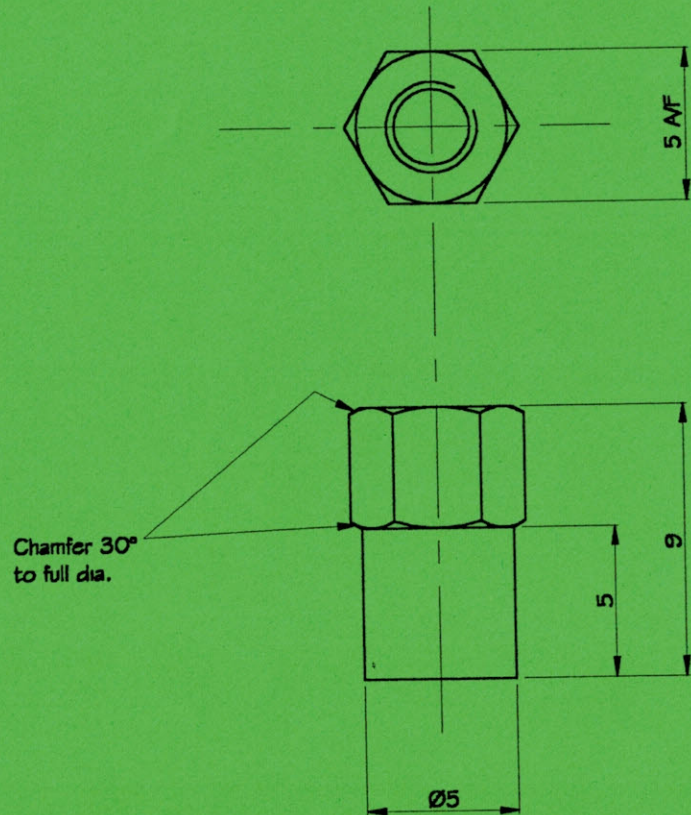
Third Angle Projection

© WREN Turbines

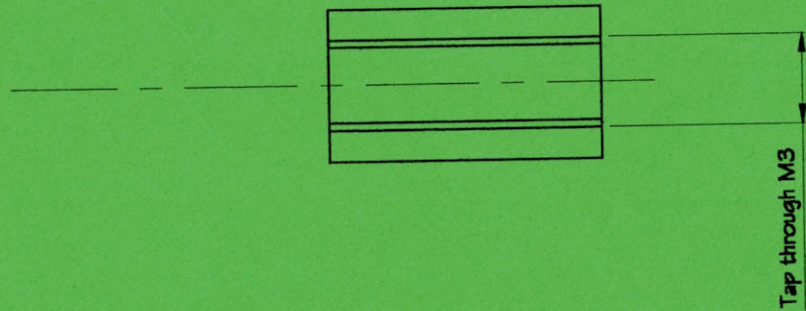
Turbine - MW54



Dimensions in Millimeters



Enlarged view - Scale 4:1

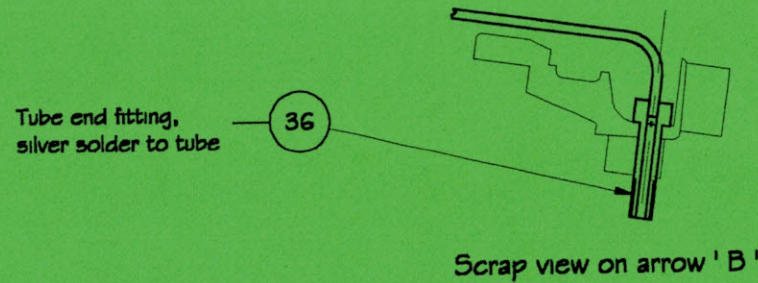
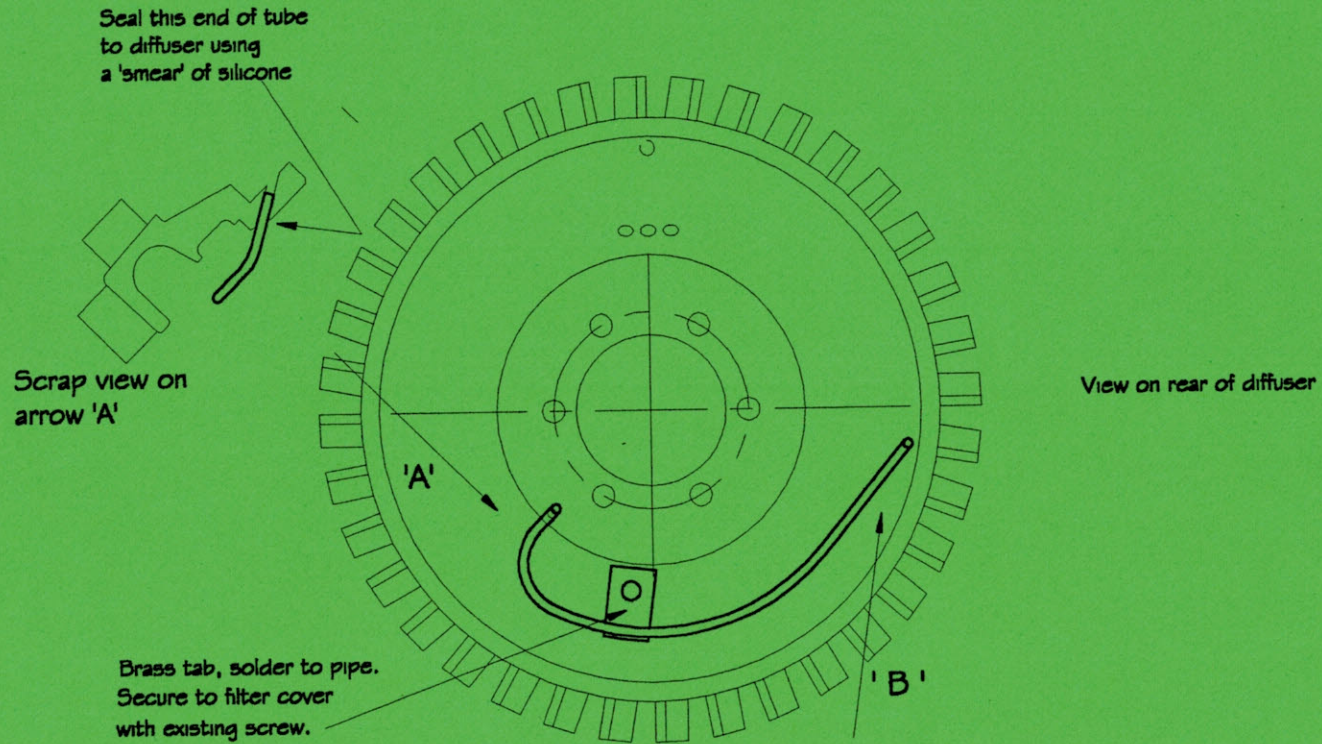


Actual Size

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

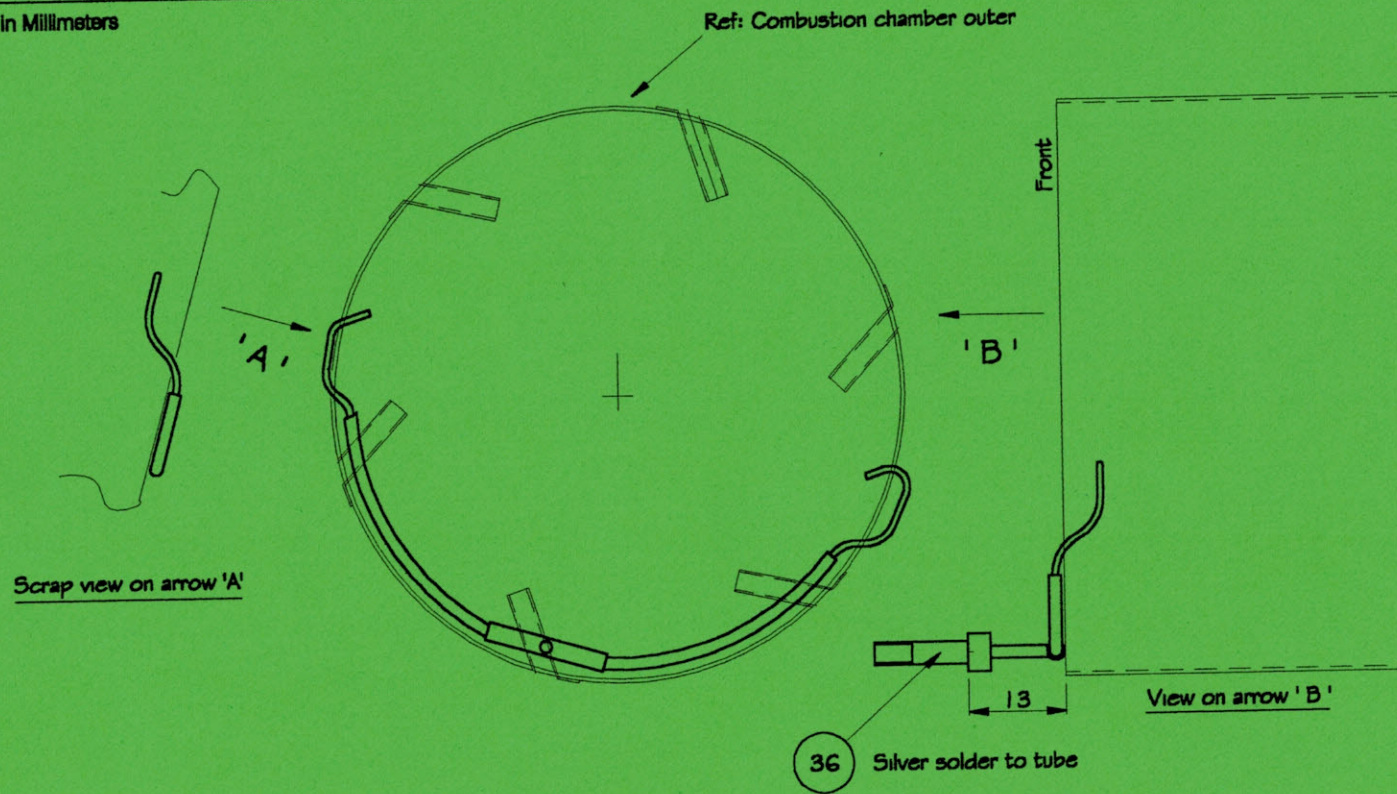


NOTE: Filter and filter cover must be fitted before tube is fitted to diffuser.

Material - Brass tube 1.6 mm O/Dia.



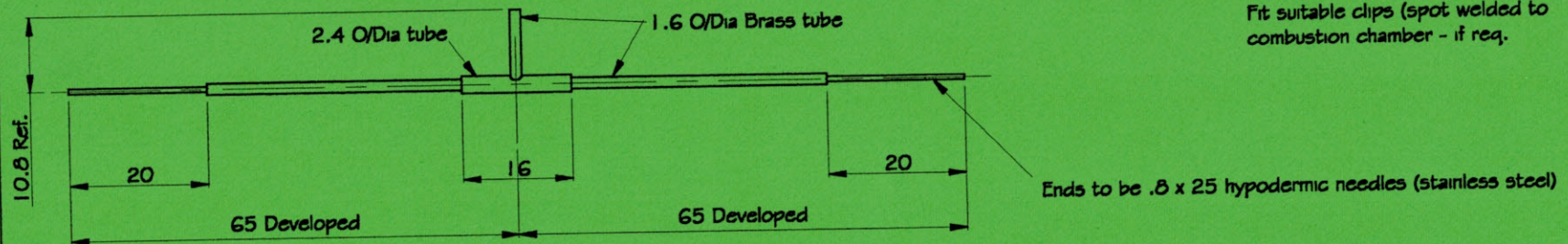
Dimensions in Millimeters



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.)



Material: Brass/Stainless Steel

Title: Gas Pipe

Issue: 2

Part No. 034

Drawn: Terry Lee

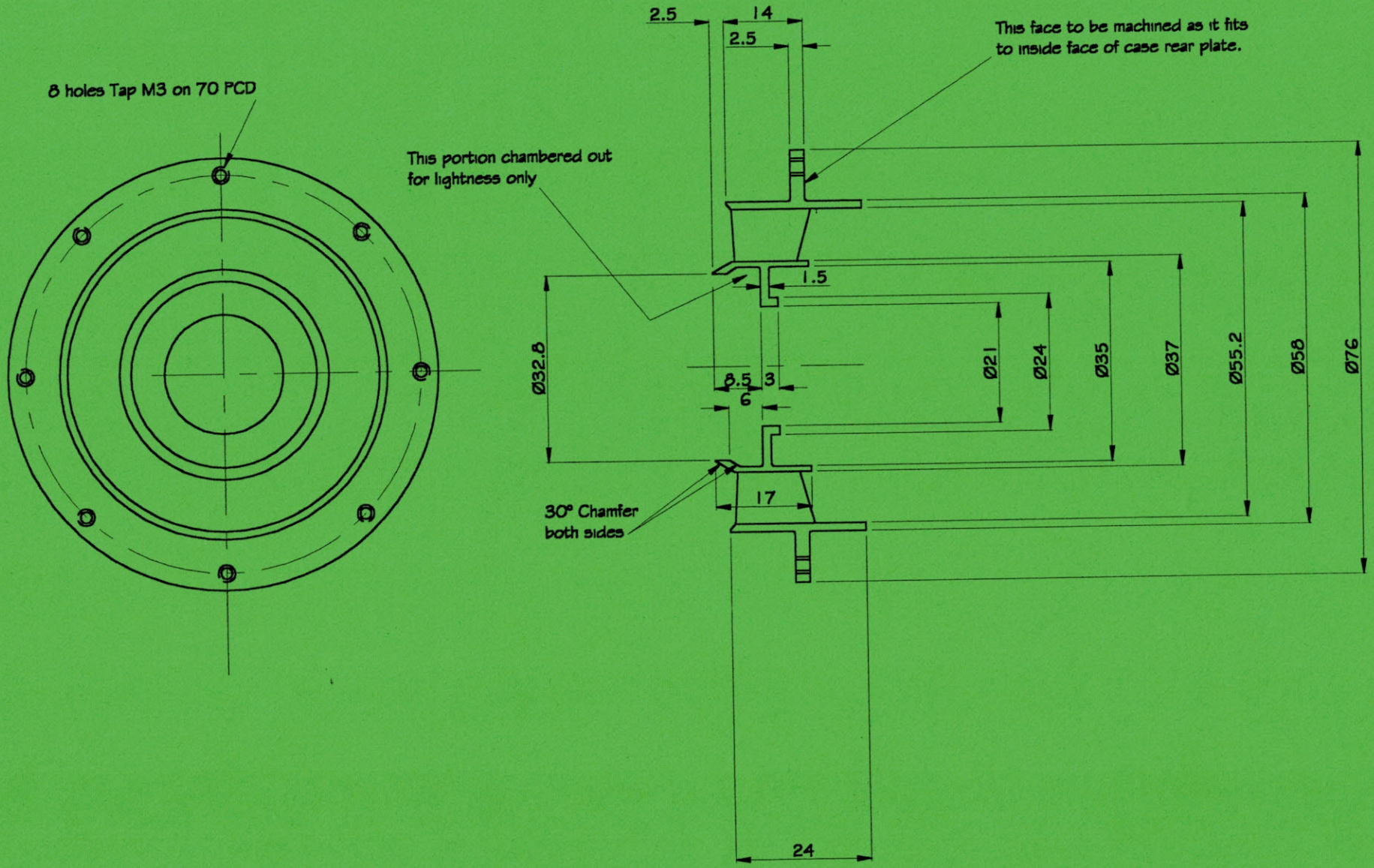
Third Angle Projection

© WREN Turbines

Turbine - MW54



Dimensions In Millimeters



Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

Material:

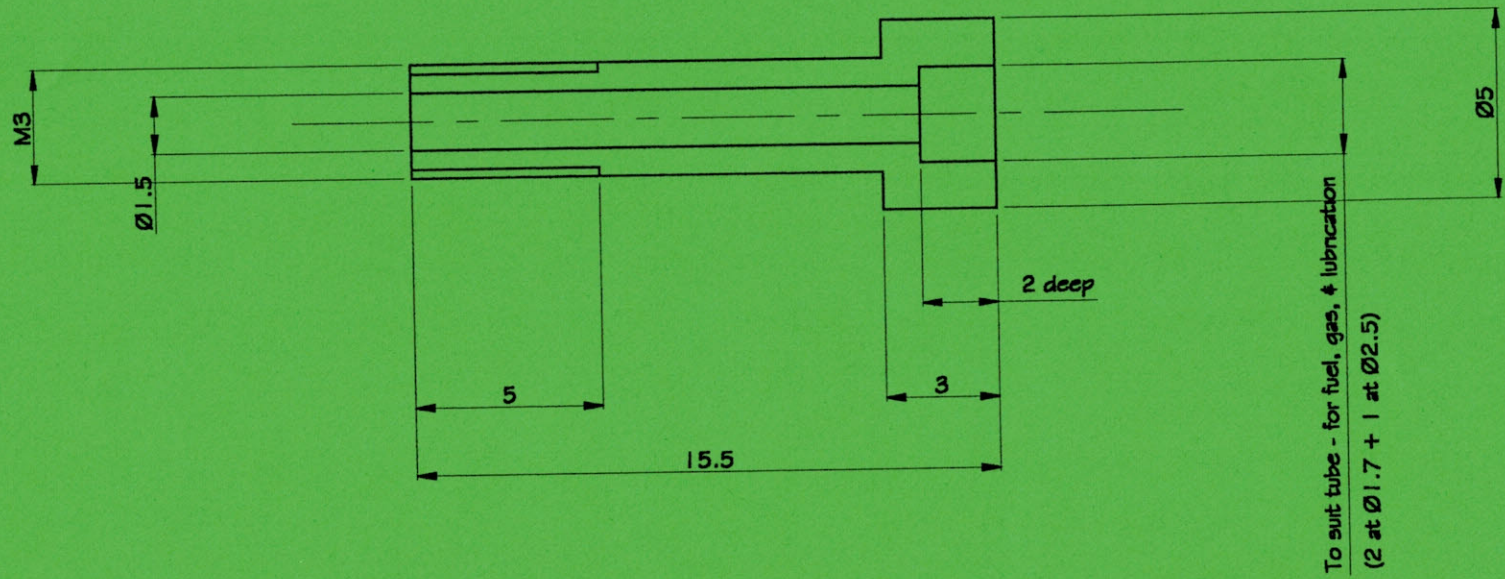
Title: Cast NGV - Machining

Issue: 2

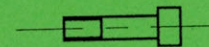
Part No. 035



Dimensions in Millimeters



Enlarged view - Scale 5:1



Actual Size

Material: Stainless Steel

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

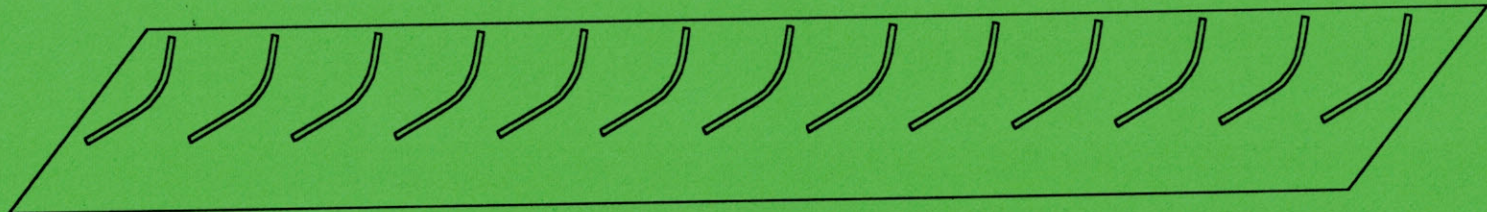
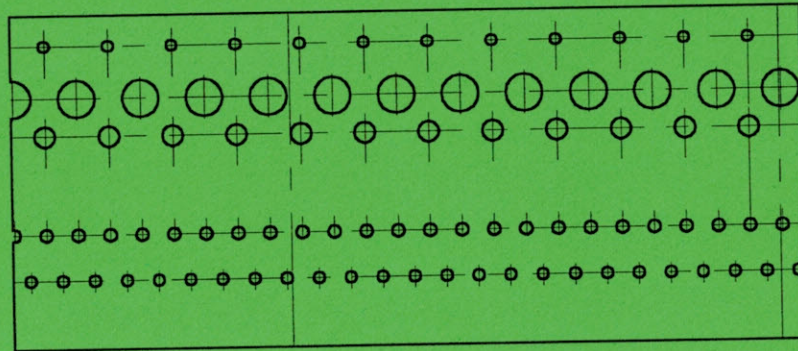
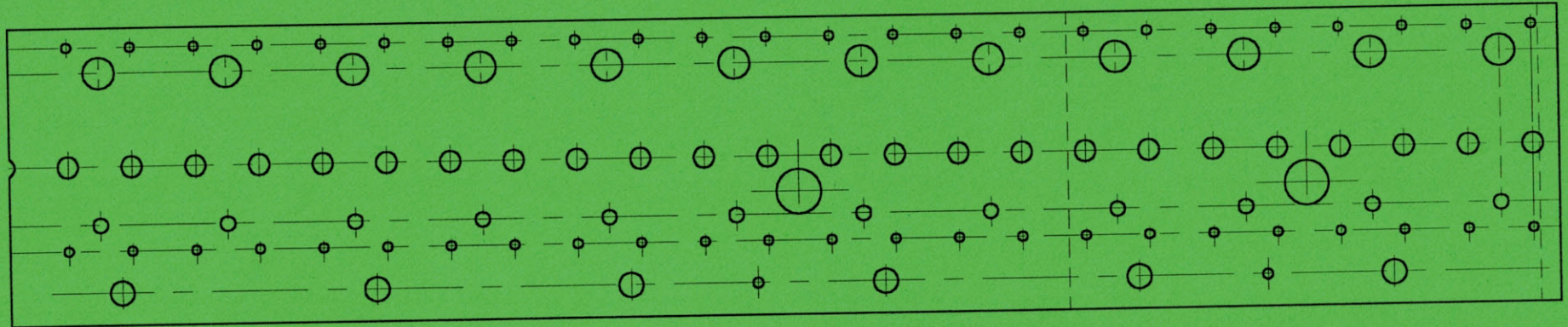
Title: Tube End Fitting

Issue: 3

Part No. 036



Dimensions in Millimeters



Material: See Details

Drawn: Terry Lee

Third Angle Projection

© Mike Murphy Turbine - MW54

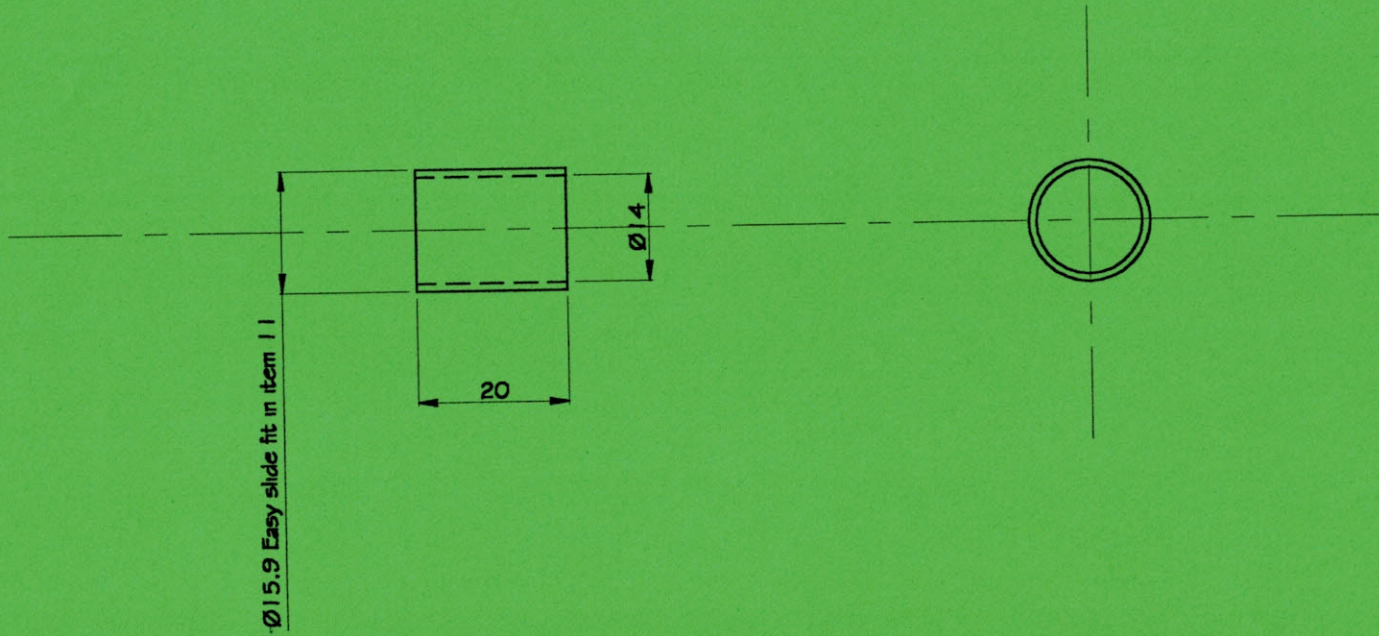
Title: Templates

Issue: 1

Part No. 037



Dimensions in Millimeters



Material: Mild steel

Drawn: Terry Lee

Third Angle Projection

© WREN Turbines

Turbine - MW54

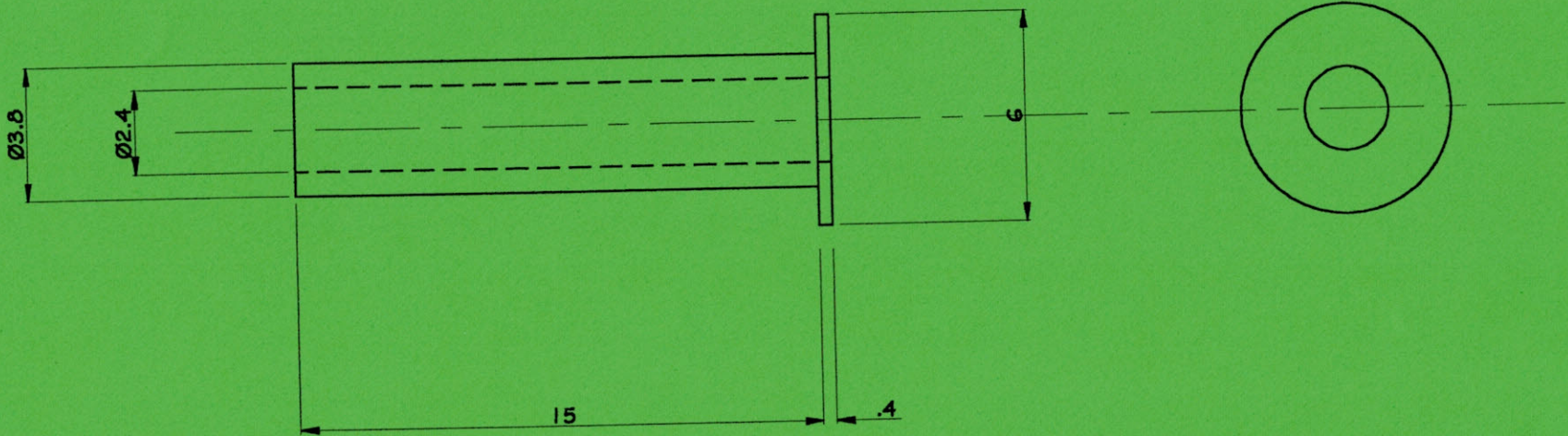
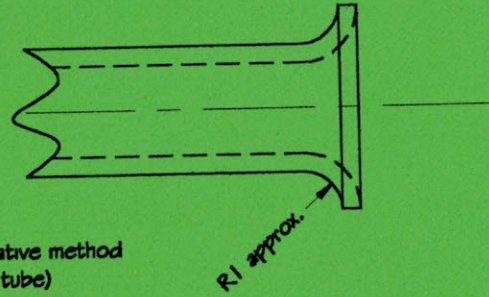
Title: Tube

Issue: 2

Part No. 038



Dimensions in Millimeters



Enlarged view - Scale 5:1

