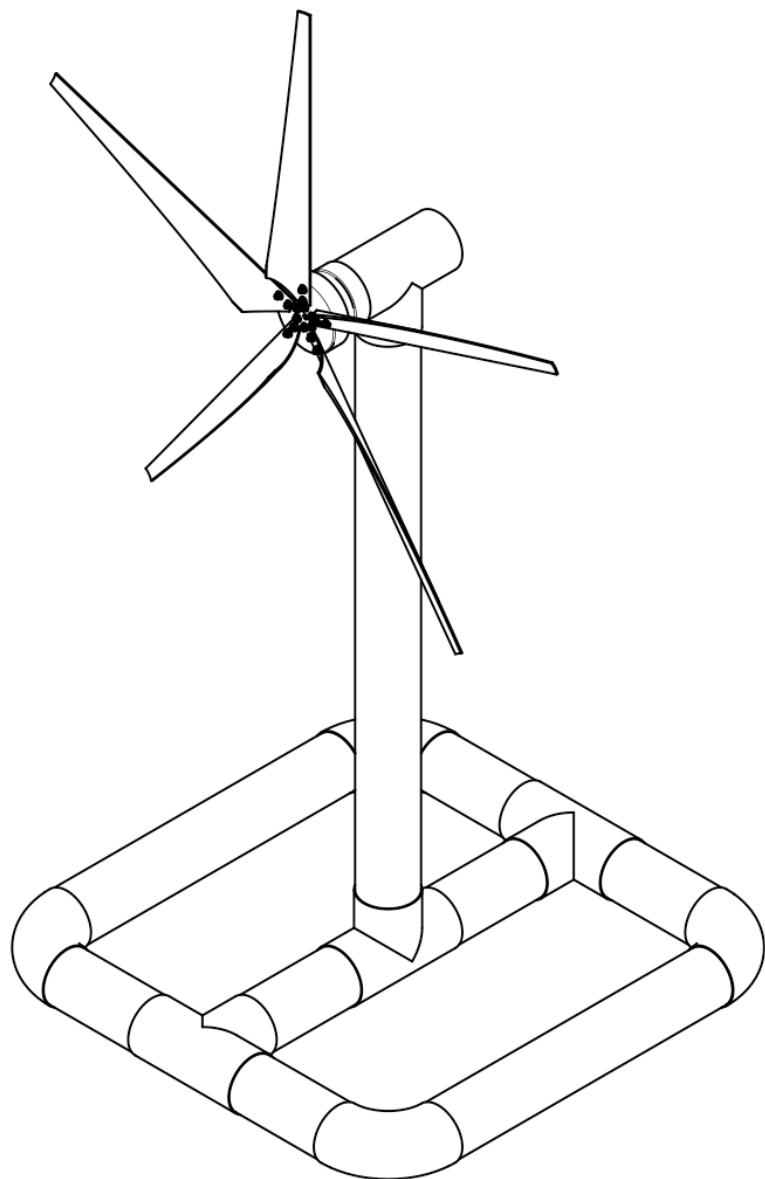




# The Local Electricity Project



## Wind Turbine Instructions

## Introduction

Welcome to the Local Electricity Project Wind Turbine Workshop! This is our step by step guide for making your very own wind turbine.

Follow each step carefully by measuring, cutting and drilling each part and assembling it all together.

Note that all dimensions shown are in millimetres (mm).

Where possible, 1:1 scale templates are provided to assist with marking out and drilling parts. Print these templates at 100% scale and use to mark up the appropriate parts.

The symbol  $\varnothing$  is used to show diameter – typically to show the width of holes.

**SAFETY NOTE:** Always take care when using power tools and working with electricity.

Wind turbines can be extremely dangerous. This guide should be used as an introduction to wind power by demonstrating how to use simple parts to build a functional wind turbine.

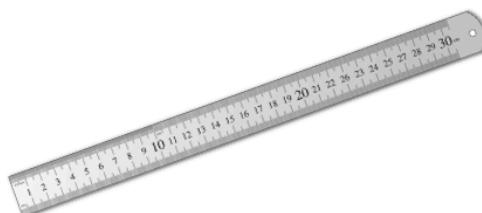
Your wind turbine should not be left unattended in strong winds – for details on how to construct a more robust version, or for any other queries contact us at [info@localelectricity.org](mailto:info@localelectricity.org)

## Tools required:

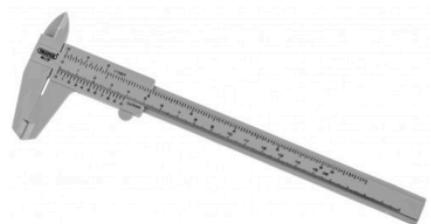
(Tools marked with \* are optional)



Hack Saw



Ruler



Callipers\*



Hand drill



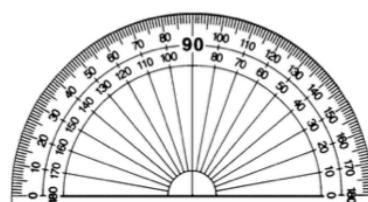
Tape measure



Bench vice\*



Spanners  
(various sizes)



Protractor



Power saw\*



File



Sticky Tape



Pliers



Marker pen

Drill press\*

## Materials - Fasteners

Item	Quantity
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### Bolts

M3x15mm	3
M5x15mm Bolt	10
M5x20mm Bolt	6



### Nuts

M3 Nut	5
M5 Nut	16



### Washers

M3 Washer	3
M5 Washer	16



## Materials – PVC Pipe & Fittings

Item	Quantity
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PVC Pipe

200x90mm PVC Pipe 6

500x90mm PVC Pipe 4

1000x90mm PVC Pipe 1



90mm PVC End Cap 1

100mm PVC End Cap 1



90mm PVC Elbow 4



90mm PVC Tee 4



## Materials – Dynamo (Generator)

To purchase contact [info@localelectrity.org](mailto:info@localelectrity.org)

Item	Quantity
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Dynamo	1
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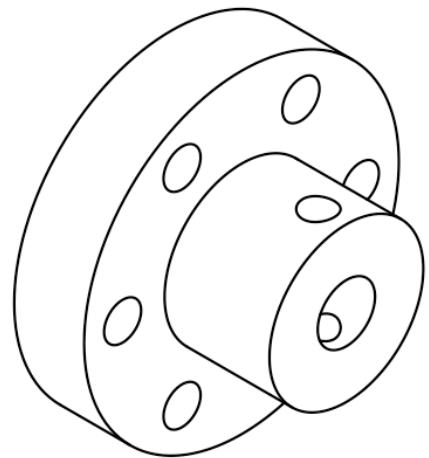
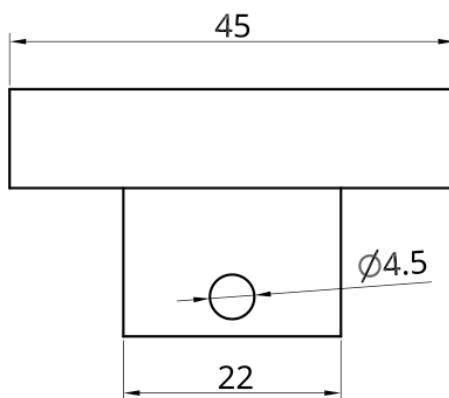
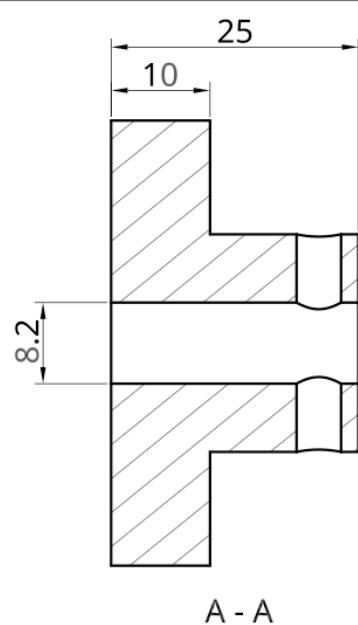
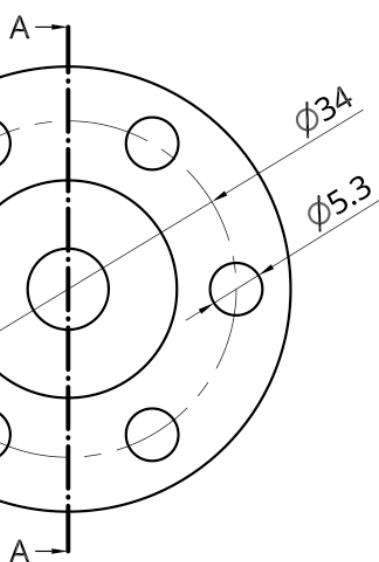


## Materials – Motor Hub (8mm bore)

You can make your own hub using the dimensions below, or to purchase contact [info@localelectricity.org](mailto:info@localelectricity.org)

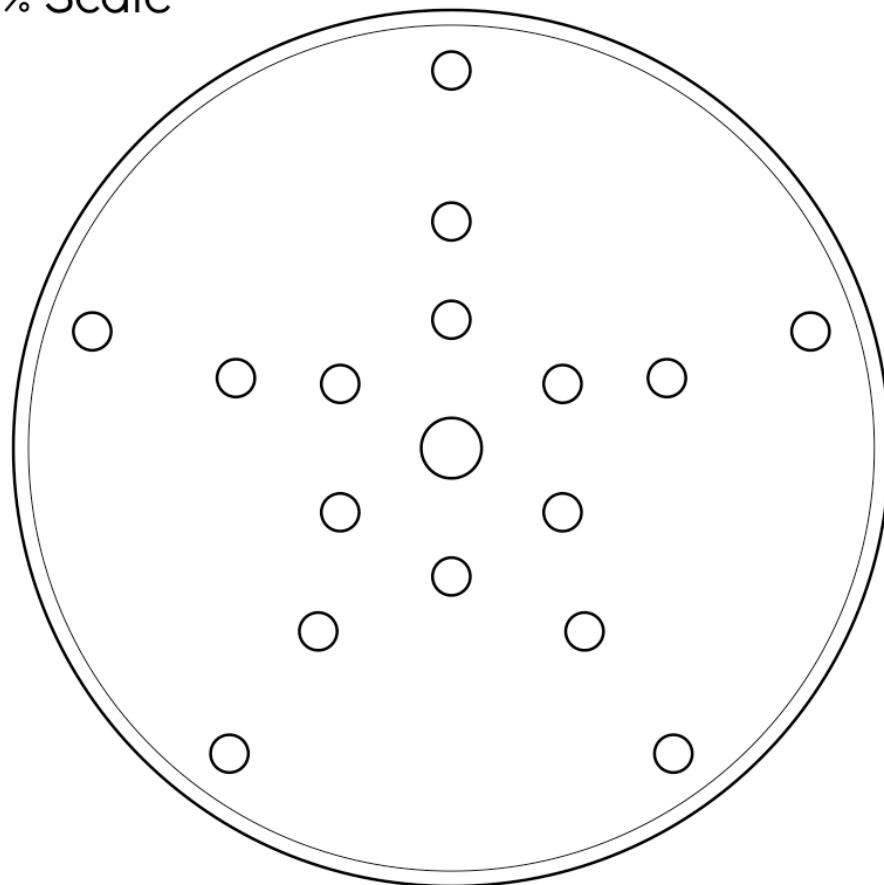
Item	Quantity
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Motor Hub (8mm bore)	1
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Template 1: 100mm PVC End Cap

Print at 100% Scale

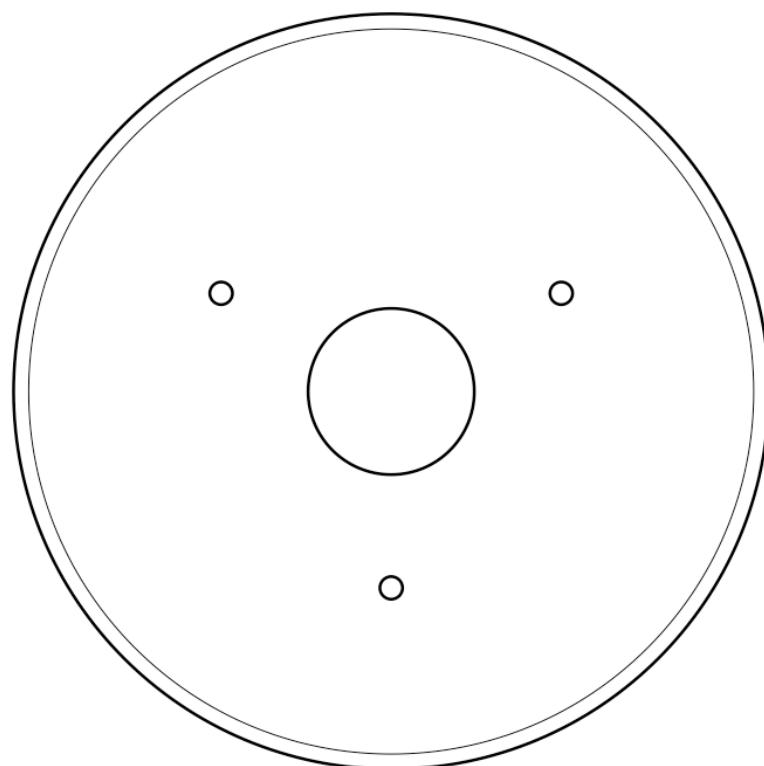


1:1

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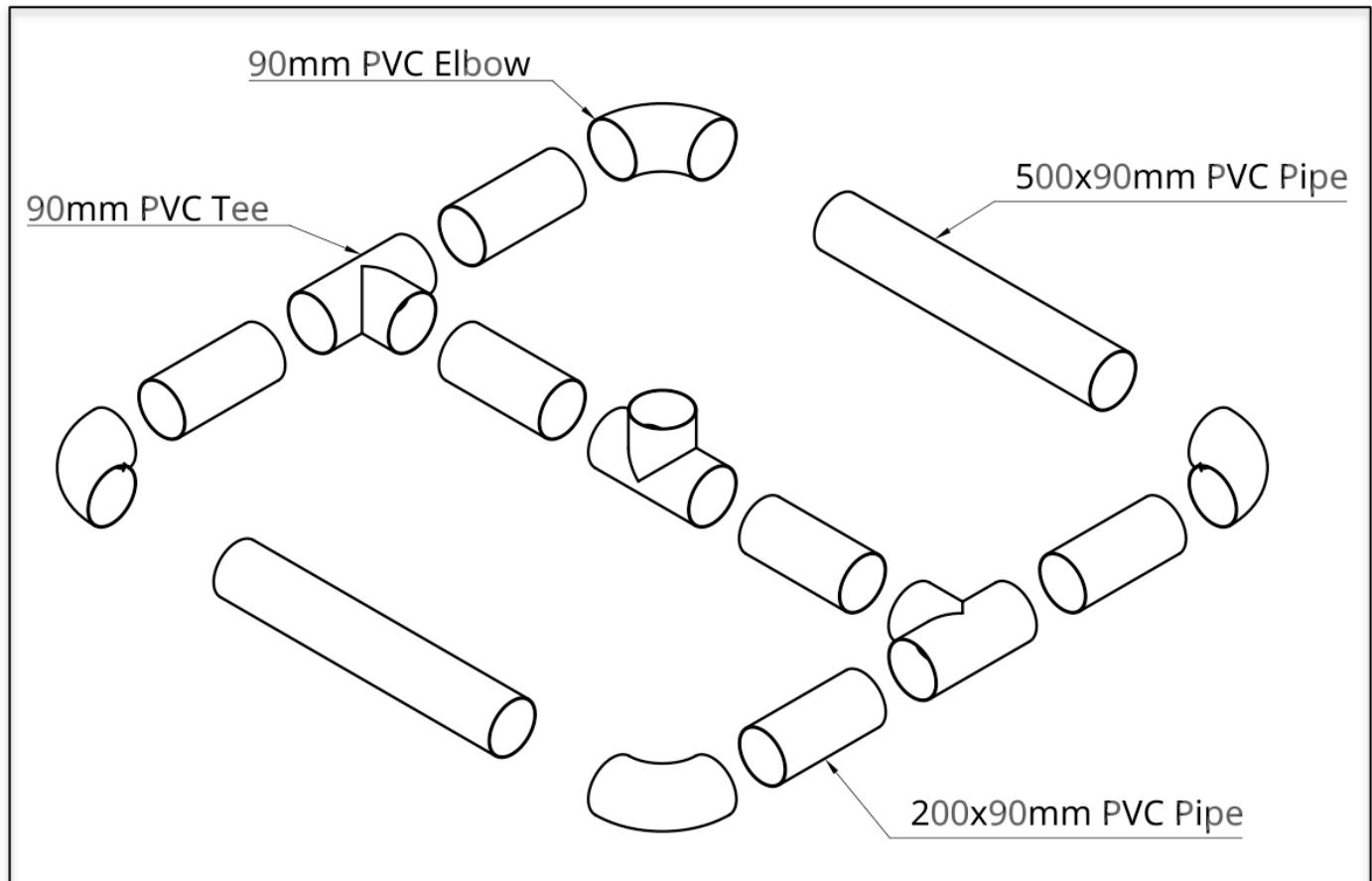
Template 2: 90mm PVC End Cap

Print at 100% Scale

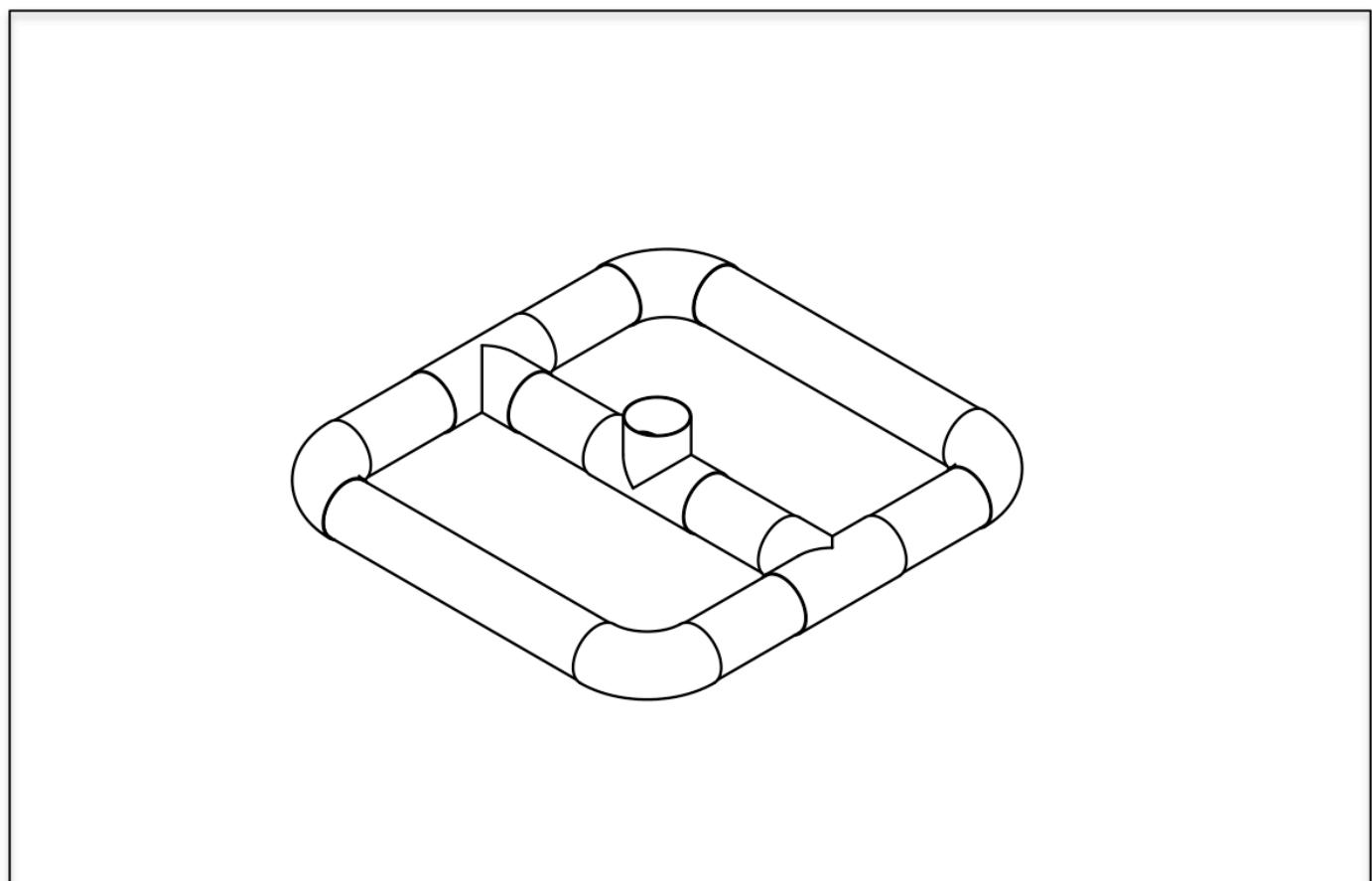


1:1

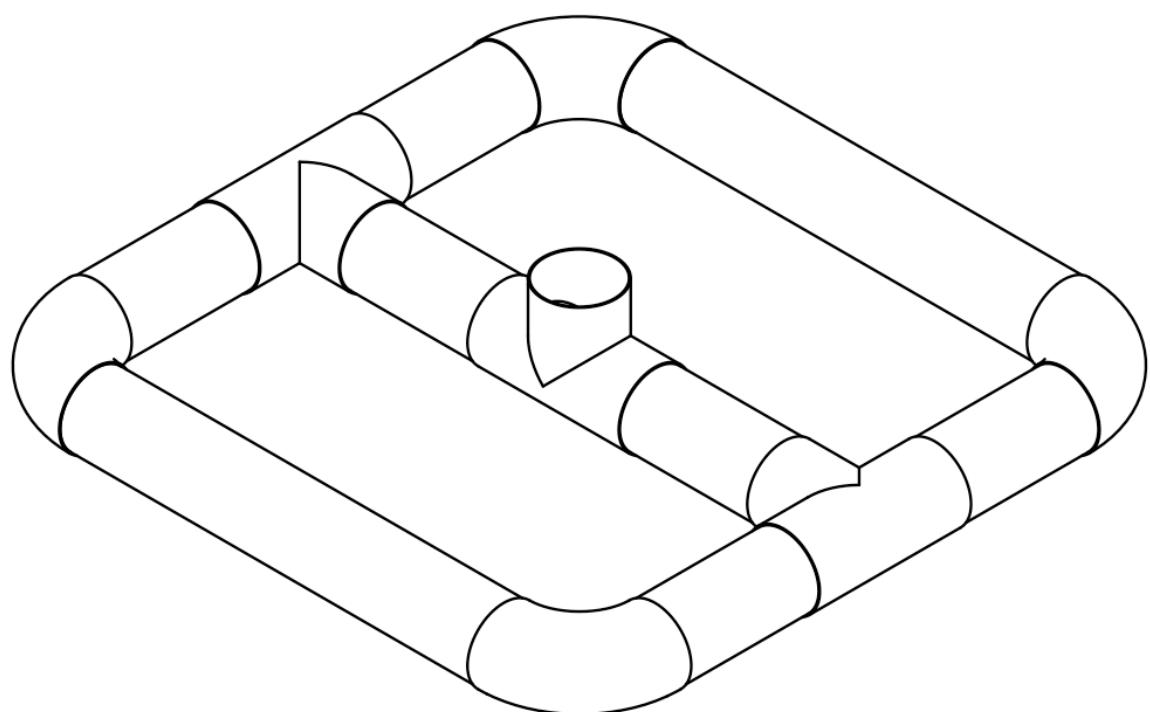
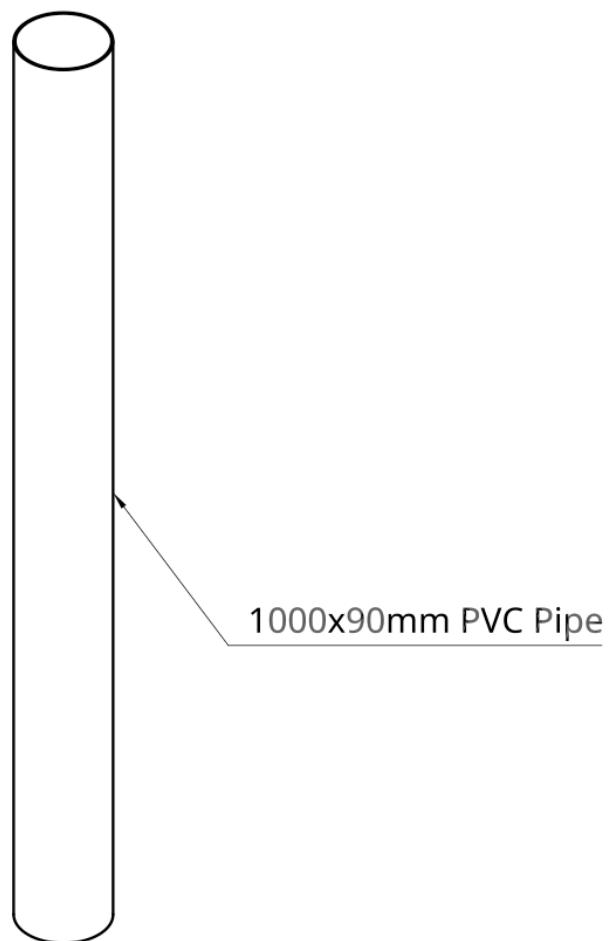
1. Cut and assemble the following 90mm PVC Pipe sections and assemble using 90mm PVC Elbow and Tee fittings.



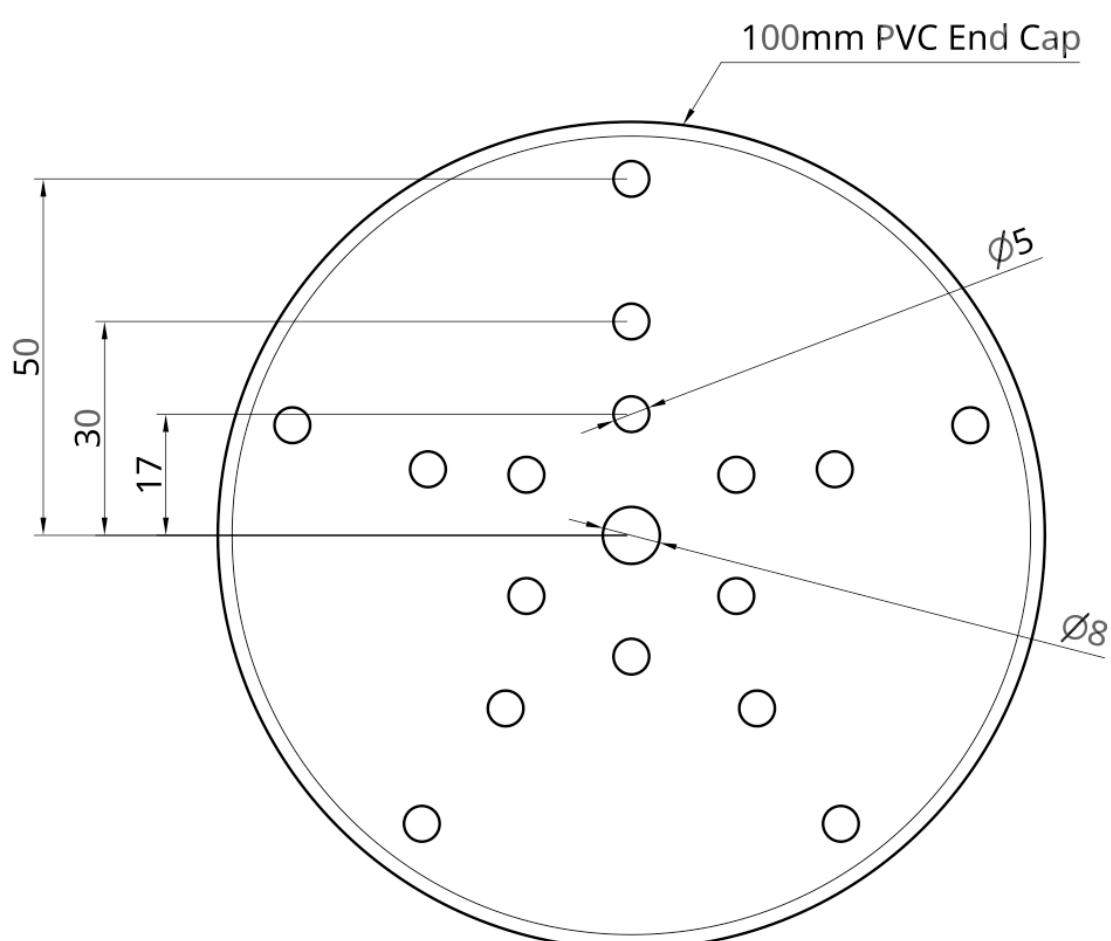
2. Make sure all pieces are secure and tight.



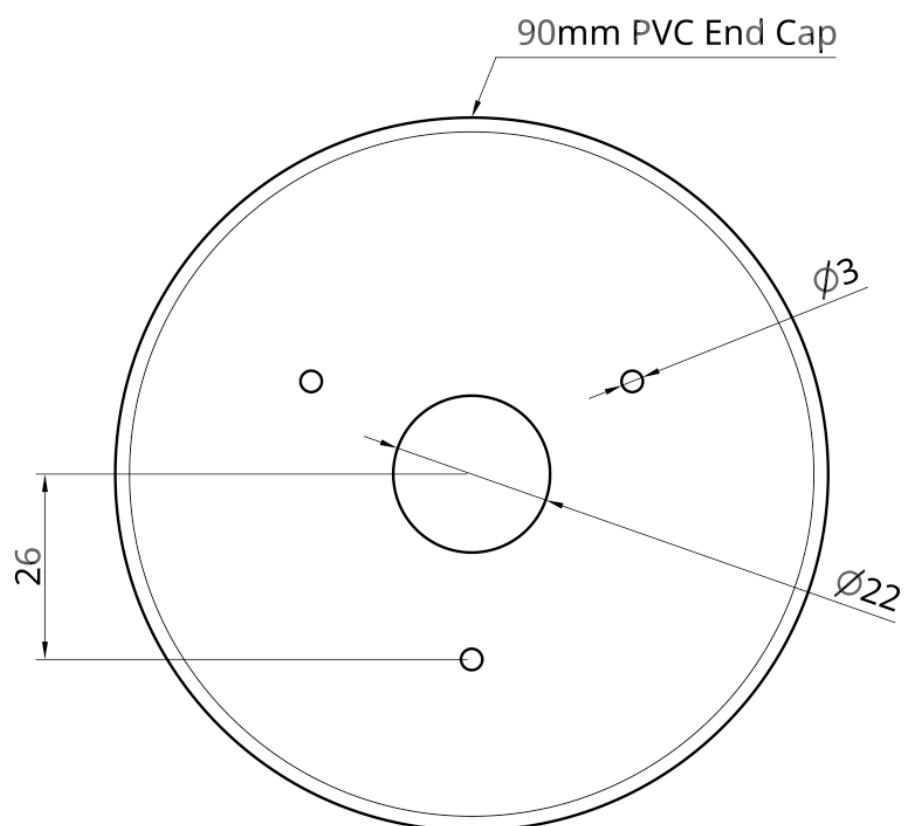
3. Insert a piece of 90mm PVC pipe to form the base and tower.



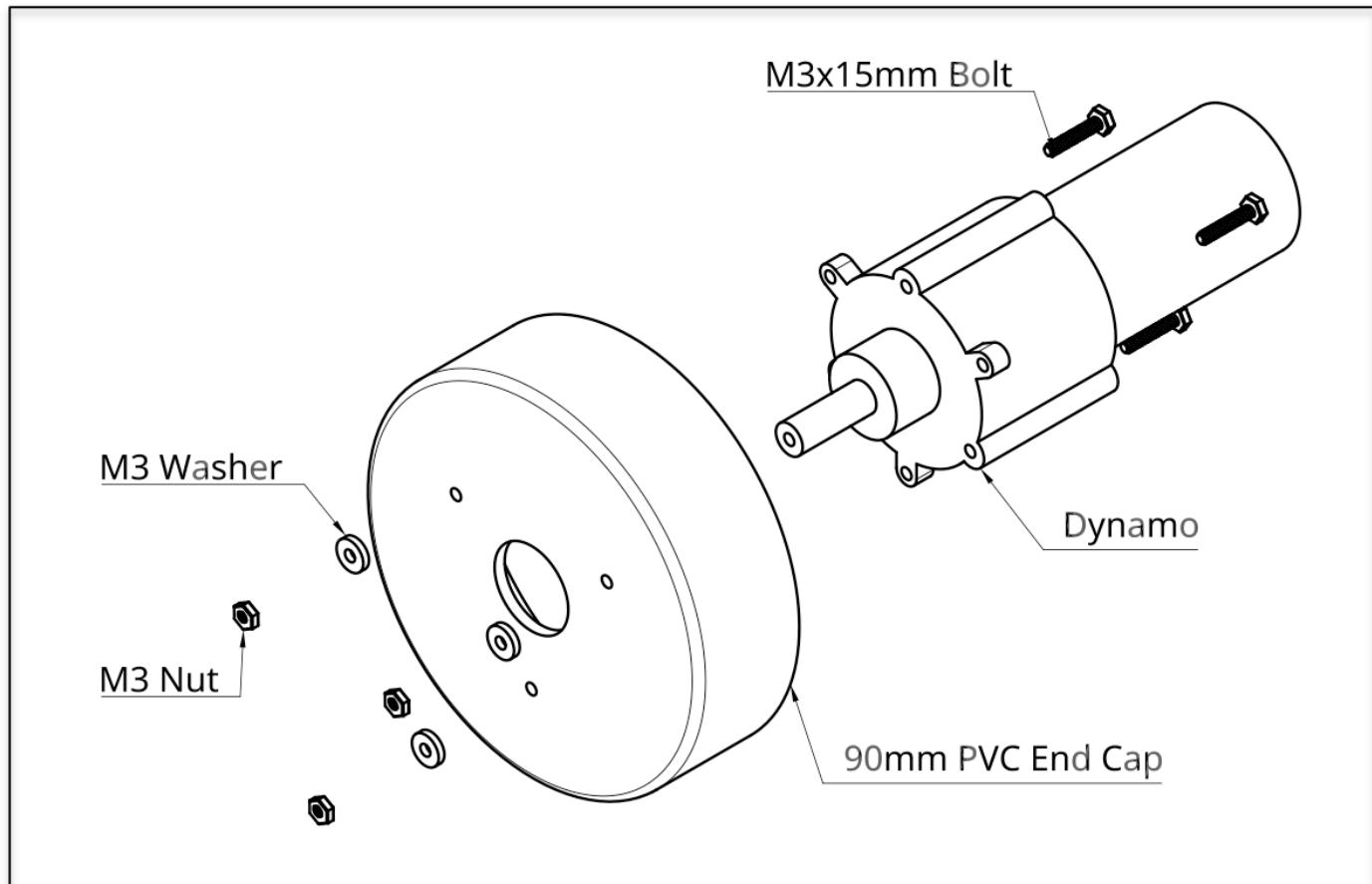
4. Drill the 100mm PVC End Cap to match the following dimensions. You may find it easier to use the 1:1 scale template available at the start of these instructions.



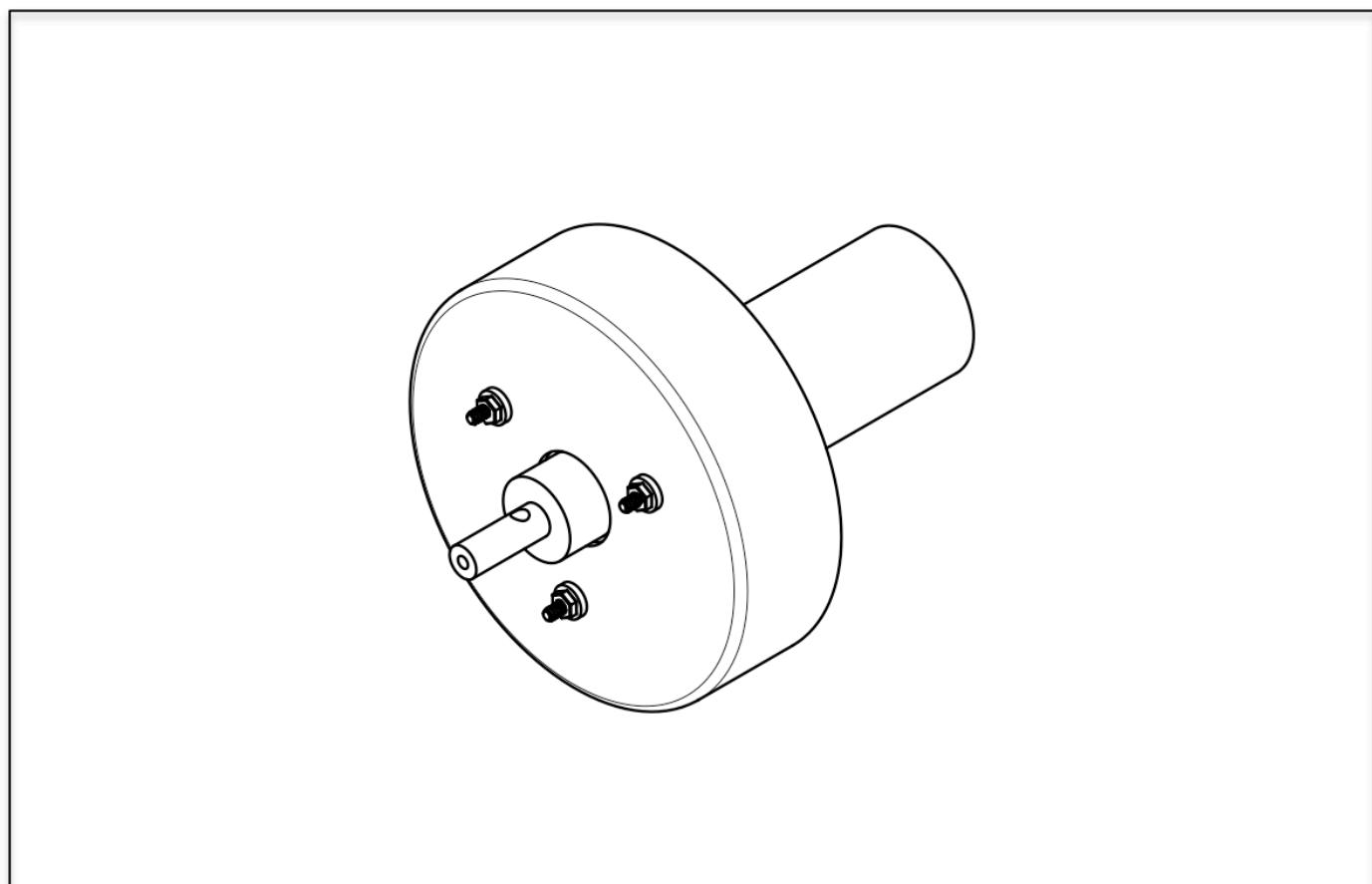
5. Drill the 90mm PVC End Cap to match the following dimensions. You may find it easier to use the 1:1 scale template available at the start of these instructions.



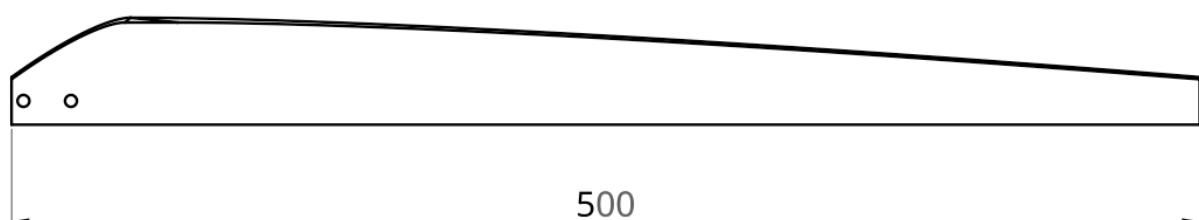
6. Fasten the Dynamo to the 90mm End Cap using M3 Nuts, Bolts and Washers.



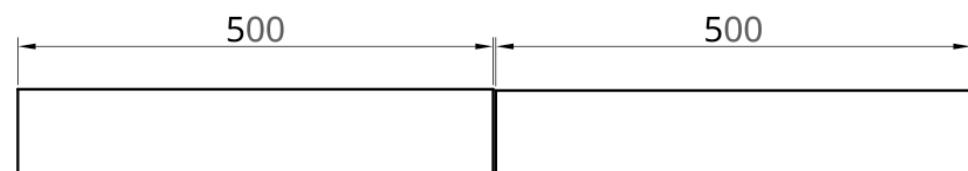
7. Make sure the Bolts are fastened down tight!



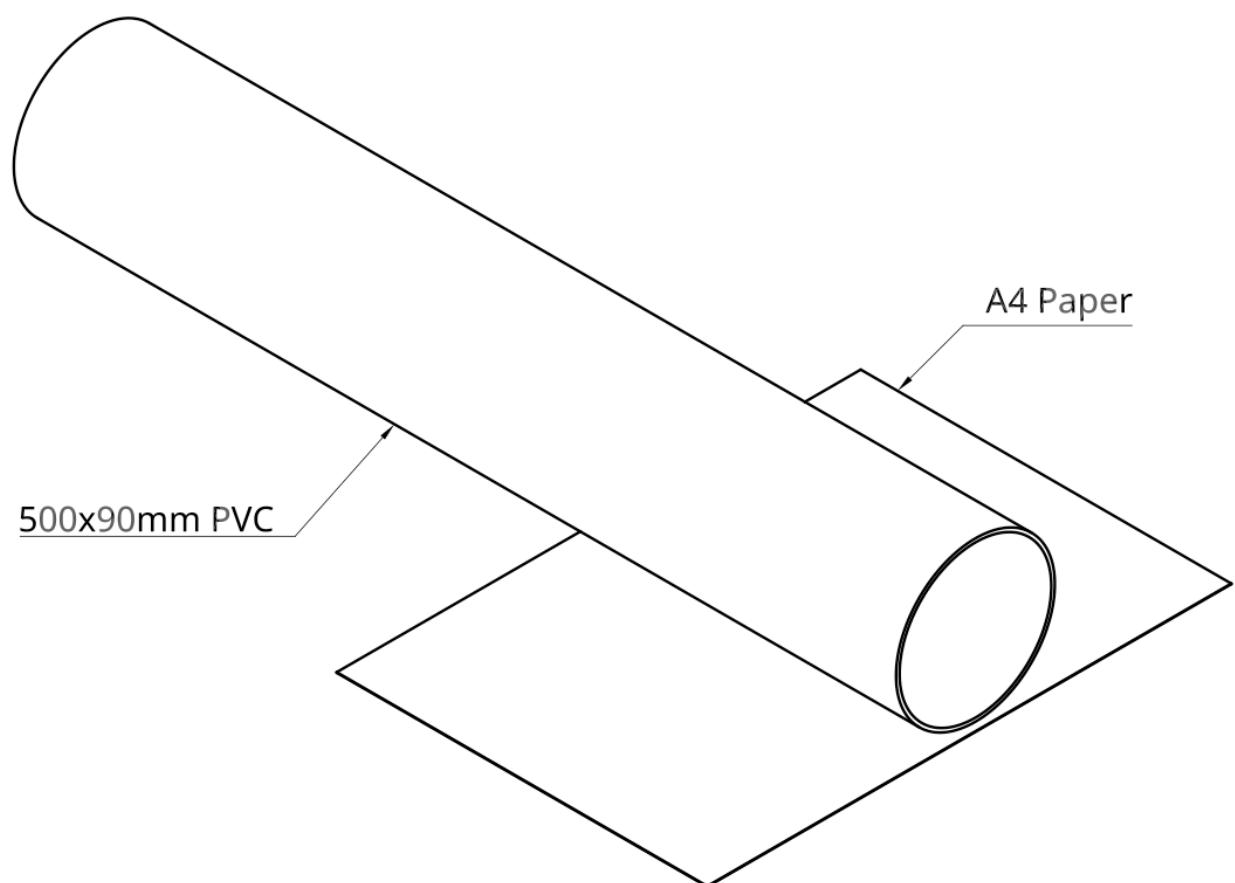
8. We need to make a total of 5 blades, measuring 500mm long as shown.



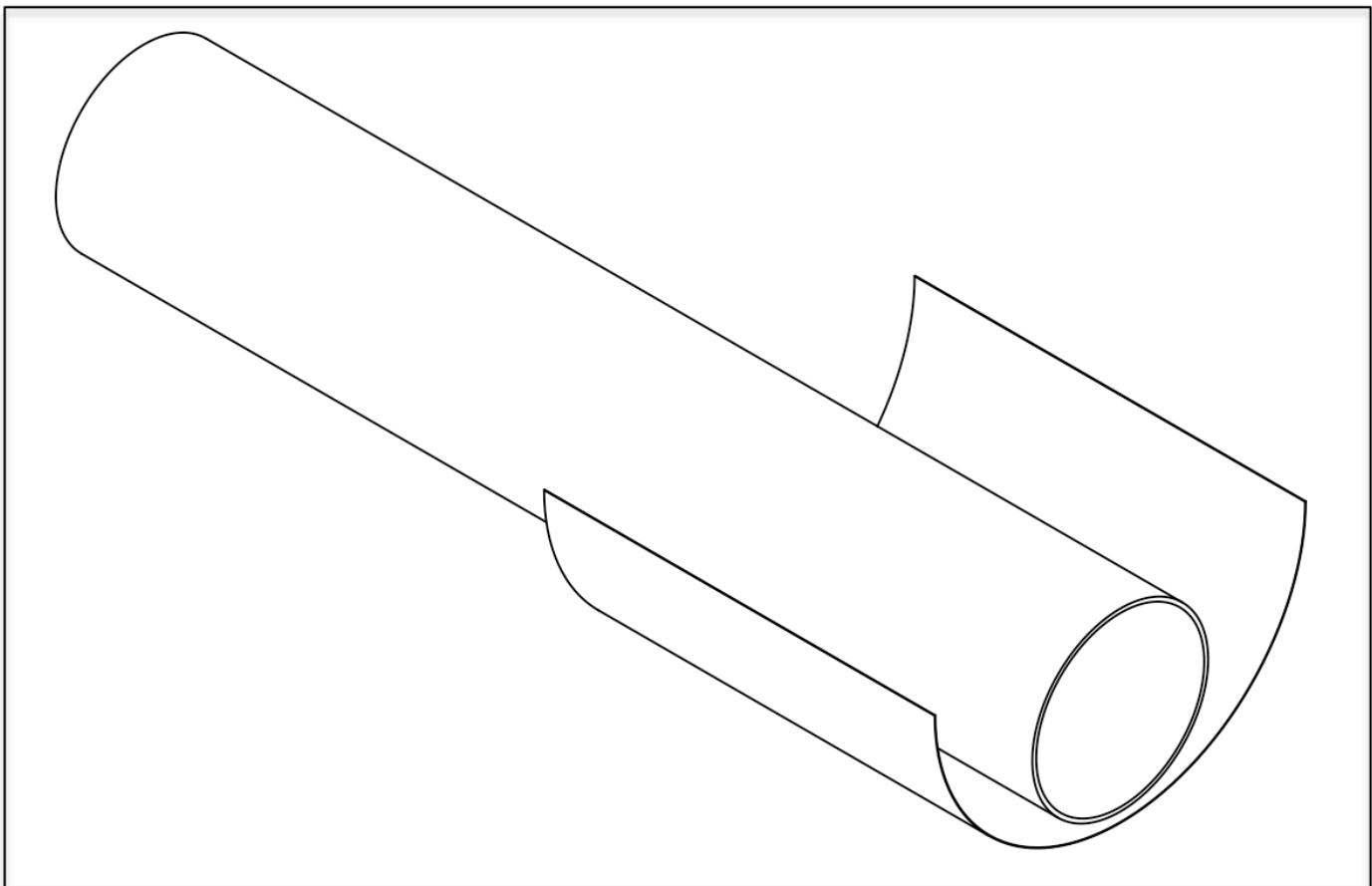
9. We can make the blades by cutting some 90mm PVC pipe into quarters. To make 5 blades we need 2 lengths of 500mm.



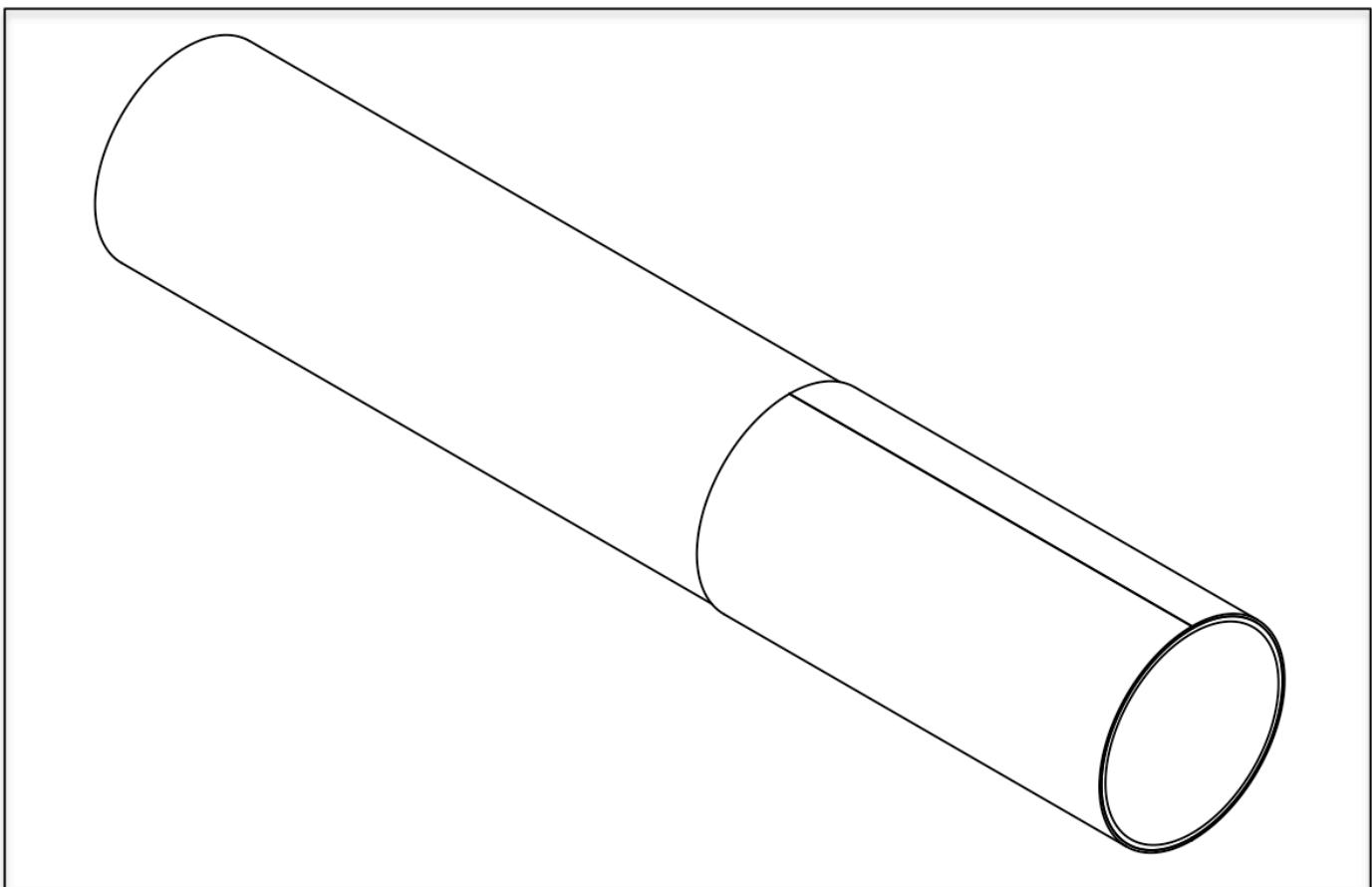
10. To precisely cut the PVC pipe into quarters we need to accurately measure and mark where to cut. The best way to mark the pipe into quarters is to use an A4 sheet of paper (or any size that will wrap all the way around).



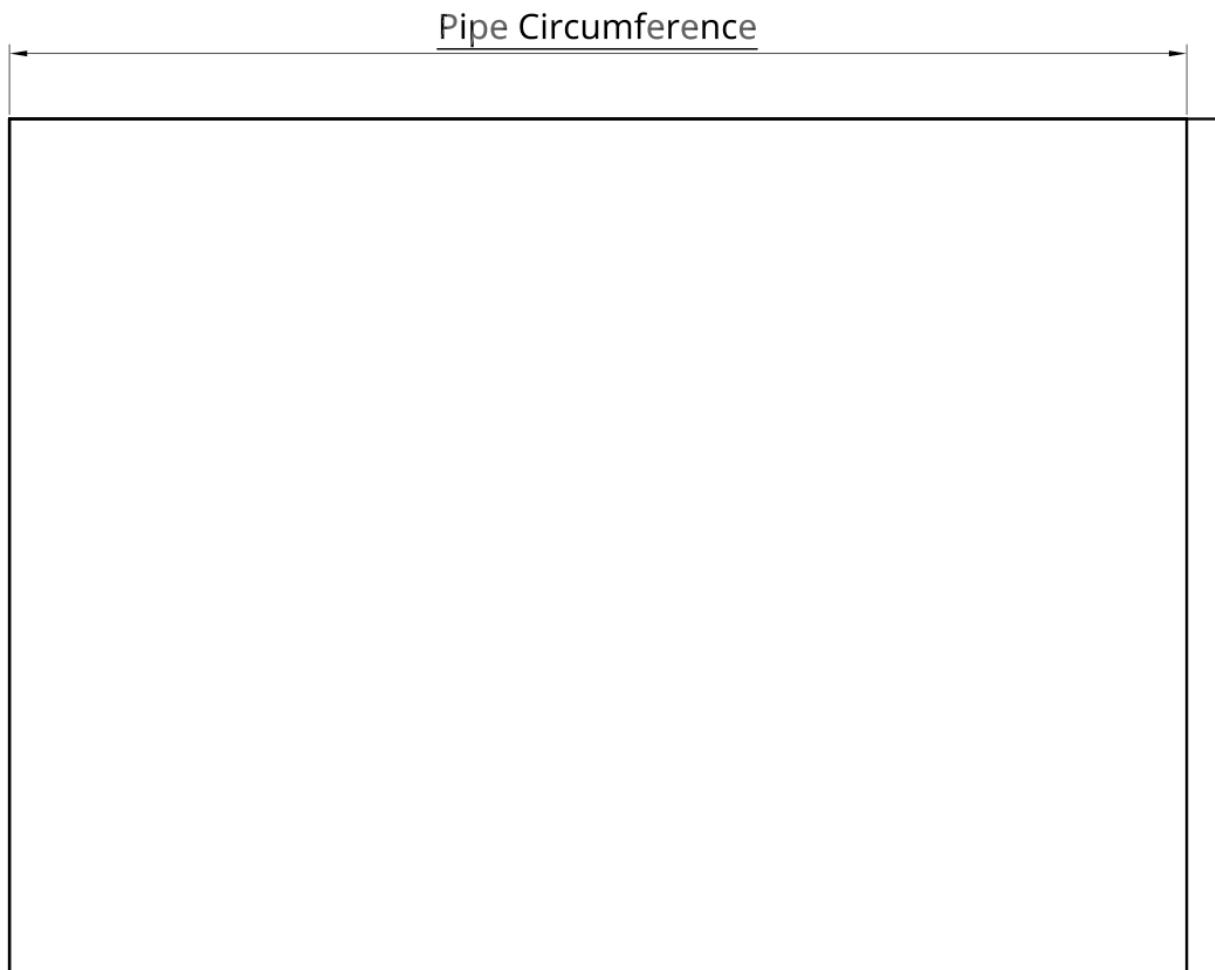
11. Wrap the paper around one end of the pipe.



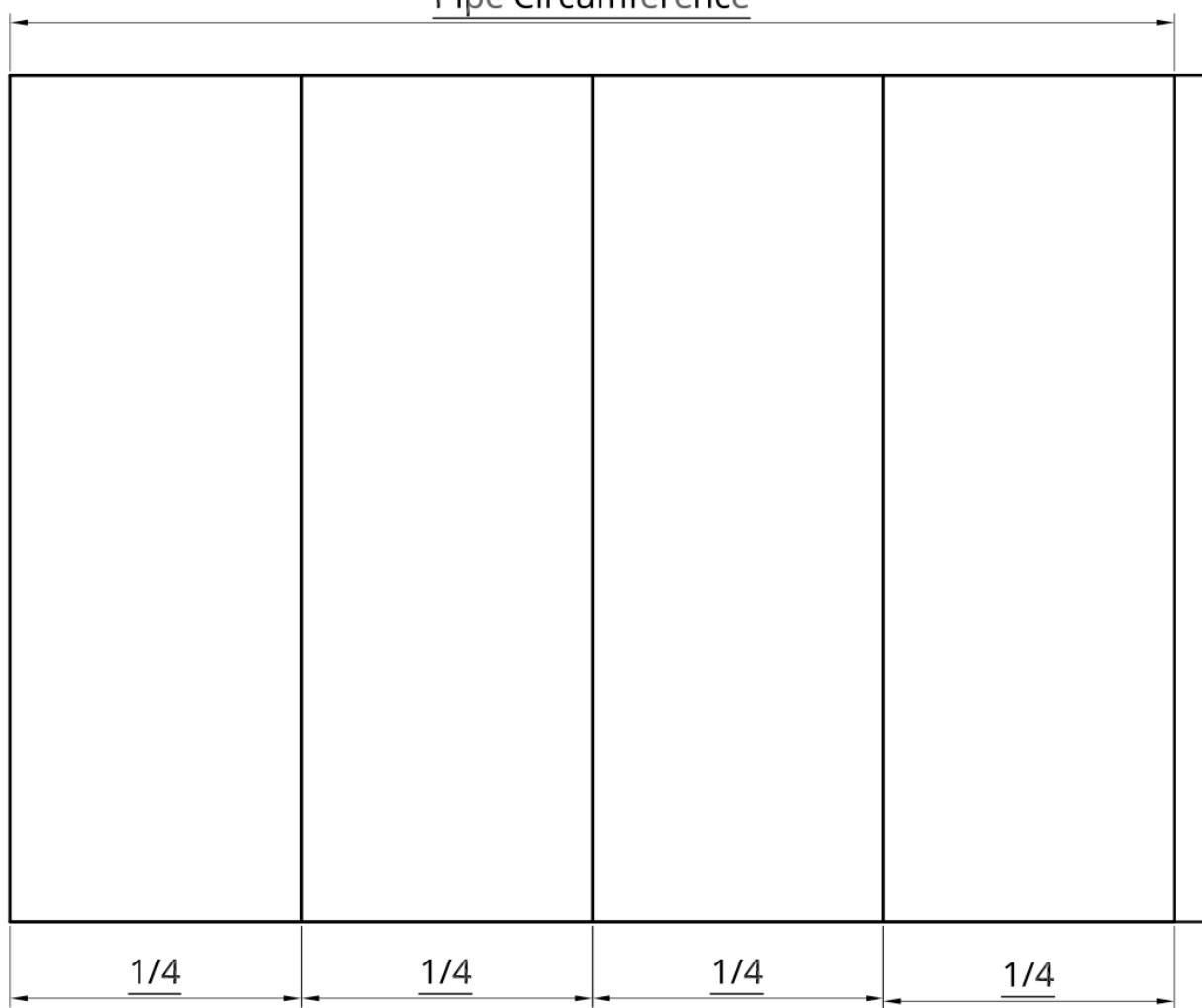
12. Wrap the paper tightly and make sure the edges all line up. Make a mark along the edge where the paper overlaps.



13. Roll the paper out on a flat surface. Make sure you have a straight line all the way across the paper. This is the total distance (circumference) around the pipe.



14. Measure the distance from the edge of the paper to this line and divide it by 4. Measure and mark out similar lines at a distance of  $\frac{1}{4}$  the total circumference.

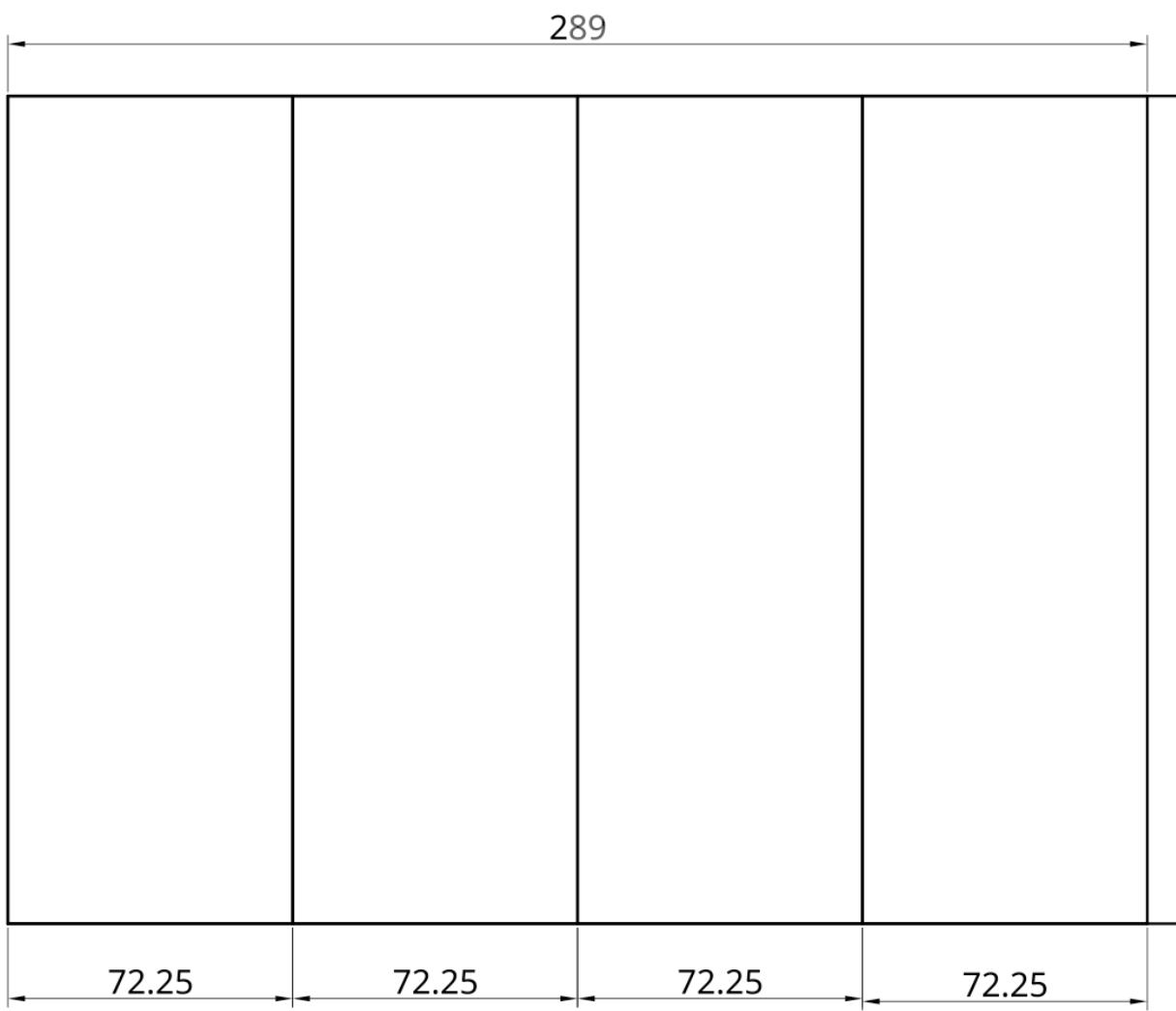


Example:

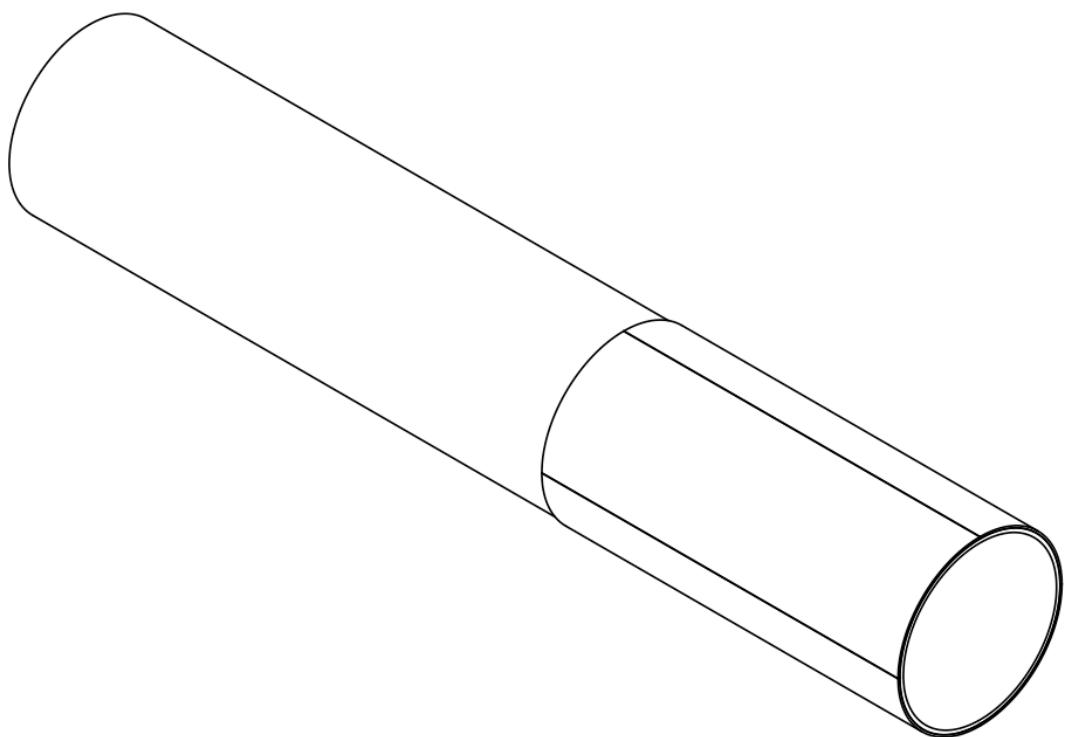
Pipe diameter = 92mm

Pipe circumference = 289mm

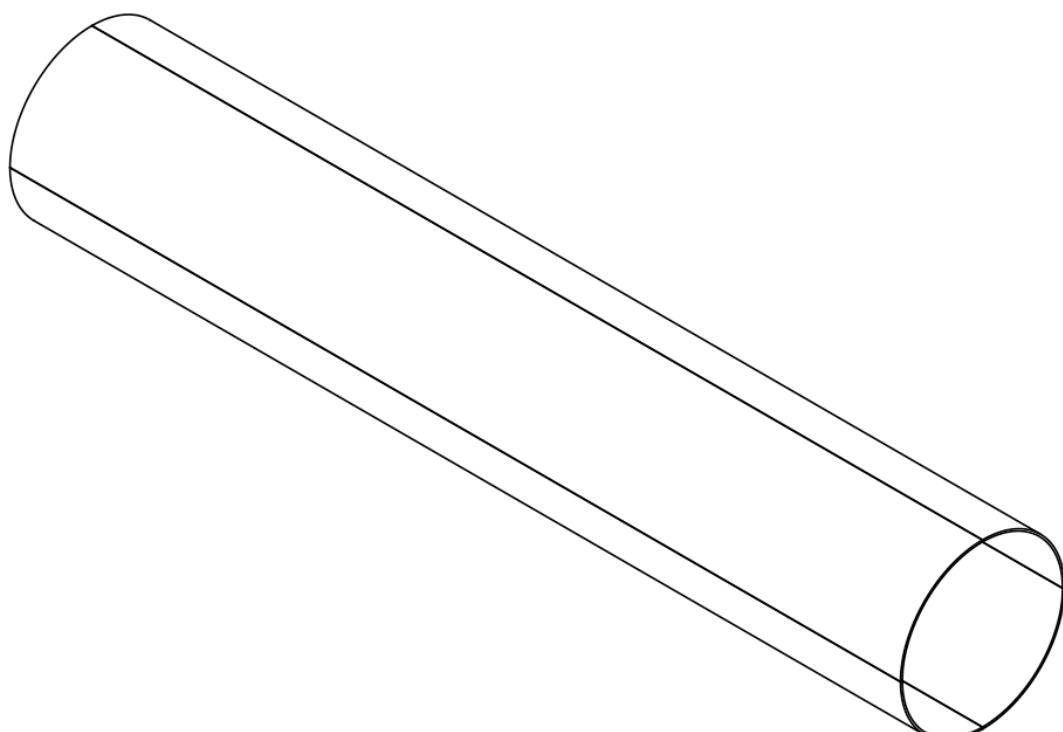
$$280/4 = 72.25\text{mm}$$



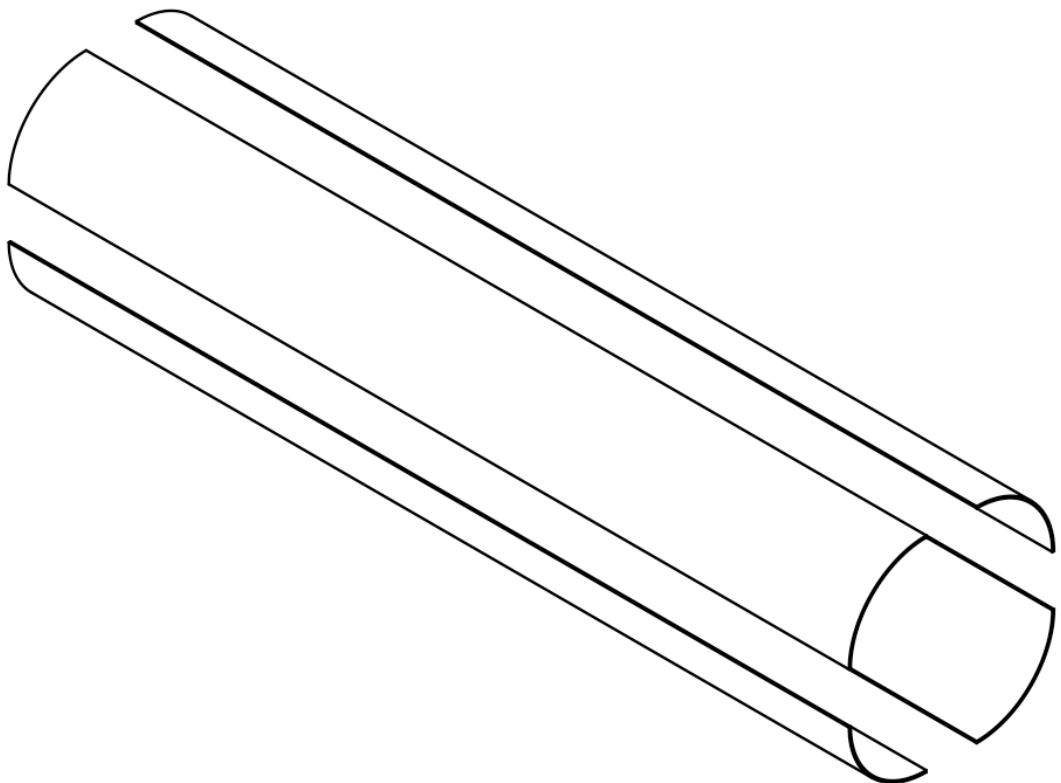
15. Wrap the paper back around the pipe and make sure the edges line up



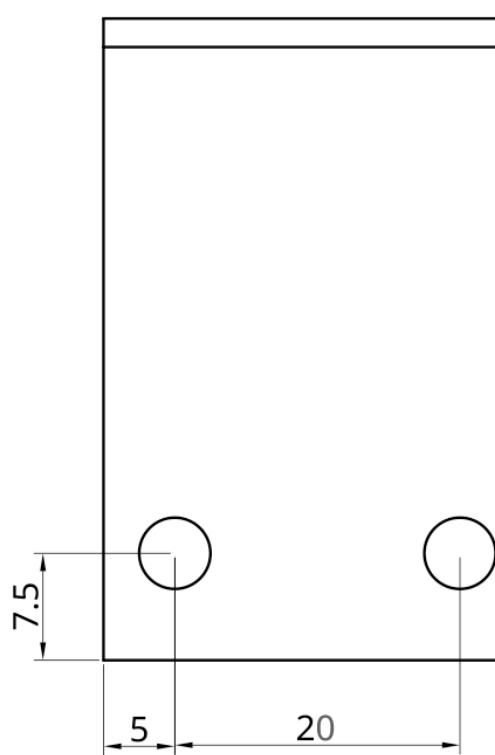
16. Use the paper to carefully mark straight lines down the entire length of the pipe.



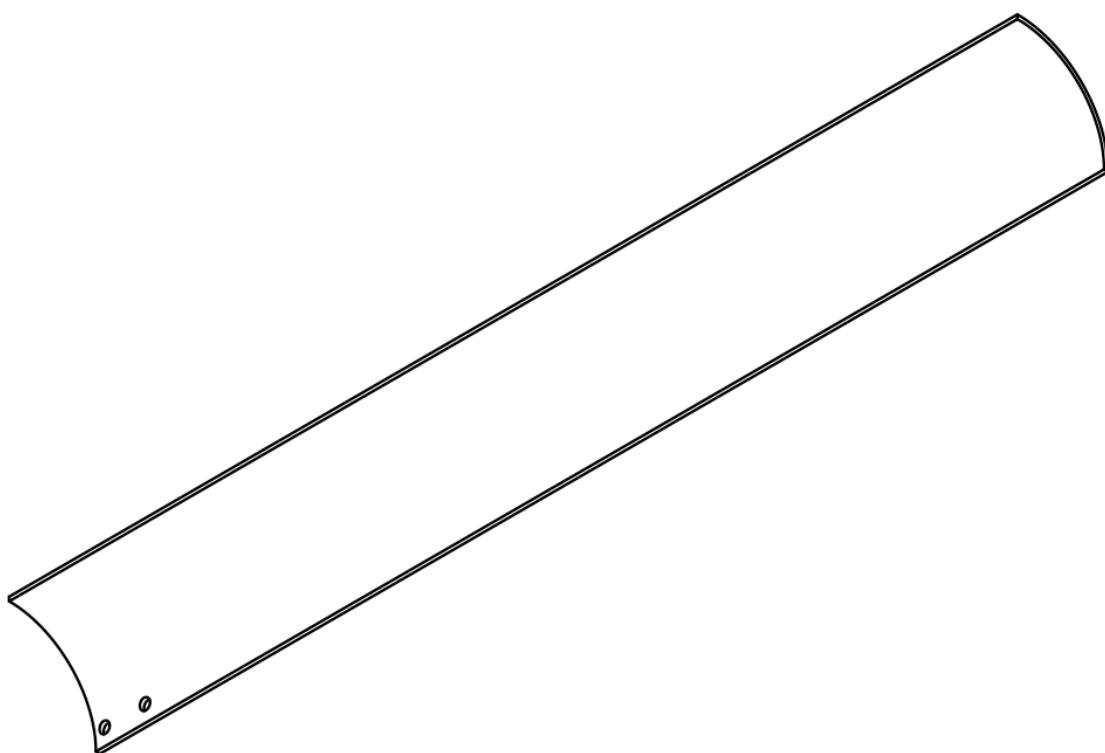
17. Cut the pipe into quarters using the lines you marked out.



18. Drill two 5mm holes in each quarter as shown, 10mm away from the edge:



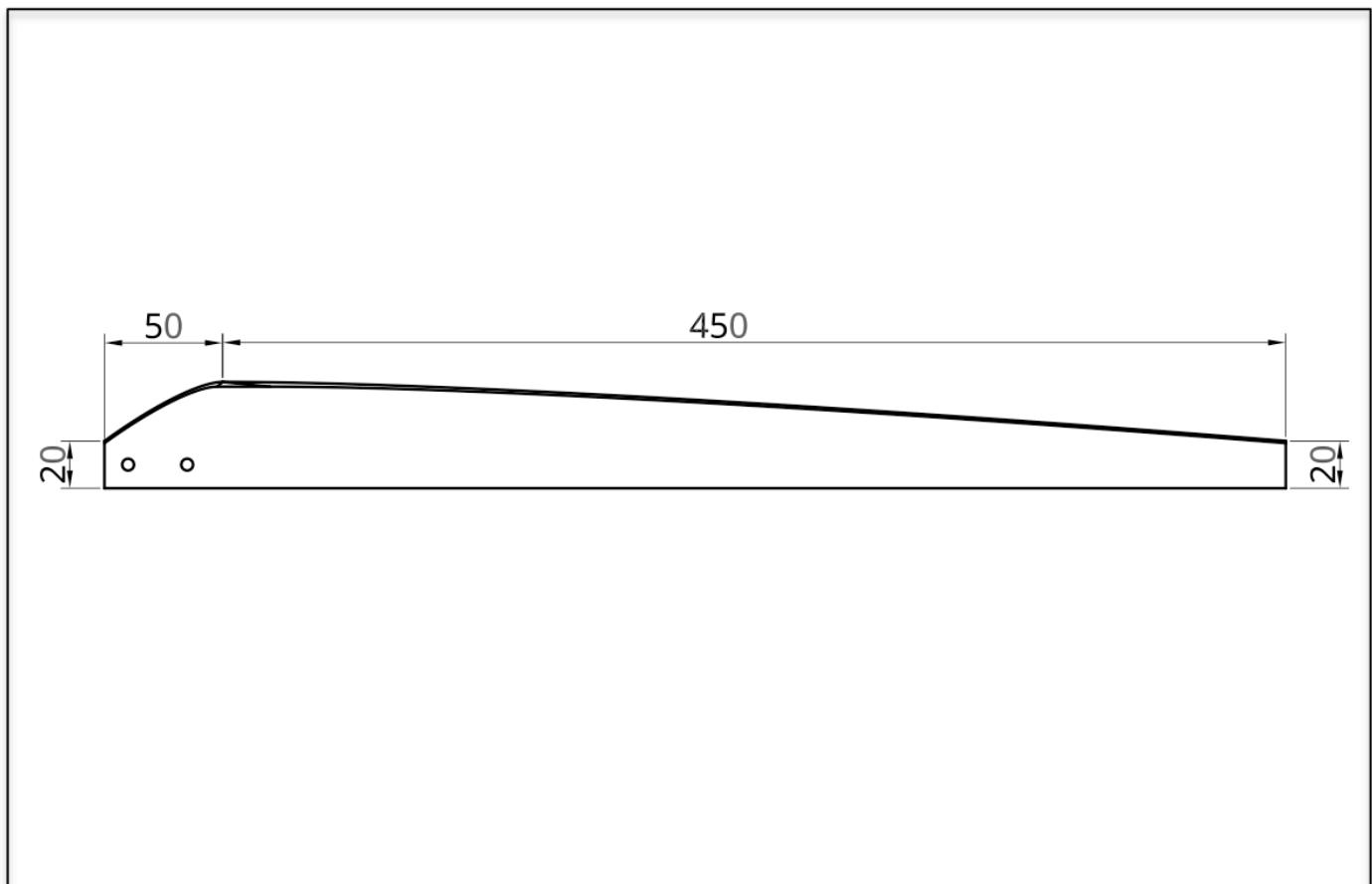
19. The way you cut your blades will determine which direction the turbine spins. Make sure that each blade is the same way around.



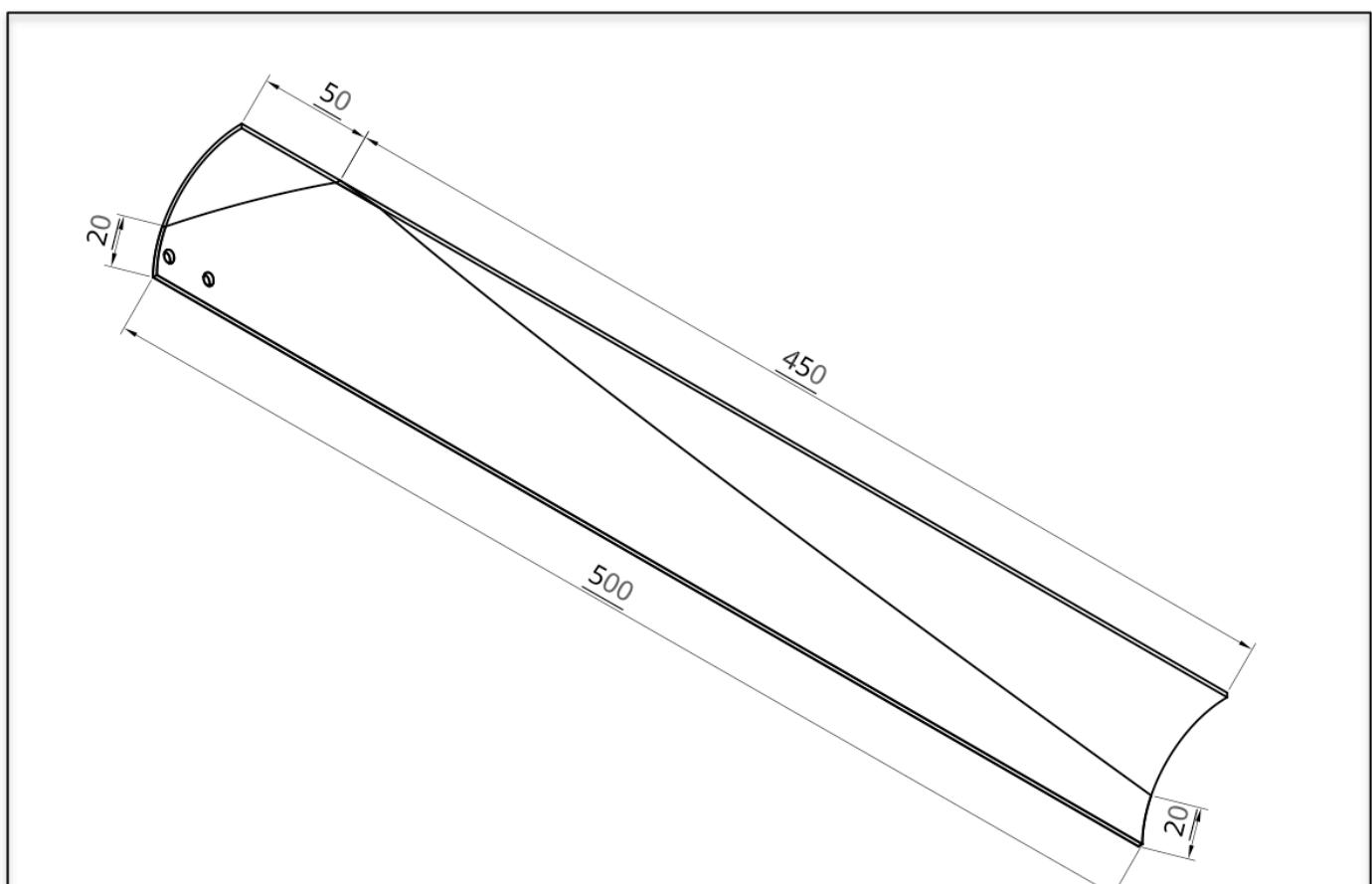
20. To shape the blades, measure and cut the PVC as shown:



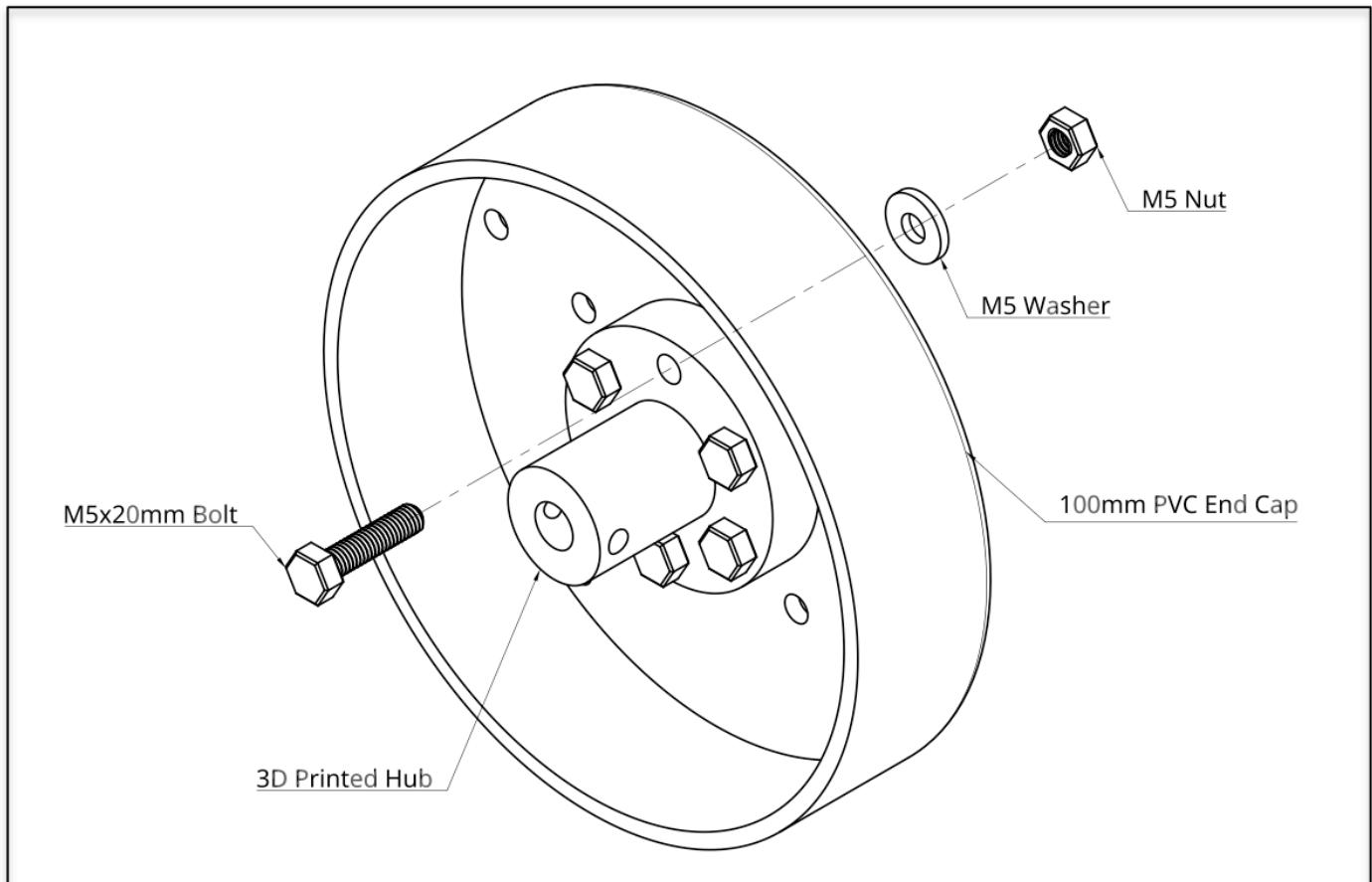
21. Make another cut to match the following dimensions:



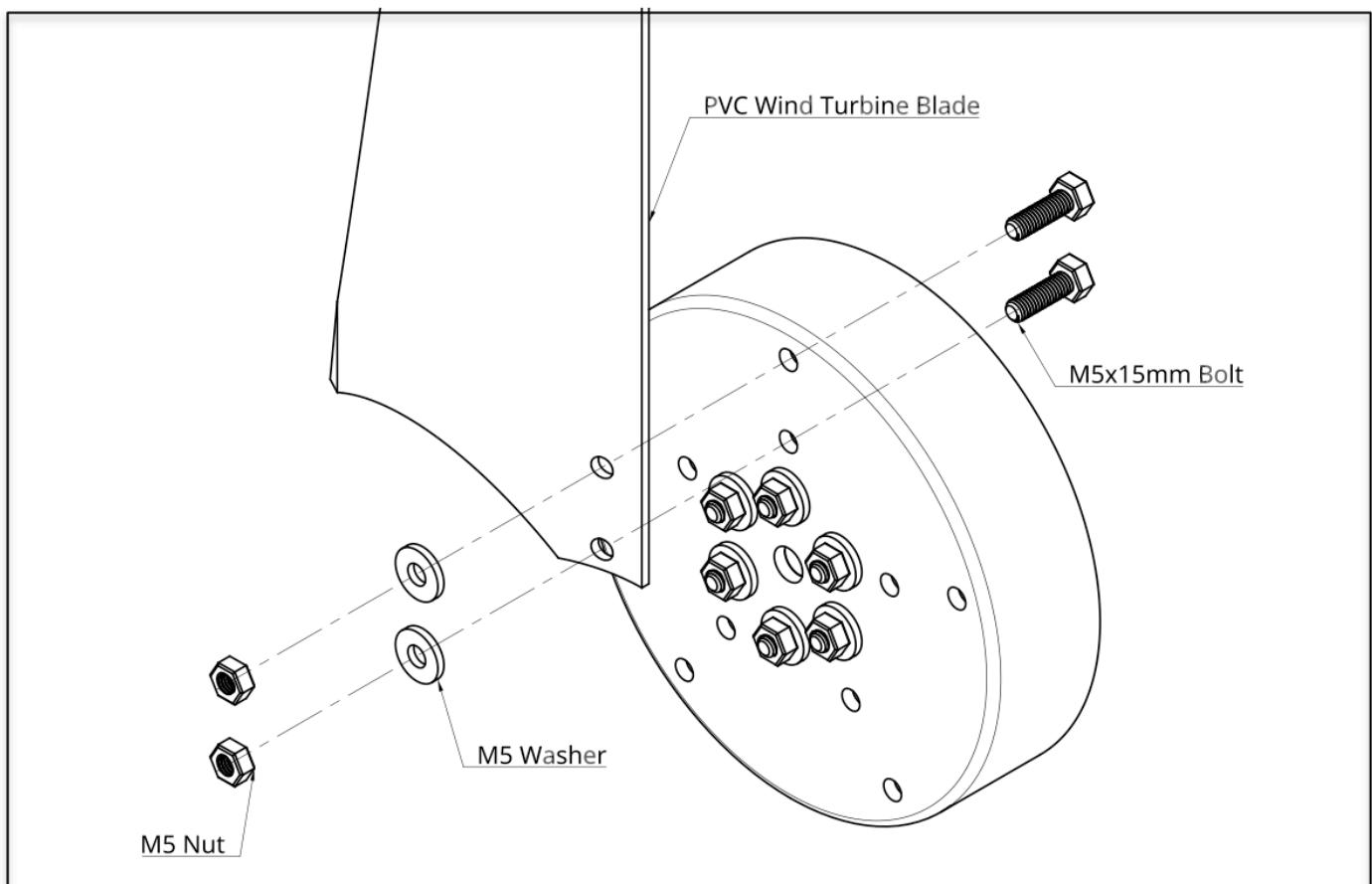
22. Your final blade should look like this. File and sand the edges so they are smooth and each blade is the same shape.



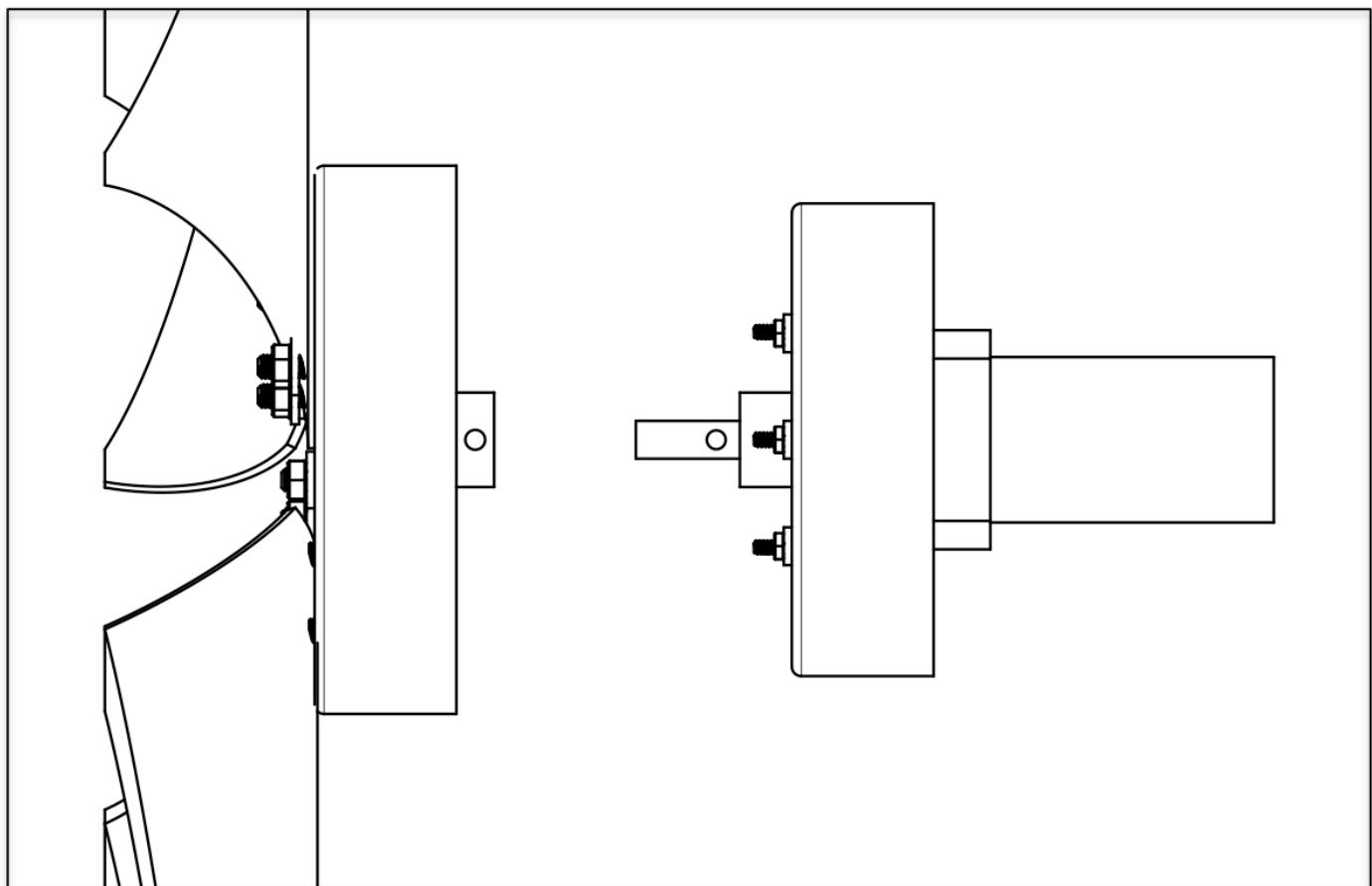
23. Fasten the Motor Hub to the 100mm PVC End Cap using M5 Nuts, Bolts and Washers.



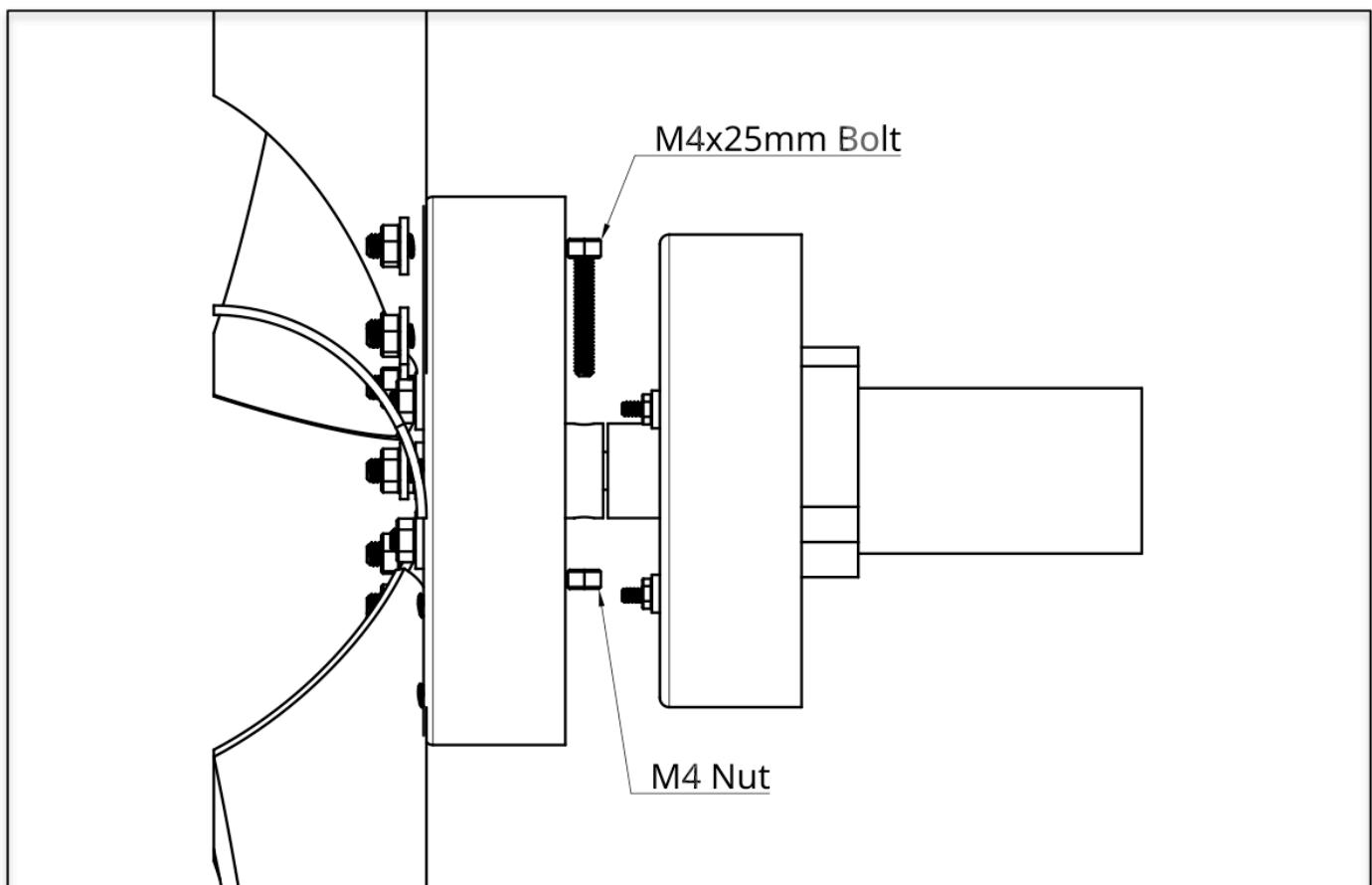
24. Fasten the Blades to the 100mm PVC End Cap using M5 Nuts, Bolts and Washers.



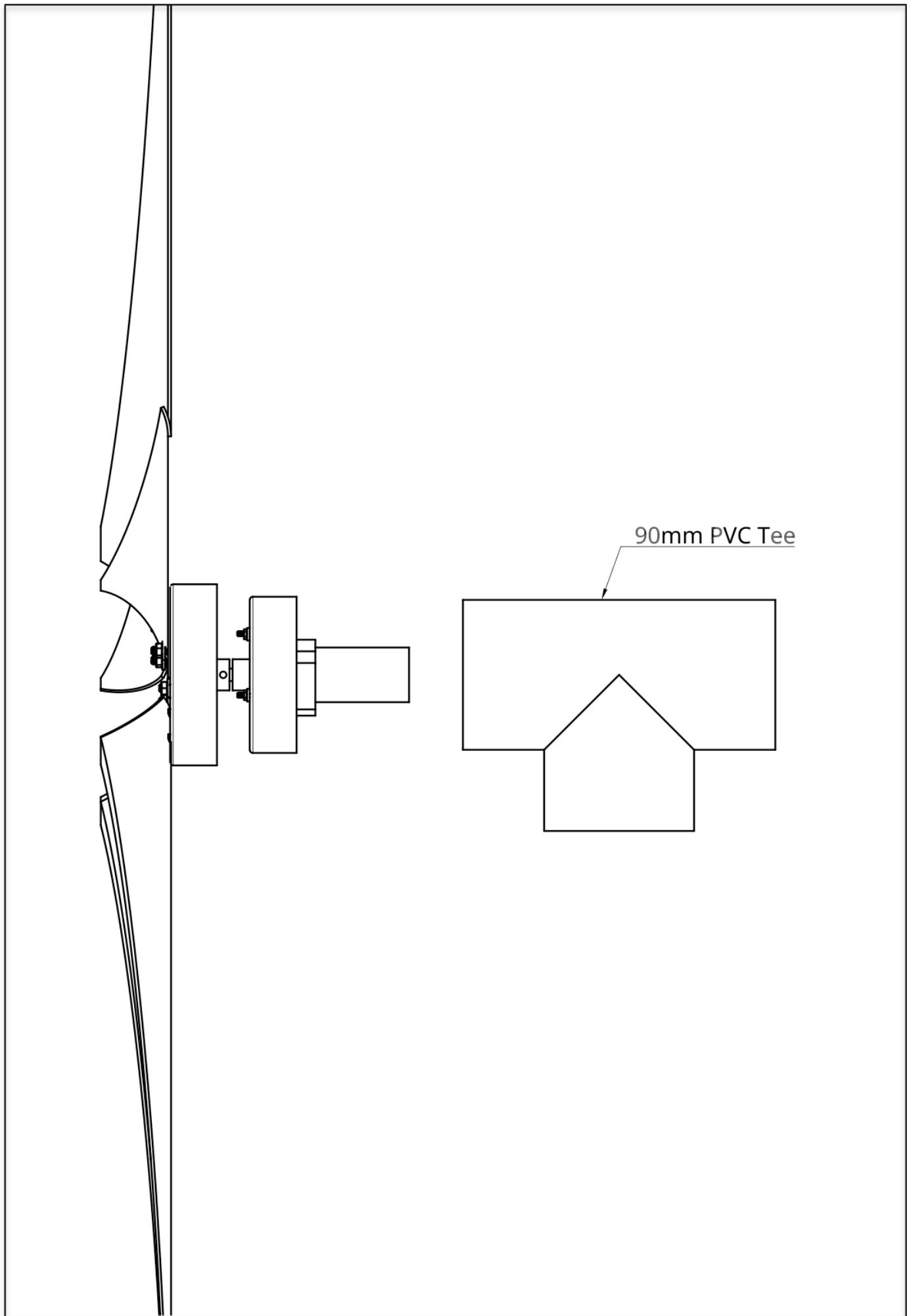
25. Line up the 3D Printed Hub with the Dynamo shaft.



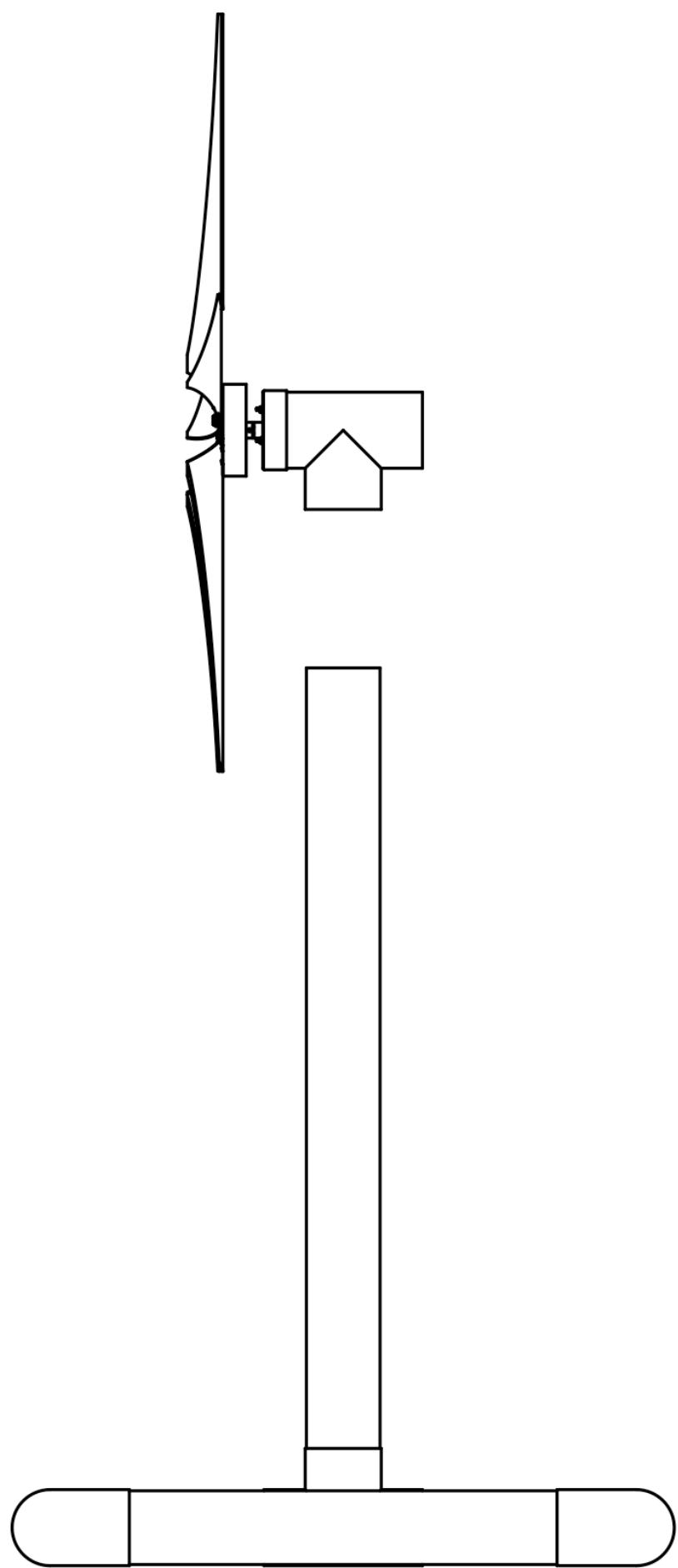
26. Secure the Hub to the shaft using an M4 Nut and Bolt.



27. Insert and fasten the 90mm PVC End Cap to a 90mm PVC Tee.



28. Fasten the 90mm PVC Tee to the Tower and Base you made earlier. Make sure all parts are tight and secure!



29. Congratulations! You have made your first wind turbine!

