



Do It Yourself Air Purifier **Assembly Instructions**

Part 1: Structure



Version 3.1 – 06/07/2026

This document is based on the work carried out by three students from CentraleSupélec engineering school during the 2023-24 school year under the supervision of Professor Pascal Morenton: Clément Bonizec, Alex Martinez and Ismaël Rais. This document was later refined and edited by Designing Accessible Futures Together CIC.

The instructions provided are for guidance only and are an aid to making an air purifier. We invite the reader to adapt them to the means available, the skills that can be mobilized and the security conditions required.

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This document is available here:

Our X account is:

x.com/nousaerons

To talk about this diy air purifier on social media, you can use the following hashtag:

#ladiyap

(Let's Air Do It Yourself Air Purifier)

For more information or any question, please send an email to:

info@letsair.org

daftcic@proton.me

TECHNICAL SPECIFICATIONS

- CADR (Clean Air Delivery Rate): 150 m³/h
- Power consumption: 3W
- Volume (measured at 1m): 38dB
- Dimensions: 37cm (length) x 21cm (width) x 30cm (height)

When to use this filter: This filter will provide some mitigation from allergies, dust and viruses. It does not include a carbon filter as standard. If you need to filter gases or volatile organic compounds (VOC's), you should add a carbon filter.

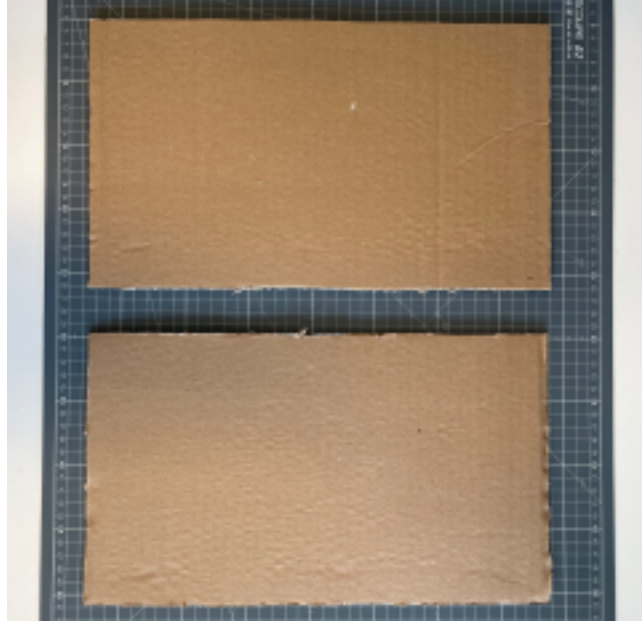
To find the right Air Filter for your space & use case, [use this tool](https://filters.cleanairstars.com/). <https://filters.cleanairstars.com/>

BILL OF MATERIALS & TOOLS

- [2 particle filters IKEA FÖRNUFTIG](#)
- [2 PC fans Artic P14 PWM PWST](#)
- [2 Protective grilles for 140mm fans](#)
- [1 4-Pin PC Fan \(aka PWC\) to DC Power Adapter](#)
- Cardboard (preferably single-fluted for easier cutting, with maximum dimensions of 21x37 cm)
- Standard wide adhesive tape
- Pencil, Ruler, Square, Compass, Scissors
- [Circle Compass](#) and/or protractor/way to measure right angles
- [12V 2A DC Power Supply](#) (to power from mains) **or** [USB 5V to 12V upconverter](#) (for powering from USB port or USB power bank)

STEP 1: FANS PANEL

1) Cut out two 21 x 37cm rectangles from cardboard: these are the ① and ② pieces. Set the ② rectangle aside, we won't cut it out.



2) On the rectangle ①, draw the following 3 segments:
Starting from the middle of one of the two widths (the shorter side), draw a perpendicular segment 10cm long.

Do the same for the other width.
Starting from the middle of one of the two lengths (the longer side), draw a perpendicular segment 1.5cm long.



3) Still on the rectangle ① :

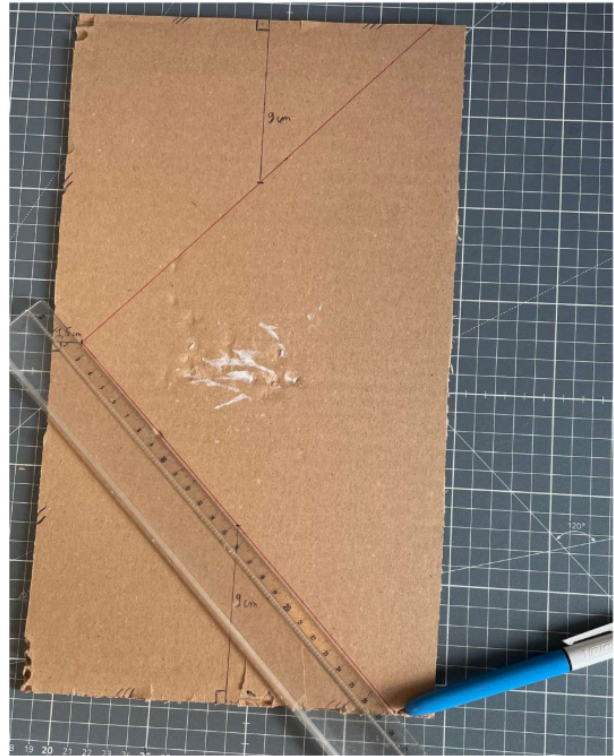
- **Draw a line in red** from the end of the 1.5cm segment to the end of a 10cm segment.

Continue this line to the edge of the cardboard.

(Symmetrically)

- **Do the same**, starting at the end of the 1.5cm segment and going to the end of the other 10cm segment.

Continue this line to the edge of the card.



Now it's time to cut the holes the fans will attach to. There are 2 ways to do this.

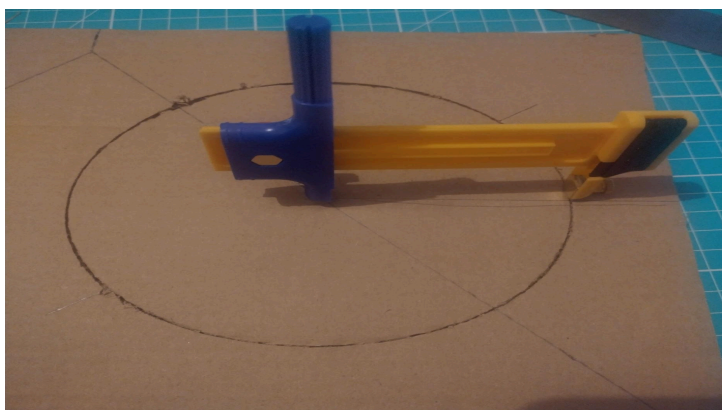
Option #1 - Compass Cutter & Fan Template (Recommended)

4) Still on the rectangle ① :

- **Use your compass cutter** to cut a circle with a 14cm diameter that has the end of a 10cm segment as its centre.

(Symmetrically)

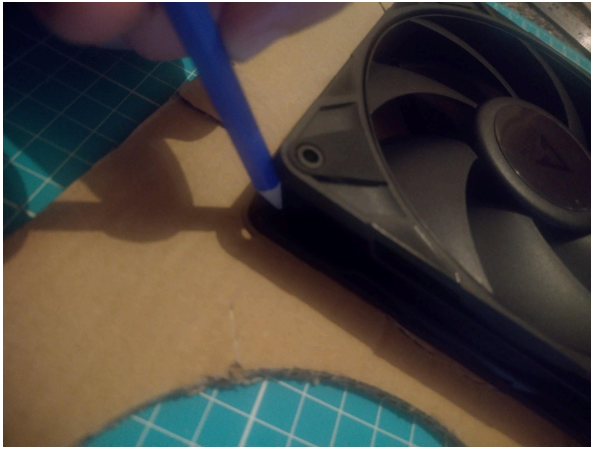
- **Use your compass cutter** to cut a circle with a 14cm diameter that has the end of the other 10cm segment as its centre.



If all goes well, the gap in the middle between the two circles should be around 2-2.5cm.

5) Still on the rectangle ①:

- **Place one of the 140mm fans over the hole you've made.** It should be a snug fit. Then, use a pencil, pen or sharp tool to make a mark in the screw holes at **all 4 corners**.

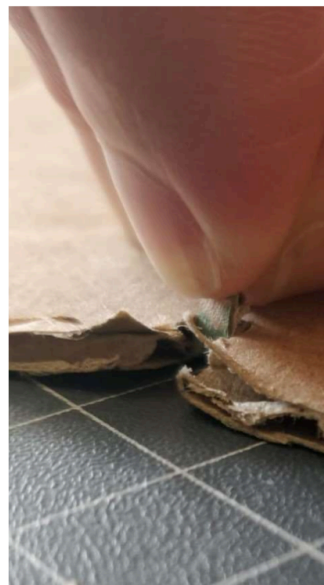


Then, draw a straight line from this point to the edge of the cut-out circle.

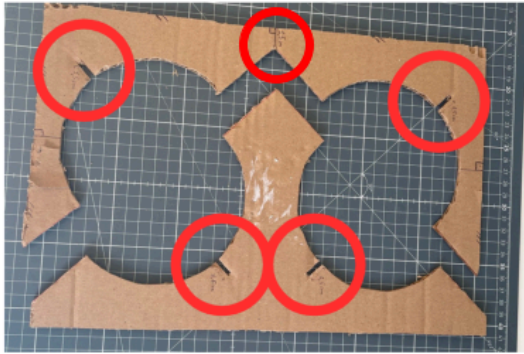
If all goes well, the line should be 1.5cm long.

6) Using the **1.5cm segments** on the edges of the circle, cut **2mm thick slots**.

Technique for making the slits: make small cuts 1mm to the left and 1mm to the right of the line, then tear the tab by hand.



7) Still on the rectangle ①:



- Cut along the remaining diagonal red lines from step 3)

!! Do not cut further than the end of the 1.5cm segment!
There should only be two pieces of cardboard.

Instructions for Option #1 continue from step 8

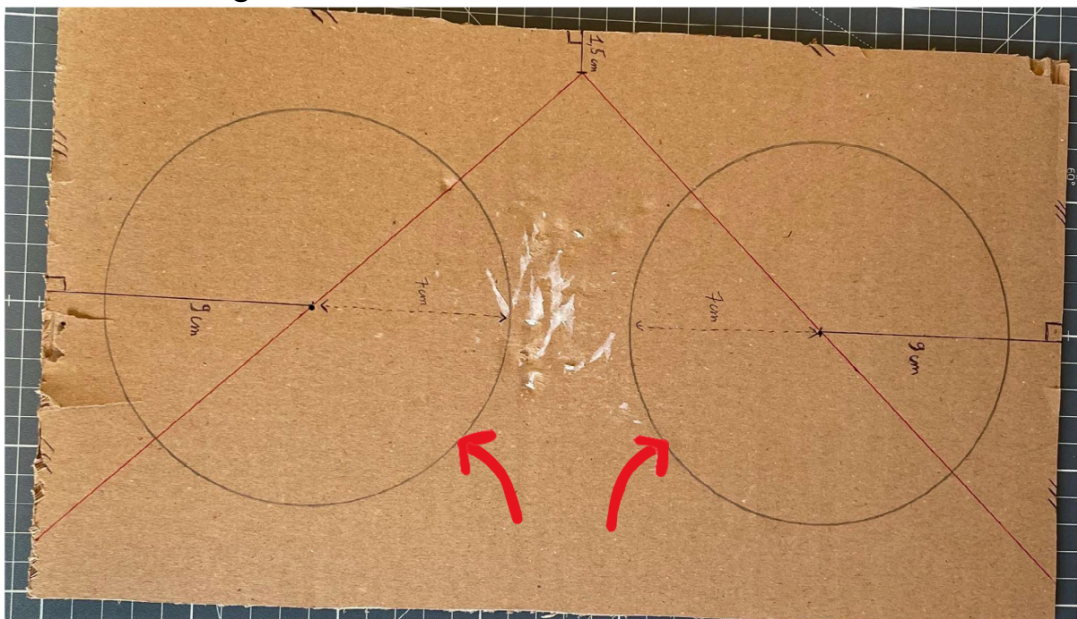
Option #2 - Measuring & Angles

4) Still on the rectangle ① :

- **Draw a red circle** with a radius of 7cm that has the end of a 10cm segment as its centre.

(Symmetrically)

- **Draw a red circle** with a radius of 7cm whose centre is the end of the other 10cm segment.



If all goes well, the gap in the middle between the two circles should be around 2-2.5cm.

5) Still on the rectangle ① :

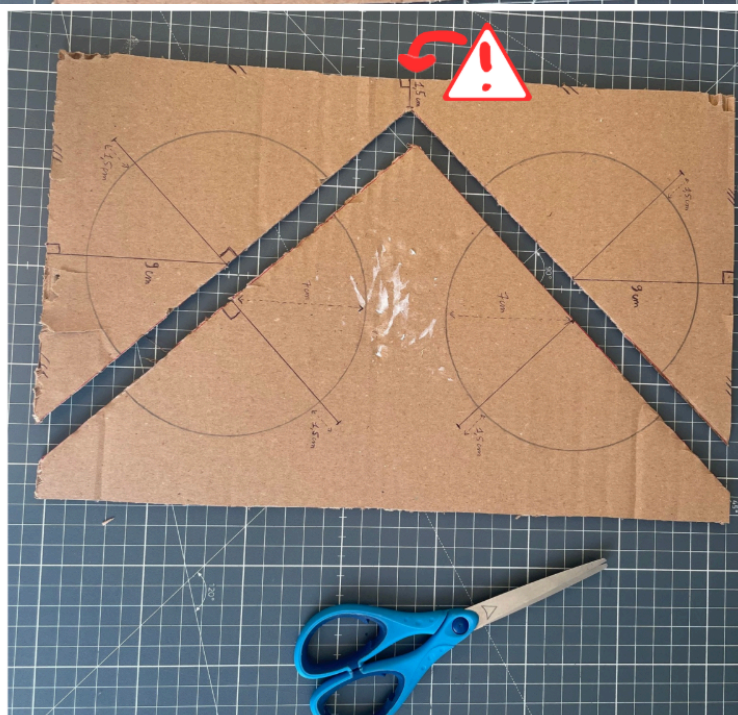
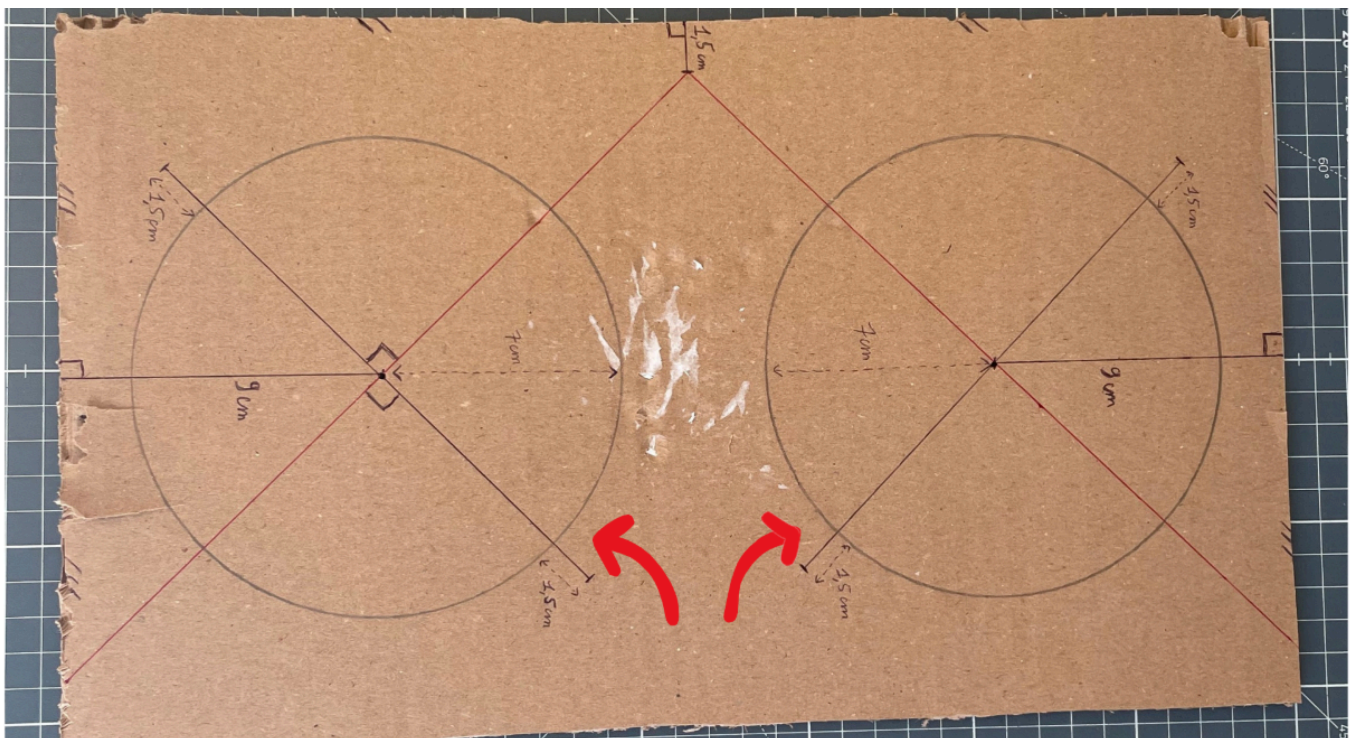
Draw a red segment that passes through the centre of the circle, **perpendicular** to the red line drawn in step 3).

The segment should "protrude" 1.5cm either side of the circle.

If all goes well, the segment is 17cm long and passes through the centre of the circle.

(Symmetrically)

Do the same with the other circle.



6) Using the rectangle ①:

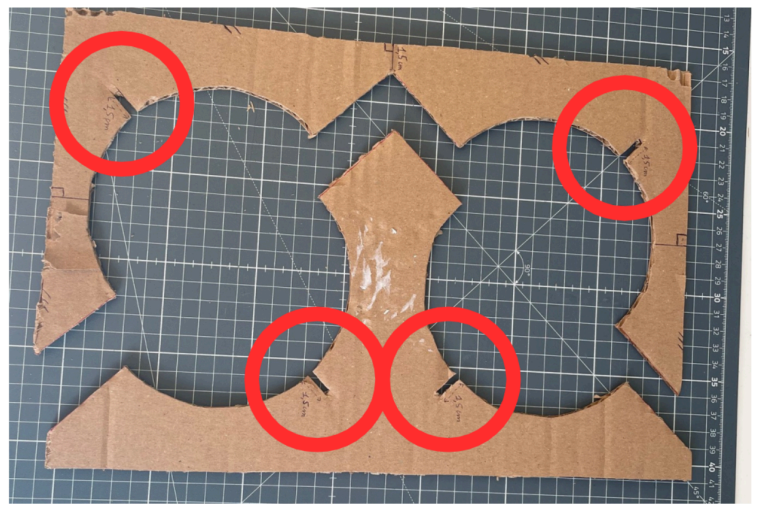
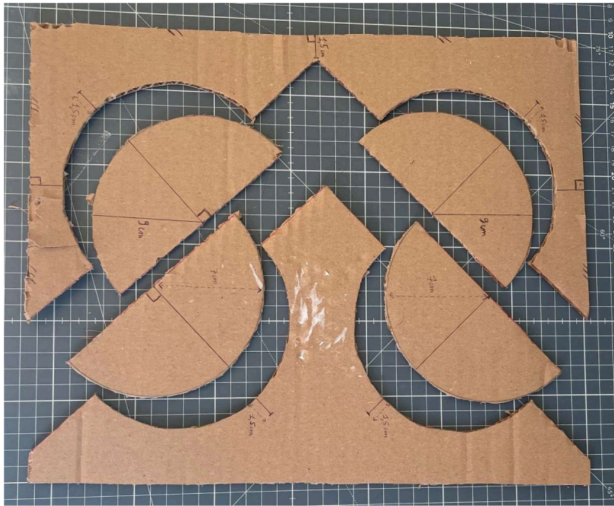
- Cut along the red segments from step 3)

!! Do not cut further than the end of the 1.5cm segment!

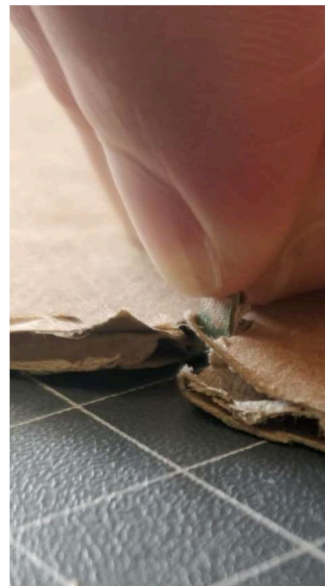
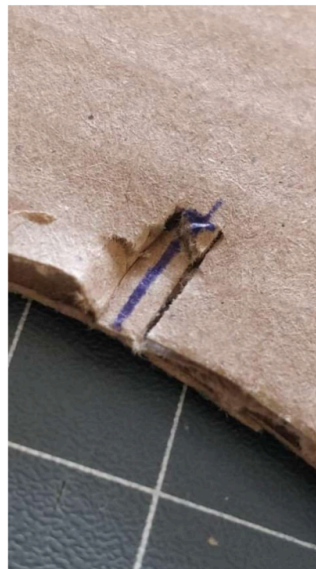
There should only be two pieces of cardboard.

7) Using the pieces cut out in this way:

- Cut out the **outer edges of the semi-circles**. The half-circle pieces will be discarded, as it is the outer part that will be kept.
- Using the **1.5cm segments** on the edges of the half circles, cut **2mm thick slots**.



Technique for making the slits: make small cuts 1mm to the left and 1mm to the right of the line, then tear the tab by hand.



8) Insert the fans into the slots in the central triangular piece.

- The side with the white logo (or holographic sticker) **must** face upwards (or you will blow air the wrong way)

!!\Make sure the wires exit at the centre point!

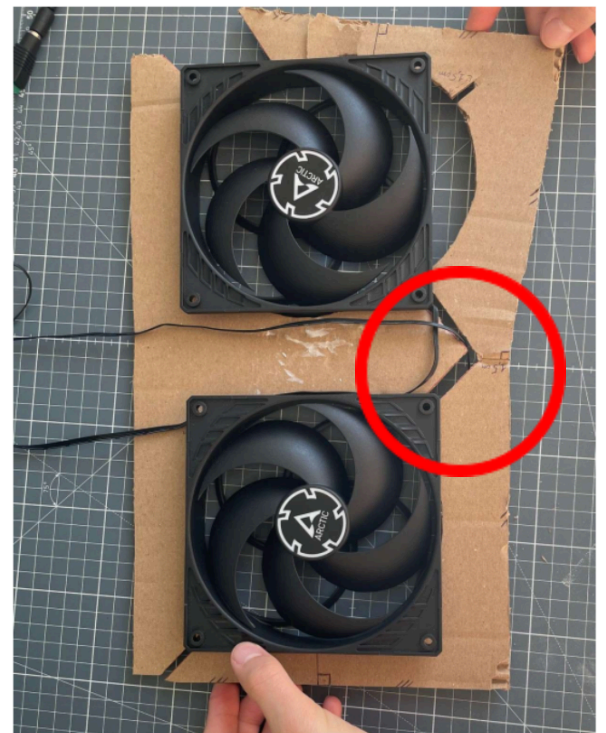


9) Add the other part of the cardboard, inserting the fans into the slots.

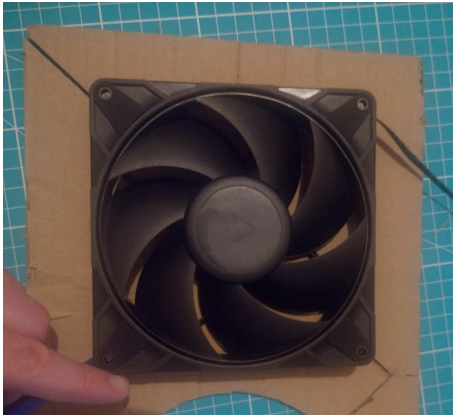
You may need to fold the cardboard a little, but be careful not to tear it.

NB: The 1.5cm bridge is extremely delicate at this point. If it's already bending or tearing, wrap some tape around it. You may want to add a small bit of cardboard to reinforce it.

You may be able to repair a small tear this way. **But if your repair fails, you will need to start over.**



!!Make sure that the wires exit from the white logo side of the fans.
Note: Newer P14's may have a holographic sticker instead of the white logo.
Make sure the wires exit from this side.



The reverse side will still appear black & flat, as in the below images.

10) Place a **10cm** piece of tape on the middle point.

Make sure it sticks to both pieces of card.

If it sticks out a little on the outside, fold over the excess.

!!The threads should come out on the side with the white logos, towards the centre of the card.

- Turn the assembly over and repeat the operation at the centre



11) Cut pieces of tape about 10cm long. On the corners:

- Place 5cm of the tape on the edge, so that it protrudes across the width of the rectangle.
- Fold the protruding part over to the other side of the assembly: this way the piece of tape goes around the corner.
- Do the same for the other corner.

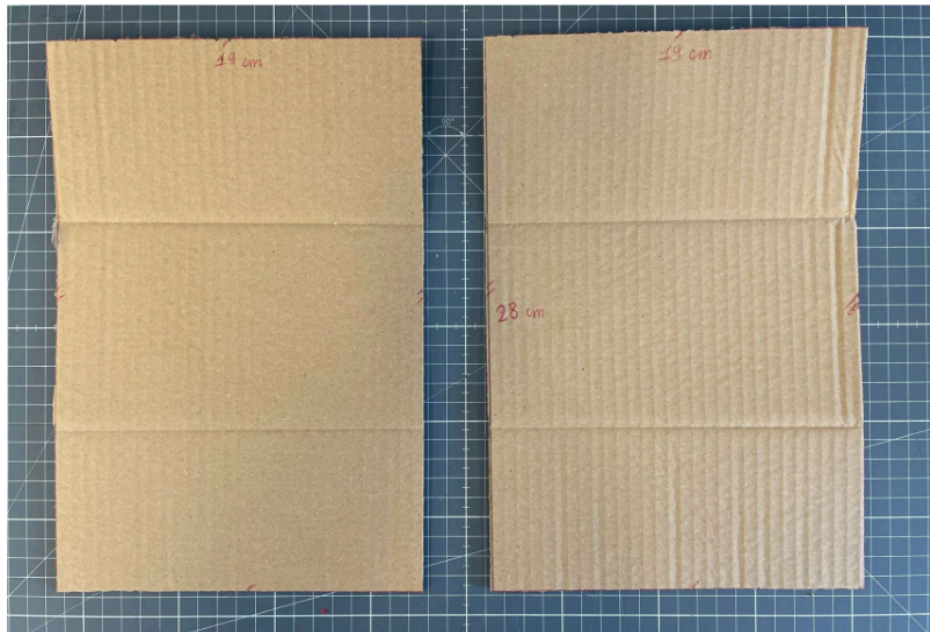


This assembly should now be able to support both fans, if not repeat this step.

STEP 2: SIDE PANELS

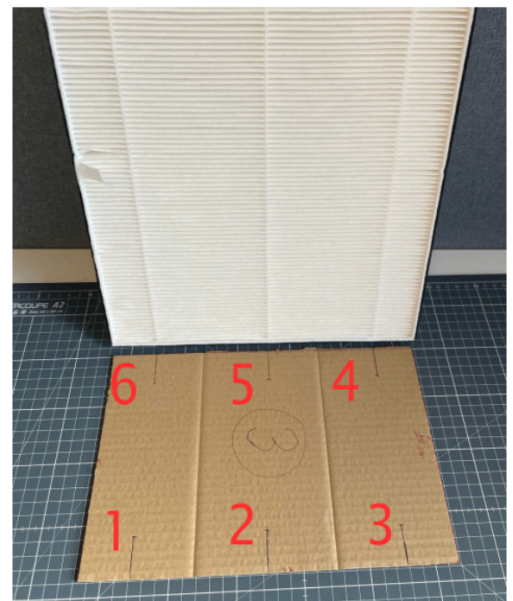
NB: The images below are from the similar Starkvind Build. Don't worry if your filter or cardboard panels look like a slightly different shape to below - the procedure is the same and the instructions are correct.

1) Cut out two **19 x 21cm** rectangles from cardboard. These are the ③ rectangles.



2) Take one of the pieces ③

- Present its length (21cm side) at the level of the width of a filter and draw **lines about 1.5cm** perpendicular to the edge at the level of the three crosspieces .
- Carry out the same operation on the other width of the piece



4) Cut successively:

- **Slots about 0.3 cm thick and 1.5 cm long** on the lines in step 10)
- The **corners** of the slots and edges to facilitate insertion into the filters

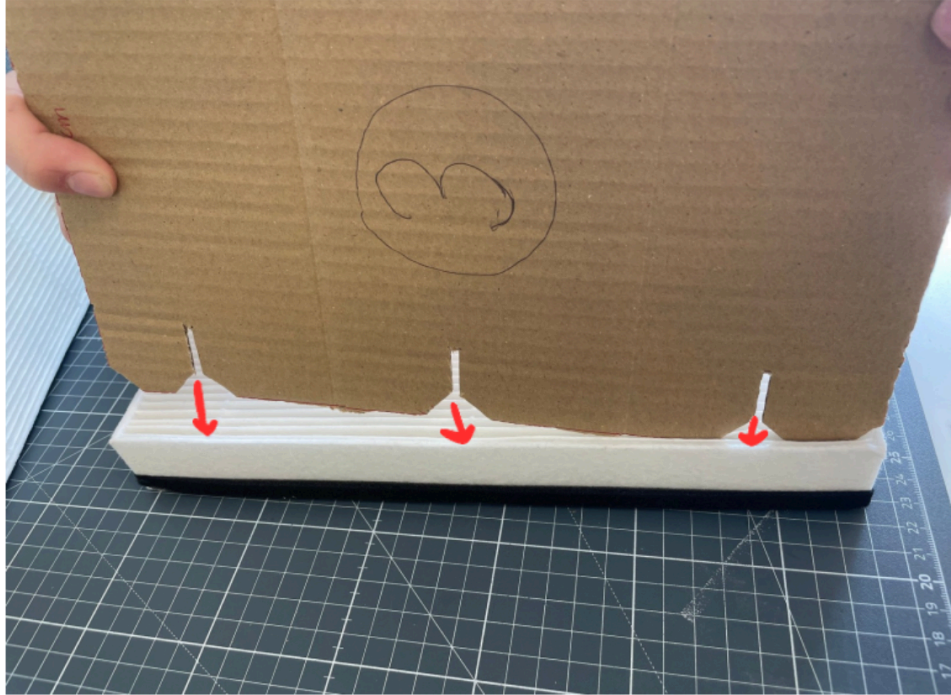


The two identical parts below are obtained

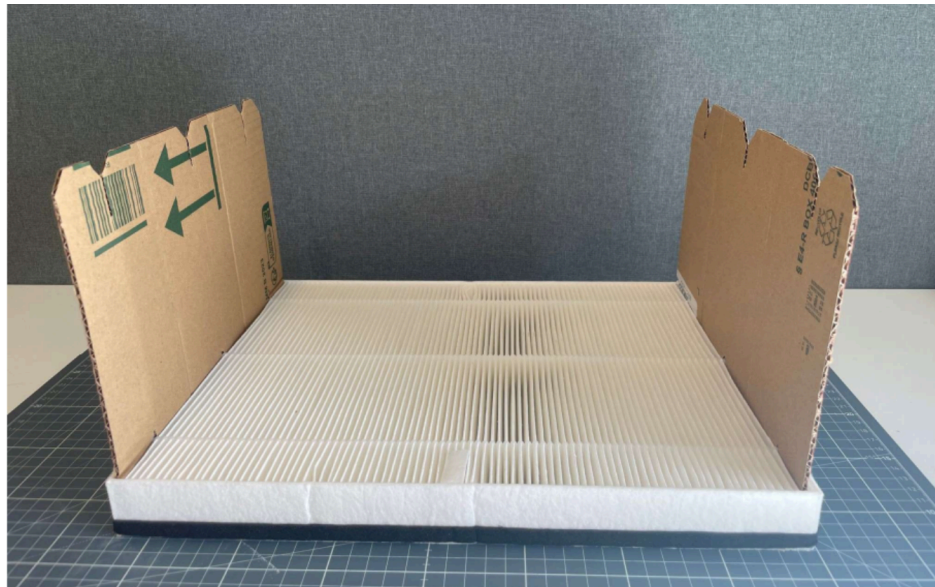


STEP 3: ASSEMBLING THE “BOX”

1) Insert the length of part ③ into the **second to last slot** of the filter.
The previously cut slots fit together with the three crosspieces of the filter.

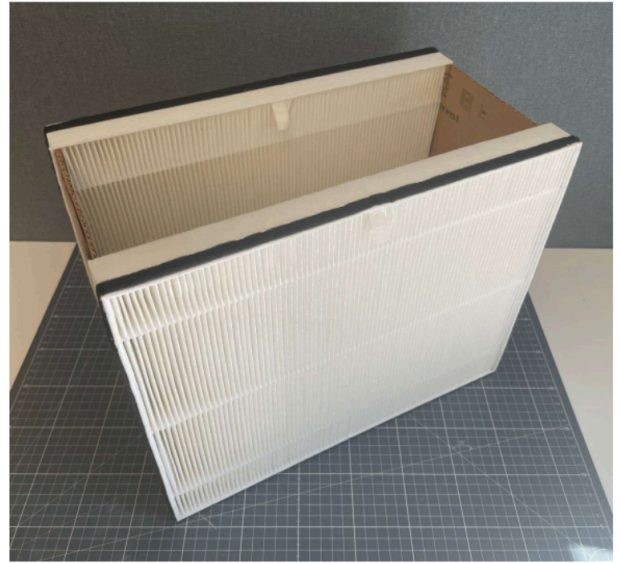
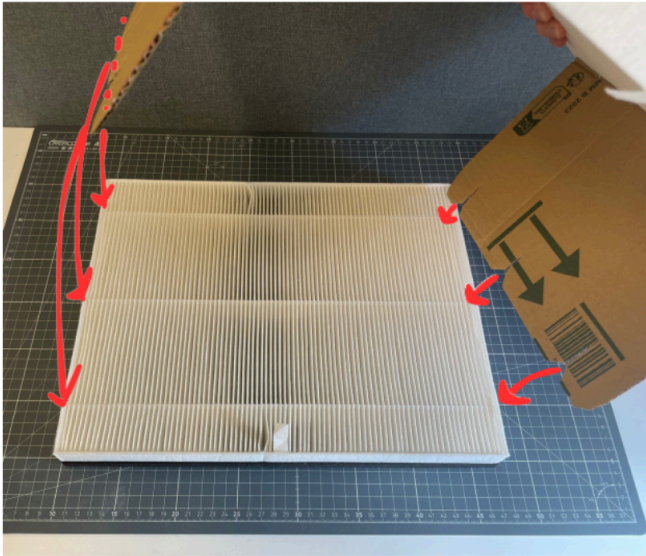


2) Insert the length of the second part ③ into the same filter using the same method as in step 1).

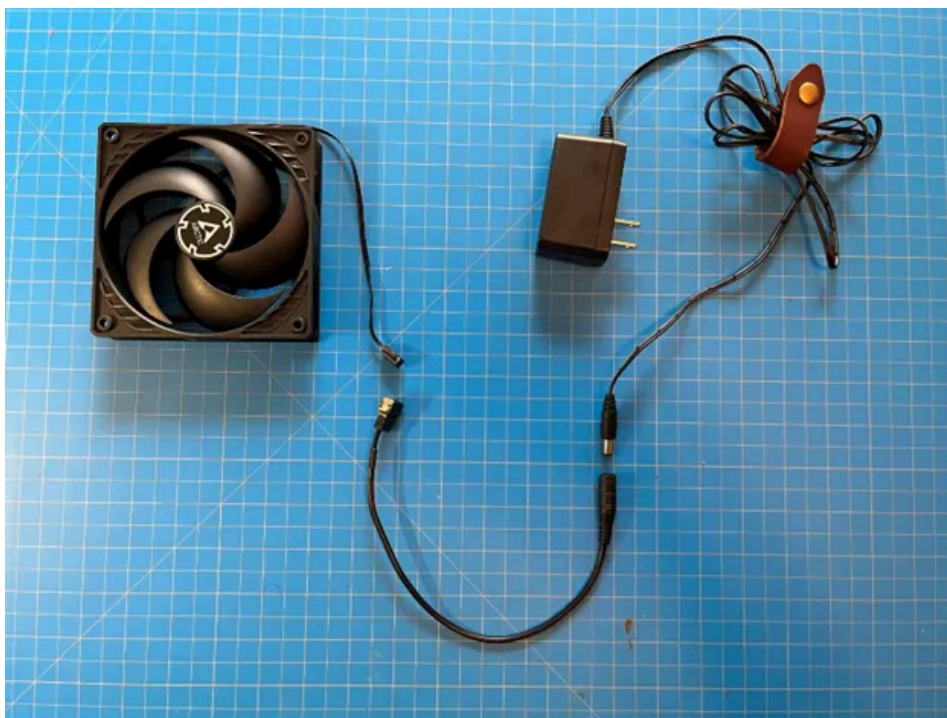


*Don't hesitate to trim corners a little more or widen slots if inserting parts ③ is difficult.
Be careful not to bend the cardboard.*

3) Present the **second filter** and insert the two free cardboard ends into the filter using the method in step 1).



4) Attach the adapter of your choice to the fans on ① piece (either the 4-pin PC Fan to DC or USB-C). Then connect the DC/USB-C power supply. This is the **electrical system**.



NB: Image taken from Bob Kirman's excellent article - [Untangling the Electronics in a PC Fan Air Purifier](#). If you are interested in other DIY builds, this article does a great job explaining what adapters you might need

5) Place the **electrical system inside the box**, then place the ① on top, making sure that the white/holographic part of the fans are hidden in the box (the black part should be facing you).



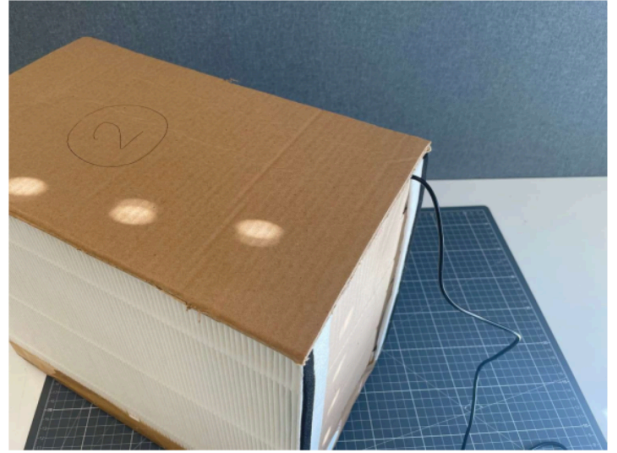
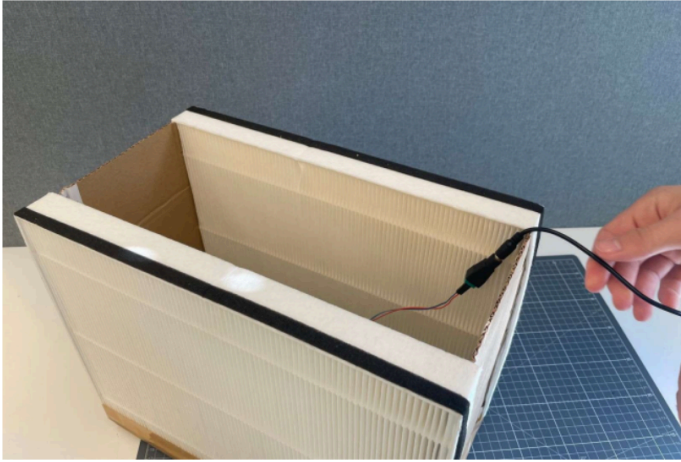
6) Tape the top of the purifier all the way round, leaving half the tape sticking out, as shown in the photos.
Fold the sides over, starting with the shorter edges.



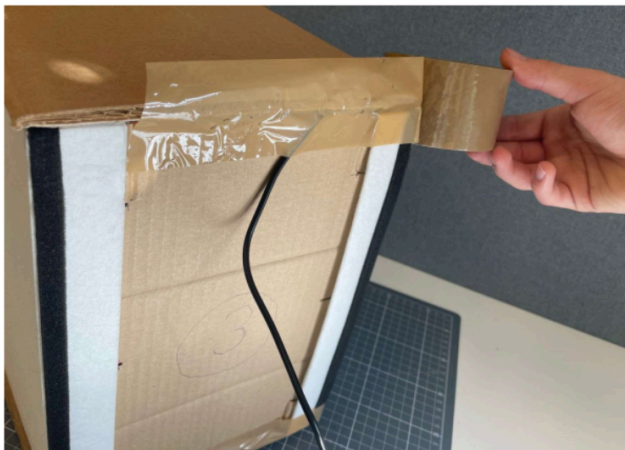
7) Turn the assembly over.

Bring out the supply wire on the side as shown in the photo (the last connection must be on the inside).

Place part ② on top of the assembly)



8) Tape the bottom of the purifier, starting with the wire, using the same method as in step 5).





Congratulations, the box is fully done!

To use it, simply plug it in. Make sure you leave it with the fans pointing upwards, with nothing on top.