

DIY a Dry Heat Sterilizer for Protective Masks

Dry heating is the simplest effective method to sterilize protective masks. Properly heated, at 70°C to 90°C for 30 to 60 minutes, the masks can be safely reused for at least **20 times!** A single unit can serve a family, sterilizing hundreds of masks monthly.

In addition to the **money saved** for buying new masks, you will also **protect the environment** from a lot of used masks.

You can DIY one sterilizer in about **20 minutes**, using only usual materials and components:

- A cardboard box, 300 mm x 230 mm x 50 mm external dimensions (or close to these), made by 3 layers corrugated cardboard.
We use self-forming boxes. (Figure 1)
- A piece of two layers cardboard, 250 mm x 400 mm, folded at the middle. (Figure 2).
- Enameled copper wire (coil wire), 14 m length, 0.25 mm diameter.
- Two pieces of insulated wires, 25 cm long and minimum 0.35 mm² section.
- A terminal block connector for 10 A, with two paths, or a DC jack socket. (Figure 3)
- Two M3 x 20 mm screws, with nuts and washers – if you use a terminal block connector.
- A piece of three layers corrugated cardboard, 260 mm x 430 mm, folded at the middle. (Figure 4)
- A piece of thin cardboard, 260 mm x 1000 mm, folded at the middle. (Figure 5)



Figure 1

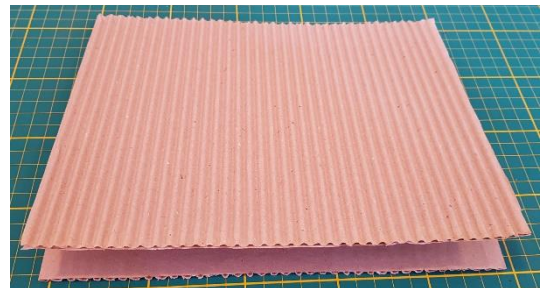


Figure 2

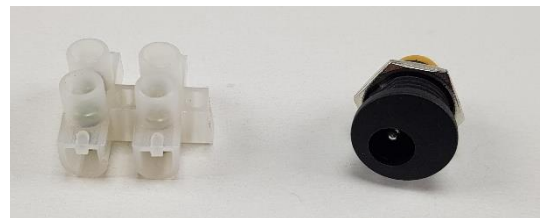


Figure 3. Connectors variants.




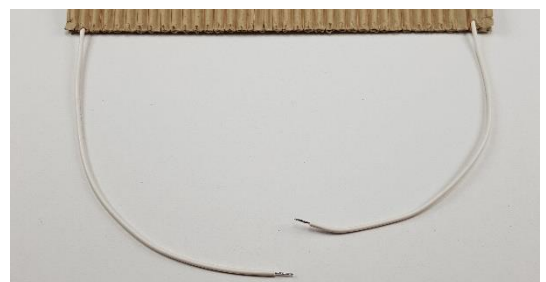
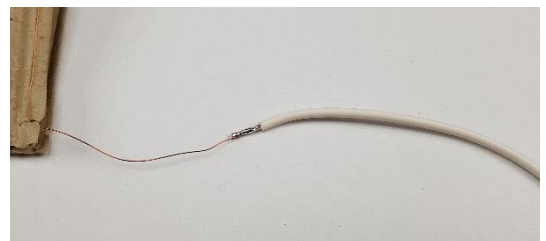
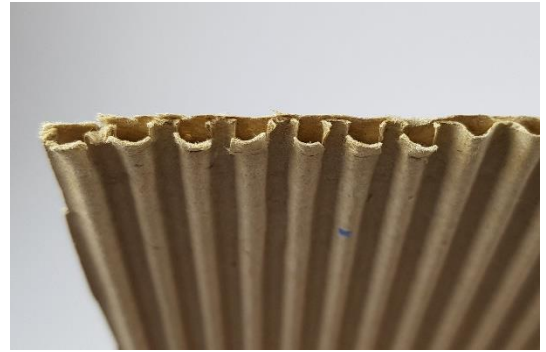
Figure 4. Three-layer cardboard piece, folded in half.



Figure 5. Thin cardboard piece, folded in half.

To make a dry heat sterilizer, follow these steps:

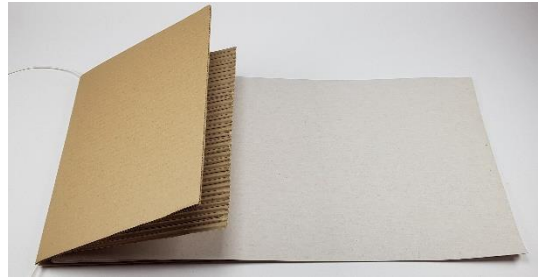
- 1.** The coil wire will serve as heating resistance. For uniform heating, the wire must be laid around the corrugation of the two-layer cardboard. To firmly anchor the wire, make 1 to 2 mm small cuts at the ends of the corrugation.
- 2.** Make small holes in the middle of the either long side and lay the wire in a zigzag pattern. Start at the middle of one long side and finish at the middle of the opposite long side.
- 3.** Trim the excess wire, leaving only about 5 cm at either end. The heater is ready!
- 4.** Using sandpaper, scrap the enamel for about 2 cm at either end of the wire.
 **Be careful, the wire is fragile!**
If you have a multimeter, check the resistance of the wire. It should be around 5 Ω .
- 5.** Solder the thick wires at the ends of the thin wire.
- 6.** Insert the soldered connections in corrugations, to protect the thin wire.



7. Mount the terminal block at the rear of the box.



8. Fold together the thin cardboard, the heater and the tree-layer cardboard.



9. Fold the thin cardboard to keep all the pieces together.




10. Connect the wires into the terminal block.




The sterilizer is ready to be used!

➤ Put inside up to three masks to be sterilized.

 **Don't forget to wash your hands thoroughly after you touched unsterilized masks!**

➤ Close the box and apply at the terminal block 12 V, **stabilized!**

 **The power source must be stabilized to maintain desired internal temperature!**

The unit will absorb at start about 2.4 A.

 **The power source must be capable of minimum 3 A!**

 **Insert a 3 A fuse if the power source is not self-protected!**

➤ Set on your phone a temporizer for **60 minutes**.

➤ When the time is up, you have **three sterile masks**, ready to be reused!

