

# Smoke, Fume, Particulate Extractor



DC3d

[VIEW IN BROWSER](#)

updated 21. 4. 2024 | published 21. 4. 2024

## Summary

Two sizes for low cost options to remove smoke, VOCs, and small particulates from workspace.

[Hobby & Makers](#) > [Tools](#)

Tags: [modular](#) [safety](#) [vacuum](#) [welding](#) [dustcollector](#)  
[laserengraver](#) [airquality](#) [shopvacuum](#) [flexiblehose](#) [shp](#)

This project started with a desire for a low cost, but effective smoke extractor for my laser engraver and then took on a life of its own. These could be used for a variety of filtration needs including soldering, welding, particulate and/or VOC capture.

- Uses commercial off-the-shelf HEPA/activated carbon filters that cost less than \$10 each
- Can use a variety of mechanisms to move air, including shop vacuums, 120mm fans, inline duct fans eg, [[https://www.amazon.com/dp/B0CFDKFYW3/?coliid=I2QCBW6S8N84LM&colid=2KK1UIAIKMCLC&psc=1&ref\\_=cm\\_sw\\_r\\_cp\\_ud\\_ls](https://www.amazon.com/dp/B0CFDKFYW3/?coliid=I2QCBW6S8N84LM&colid=2KK1UIAIKMCLC&psc=1&ref_=cm_sw_r_cp_ud_ls)] and dust collectors.
- Filters can be stacked (up to 3 in the small box and 4 in the large) to improve filtration but with a resultant increased demand in static pressure requirements.

- Various connectors are included that should meet most needs including various duct and hose sizes, and popular 3d printed segmented flexible tubing (TeslaPunk or Hornberger). <https://www.printables.com/model/107125-flexible-segmented-vacuum-hose-40mm-fits-dn40-pipe> <https://www.printables.com/model/22486-flexible-segmented-hose-75mm>
- All connectors attach using a 120mm fan hole layout using either screws/nuts or screws with heat inserts.
- Filter for small box is a readily available car cabin filter (BW285) [https://www.amazon.com/dp/B07T55BRF3/?coliid=I261VBR9YYR14R&colid=2KK1UIAIKMCLC&psc=1&ref\\_=cm\\_sw\\_r\\_cp\\_ud\\_lst](https://www.amazon.com/dp/B07T55BRF3/?coliid=I261VBR9YYR14R&colid=2KK1UIAIKMCLC&psc=1&ref_=cm_sw_r_cp_ud_lst)
- Filter for large box is from a commercial air purifier (HY4866) [https://www.amazon.com/dp/B0CF1GLSYS/?coliid=IC90R2XNBDE1I&colid=2KK1UIAIKMCLC&psc=1&ref\\_=cm\\_sw\\_r\\_cp\\_ud\\_lstp](https://www.amazon.com/dp/B0CF1GLSYS/?coliid=IC90R2XNBDE1I&colid=2KK1UIAIKMCLC&psc=1&ref_=cm_sw_r_cp_ud_lstp)
- Reversing the filters/air flow and removing the lids (large & small box) and blocking one outlet (small box) these could be used for small, clean-air stations akin to a mini laminar flow hood.
- An activated carbon box is available (holds approx 1lb./455g) that can be added to the small box for additional capture of VOC's
- Use a layer or two of paper towels on top of HEPA filters as a pre-filter

## Model files



**large-box-293x263x290mm.stl**



**large-box-lid-298x268mm.stl**



**small-box-220x204x210mm.stl**



**small-box-lid-inside-fit-220mm.stl**



**small-box-lid-228mm.stl**

---



**125-inch-vacuum.stl**

---



**25-inch-vacuum.stl**

---



**flexi-hose-40mm-teslapunk.stl**

---



**flexi-hose-75-100mm-hornberger.stl**

---



**3-inch-duct.stl**

---



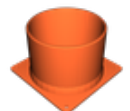
**4-inch-duct.stl**

---



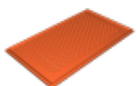
**4-inch-95mm-inline-tube-fan-connector.stl**

---



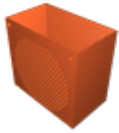
**rockler-dust-right-4-inch.stl**

---



**activated-carbon-box-lid.stl**

---



**activated-carbon-box.stl**

---



**plate-cover.stl**

## License ©

This work is licensed under a  
**Creative Commons (4.0 International License)**



**Attribution-NonCommercial**

---

- ✗ | Sharing without ATTRIBUTION
- ✓ | Remix Culture allowed
- ✗ | Commercial Use
- ✗ | Free Cultural Works
- ✗ | Meets Open Definition