



## Calaveras County Air Pollution Control District

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If portable air cleaners are not available during an event when there are elevated smoky conditions, a temporary air purifier can be assembled to help reduce smoke exposure.

Use with caution:

- Do not leave unattended
- Turn off while sleeping
- Replace filter as needed
- Use a 2012 or newer fan as those have improved safety features


Local hardware stores carry 20" x 20" MERV 13 filters for about \$25. The MERV rating is found on the cardboard casing of the filter itself. A common brand is *Filtrete*. The *Filtrete* rating system should say 1900 or higher on their packaging. Tape the filter on to the back of the fan with the air direction arrow pointing towards the fan. The fan should pull the air through the filter and blow clean air out of the front of the fan. Be sure to tape over any gaps between the filter and the fan so air cannot go around the filter.

### DIY Temporary/Improvised Air Purifier

#### Materials



20 x 20" air filter  
(MERV rating 13 or higher)




20 x 20" box fan



Duct tape

#### Assembly

Duct tape the air filter to the back of the box fan.  
Check the filter for the direction of the air flow (marked on the sides of the filter).



A box fan single filter purifier is large enough to reduce smoke in an average room as long as the doors, windows, and any outside air vents are closed. For heavy smoke, sit directly in the flow of the fan air. See the next page for a larger purifier.

To clean larger air spaces, a box fan filter can be constructed using 4 filters. Because there is more filter surface area, more air can be filtered. A box fan on high speed with 4 filters can deliver about 900 cubic feet per minute. That is enough to filter all the air contained in a 2000 square foot house twice per hour. The efficiency of the filtration will depend upon the layout of the house. Rooms at the end of hallways, many small rooms, and other characteristics that restrict airflow can result in poor filtration in those areas. Move the filter as needed.

Things you will need:

- ✓ 4 HVAC filters, **MERV 13 (Filtrete 1900 or better), 20" x 20" x 1"**
- ✓ **Box fan, 20"**
- ✓ **Cardboard, 20" x 20"**
- ✓ **Duct Tape**

1. Put 2 filters edge to edge and tape the whole edge so it doesn't leak. It should form a right angle. Make sure the air flow arrows point inward. See the picture for how the filters fit together.



2. Put the remaining filters to form a square. If they have been placed correctly, it will be perfectly square and 21 inches on each side. Tape the edges well to ensure there are no leaks.
3. Tape the cardboard to one of the open ends of the filters. Tape all edges to prevent leaks.
4. Tape the fan to the other open end of the filters. The fan may be slightly bigger or smaller than the filter opening. Use enough tape to ensure there are no leaks, including where you route the fan's power cord out. A corner between 2 filter edges is a good place to route the cord.
5. Place the unit, cardboard down, far enough away from walls to allow good air circulation. Box fans were not designed for use with filters and the safety of filter fans has not been tested. Be sure to follow these instructions for use:



- ✓ Use the fan in the room you spend the most time in.
- ✓ Position the fan toward the middle of the room, away from walls and large objects.
- ✓ Close all windows and doors while fan is in use. The filter fan can't clean the air if outside pollution is reentering the room.
- ✓ Use the fan for at least 10-15 minutes when needed.
- ✓ For electrical safety, do not use the fan in the bathroom or near water.
- ✓ Turn off the fan periodically to avoid overheating.
- ✓ Turn off filter fan when you leave the room.
- ✓ Do not use while sleeping or not at home.
- ✓ Replace filters every 3 months or when they look dirty (this depends on how frequently the unit is used).