GUIDANCE ON CREATING YOUR OWN INDOOR AIR CLEANER

Wildfire smoke contains harmful pollutants like fine particulate matter (PM2.5), carbon monoxide (CO), and volatile organic compounds (VOCs). These can worsen respiratory conditions and affect overall health.

Commercially available portable air cleaners with HEPA filters can help to significantly improve indoor air quality during wildfire events by helping to remove small particles from the air; however, they can be expensive or hard to find. In that case, homeowners may choose to make their own air cleaner using box fans and furnace filters.

Research suggests that properly constructed homemade air cleaners can be very effective at removing small particles from the air. Studies have shown them to be effective in homes over short periods, but there is no data on long-term use. They also DO NOT remove other indoor air pollutants such as volatile organic compounds (VOCs), carbon monoxide (CO), or carbon dioxide (CO2).

When planning to create and use a Do it yourself (DIY) air cleaner:

- Use a clean, newer (2012 or later) box fan with a safety fuse and multiple speed options.
- Use newer model fans with thermal protection to reduce fire risk
- Look for marks from recognized certifying organizations such as UL, CSA, or Intertek ETL.
- Use a high-efficiency filter, preferably MERV 13 (FPR 10 or MPR 1500-1900) or higher.
    - Implement other measures to help improve air quality. Please consult: Guidance on clean air space – homes.

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How to make a simple DIY Air Cleaner

Materials needed:

- Box fan (20-inch preferred)
- One or two 20” x 20” High-efficiency furnace filter MERV 13 or higher (1” depth is adequate)
- Duct tape
- Markers
- Cardboard
- Scissors or a box cutter

To get started:

- Plug in the fan and test airflow direction.
- Use a marker to draw an arrow from the back (the side that draws air in) to the front (the side that blows air out), in order to clearly indicate the direction of air flow across the fan.

Type of box fan filters:

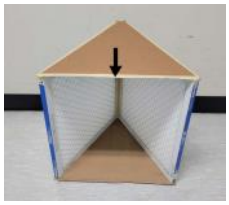
Option 1 - Single box fan filter

1. Make a shroud using cardboard and/or duct tape (See instruction on making a shroud below)
2. Align the filter against the back of the fan (the side that draws air in), making sure that the filter’s air flow direction is in the same direction as the fan.
3. Using duct tape, attach the filter onto the fan ensuring there are no air spaces.

Option 2- Double box fan filter

1. Make a shroud using cardboard and/or duct tape (See instructions below)
2. Cut two triangles out of cardboard with each side measuring 21” and each angle measuring 60 degrees. Add duct tape as needed to close all gaps around the edges and corners of the cardboard.

3. Tape the two filters together along one side, make sure the arrows on the edges of the two filters are pointing forward.
4. Tape the tops of the two filters to one triangle, and the bottoms to the other triangle. Make sure the arrows on the edges of the filters point to the inside of the triangle, where the fan will go.
5. Tape both filters and triangles to the back of the box fan ensuring there are no air spaces.


NOTE: It is very important to align the air flow arrow on the filter with the air flow of the fan.

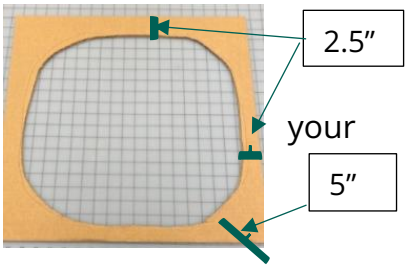
What is a shroud: The shroud stops air from being recaptured into the fan from the corners, which would reduce its effectiveness.

How to make a shroud?

Using duct tape:

1. Use duct tape around the front of the fan to create a border.
2. Measure 2 ½ inches from the outer edge of the fan on each side. Multiple strips of tape will be needed.
3. Measure 5 ½ inches from the outer edge on each corner and place duct tape to form an octagonal shape.

Using cardboard:



1. Cut a piece of cardboard the same size as the front of fan.
2. Measure and mark a 2 ½ inch border around the outer edges and 5 ½ inches at each corner.
3. Align the marking to make an octagonal shape.
4. Remove the center using scissors or a box cutter.
5. Using duct tape, attach the cardboard shroud to the front of the fan (the side that blows air) ensuring not to have any openings.

Directions:

- Place the air cleaner in a central location in the room.
- Run the fan on low or medium speed for quieter operation and better filtration.
- Close windows and doors to prevent smoke infiltration.

Safety precautions to be considered:

- **NEVER** leave the fan unattended while running.
- **DO NOT** block the back or front of the fan – keep it away from walls, curtains, furniture, etc.
- Avoid placing the air cleaner near flammable materials.
- Use only certified filters and fans that are in good working conditions
- Do not use the fan if the filter is clogged or damaged and replace filters when visibly dirty or after heavy use.
- Ensure the fan is not overheating.
- If poor air quality is expected over long periods, consider more permanent measures to improve indoor air quality, such as purchasing a commercial air cleaner or upgrading the Heating, Ventilation, and Air Conditioning (HVAC) system.

For more advanced DIY designs with additional filters or fans, visit:
http://www.bccdc.ca/health-info/prevention-public-health/wildfire-smoke