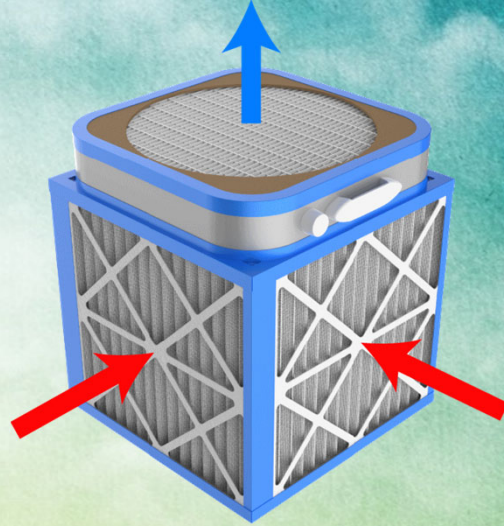


The Corsi-Rosenthal Box

An affordable, DIY indoor air purifier that really works!

Roberta Burnes
Kentucky Division for Air Quality



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Division for Air Quality

- Protecting human health & the environment by achieving clean air for all Kentuckians



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The Challenge: Indoor Air Quality

- Indoor air is often dirtier than outdoor air
- Pollutants, aerosols concentrate indoors
- Asthma triggers abound
- Ventilation & filtration not always adequate
- No indoor air quality standards or regulation



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The birth of an idea ...

Richard Corsi



- UC Davis Engineering dean
- Indoor air quality specialist

Jim Rosenthal



- CEO, Tex-Air Filters
- Certified air filter specialist

- How to improve filtration in classrooms AFFORDABLY?

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The Corsi-Rosenthal Box



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Supplies

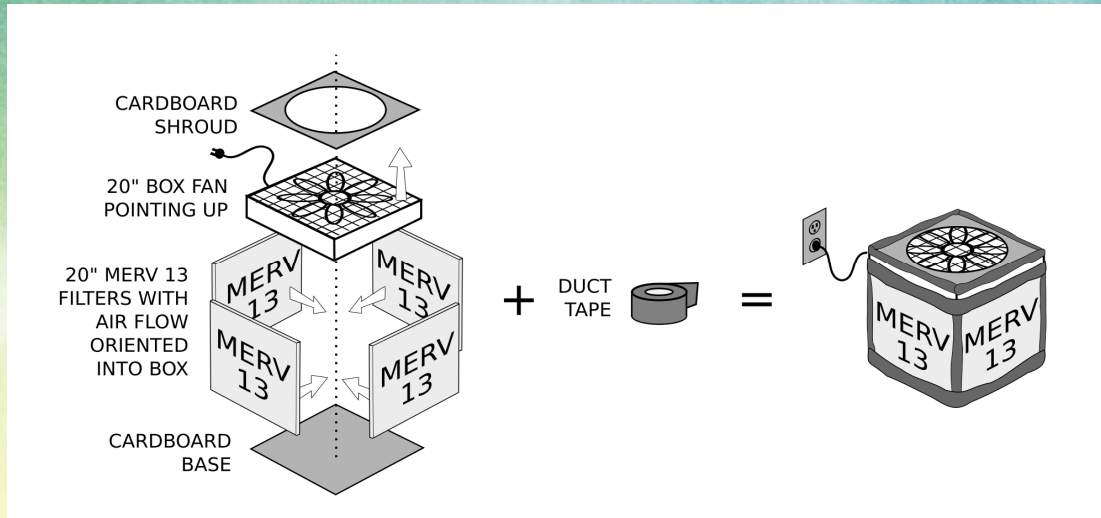
- One 20" box fan
- Four 20" MERV 13 air filters
 - 1" thick or thicker
- Duct tape
- Cardboard
- Marker or pencil
- Straight edge or yardstick
- Utility knife or scissors

Total cost: \$70-\$100



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Assembly diagram



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Assembling the cube

- Tape air filters together
- Look for arrows along edge of filters to indicate airflow
- Make sure airflow is pointing inward



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Taping the cardboard base

- Cut a 30" square of cardboard
- Tape to cover top of filters
- Flip over after taping to become the base



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Sealing the gaps

- Use duct tape to seal all gaps
- If necessary, use cardboard to fill corner gaps when fan is placed



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Placing the fan

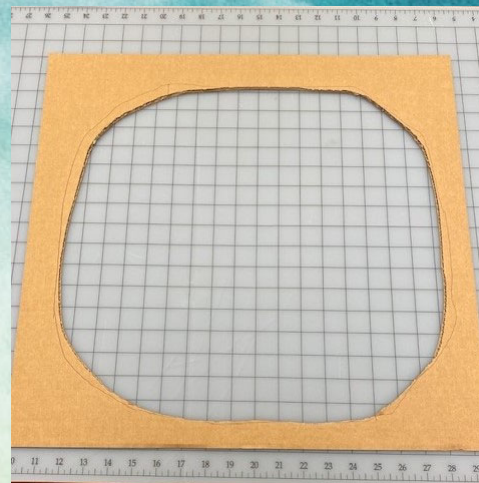
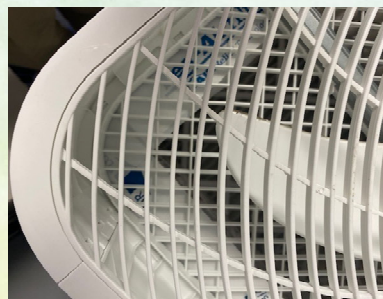
- Note the direction of airflow on side of fan
- Orient the fan so air is blowing up and out of the box
- Make sure plug and cord are outside the cube
- Tape all gaps with duct tape



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Improving efficiency

- Gaps in the corners of a box fan can reduce efficiency
- Cover corners with a cardboard shroud
- Tape shroud to front of fan



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Optimized box fan shroud opening by @DavidElfstrom



Utilitech/Hurricane
13.5" (34 cm) opening
align with pattern
47% more flow

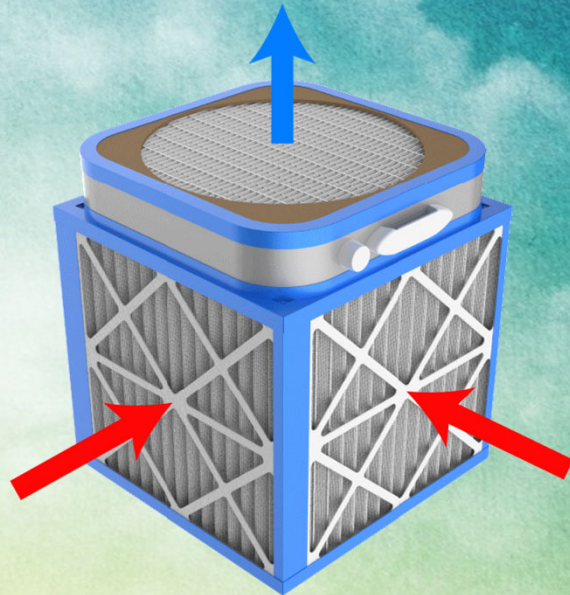


Lasko Comfort Cooling
15" (38 cm) opening
38% more flow

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How it works

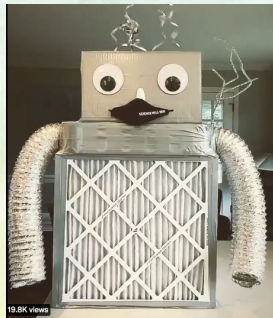
- Air flows in through the filters and out through the fan
- Place box in center of room for best results, or at least 3 feet from a wall



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Finish sealing with tape

- Seal all seams and gaps with duct tape
- Add your own special touches!



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How well does it work?

- Air Changes per Hour (ACH) – The goal is 6 ACH
 - Typical home <1
 - Typical classroom ~3
 - Adding one-two CR boxes in a classroom can reach or exceed this goal
- Clean Air Delivery Rate (CADR) varies from 250-600, depending on fan speed
- Efficient
 - Tests perform very well for aerosols, smoke, dust, pollen, mold
 - More efficient with larger particles
 - Safe & quiet
 - Can be used for several months before switching out filters

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Box-a-thons

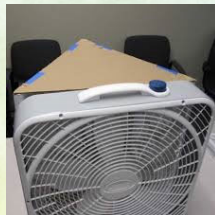
- Trinity High School
- UC San Diego
- UC Davis
- Arizona State
- Uconn
- Brown University



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In conclusion ... the Corsi-Rosenthal box:

- Significantly improves filtration of indoor air
- Performs well at a fraction of the cost of commercial air cleaners
- Is scalable, using 1-5 filters and virtually any filter/fan size
- Can be an important tool for reducing asthma triggers and virus-laden aerosols without modifying existing building ventilation



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For more information ...

- Cleanaircrew.org
- Cleanair.com – lesson plans and resources
- <https://bit.ly/CRTesting> - Testing efficiency & effectiveness of CR boxes
- <https://www.youtube.com/watch?v=XNZCGdZYqxs> – EEC video showing construction of the CR box

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It all adds up to cleaner air!



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