Roof Vent Protection from Wildfire Embers

Sandia Heights Homeowners Association
Environment & Safety Committee

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Presentation Key Concepts

- What makes Sandia Heights vulnerable to wildfire.
- Wildfires and Home Ignition
- How to make typical homes in Sandia Heights more resistant to wildfire.
- The more homes protected, the more the neighborhood is protected.

What makes Sandia Heights vulnerable to wildfire?

- 3+ miles of National Forest Boundary
- Dried vegetation in arroyos
- Low humidity and frequent high winds
- Large lots inside the Wildlands/Urban Interface (WUI) Zone
- Small lots in Urban Fire Zone

Home Ignition by Wildfire 1

- "***Wind-blown embers are the principal cause of building ignitions.***"
- (Quarles, Stephen L. Vulnerability-of-Vents-to-Wind-Blown-Embers_IBHS AUG 2017)

- "**In southern California, over half of homes which are damaged or destroyed by wildfire are ignited by windblown embers.**"
  - (Pauline Allen, Resource Conservation District of the Santa Monica Mountains)

- Some estimates state more than 90% of home ignitions by wildfire are caused by windborne embers ahead of the fire front.

- Flying embers can ignite homes more than a mile from the active fire.

CAUSES OF HOME IGNITION BY WILDFIRE

Flying embers are the cause of up to 90% of homes destroyed by wildfire

When we think about wildfires, we generally envision huge walls of flames engulfing homes. The reality is that most homes do not ignite from direct contact with a flame front. In fact, it's estimated that 90% of homes are destroyed indirectly by wind-borne embers that are carried ahead of the fire perimeter. When the heat generated by an intense wildfire is combined with wind, small burning embers can travel several miles away from the fire perimeter.

https://www.frontlinewildfire.com/wildfire-news-and-resources/wildfire-embers-how-homes-catch-on-fire/

There are things we can do to reduce our home's risk from wildfire.

FRONTLINE® WILDFIRE DEFENSE

Preventing ember ignition can save homes

In March of 2019 the Insurance Institute for Business & Home Safety (IBHS) simulated an active wildfire by showering embers on a duplex house structure in their test chamber in South Carolina. The house was built and landscaped on one side as a wildfire-resistant structure, and on the other side with common materials used when wildfire resistance is not a consideration. The wildfire-resistant side did not burn, highlighting the fact that if embers don't have any fuel to ignite, the chance of a home being destroy by wildfire is reduced significantly.

https://www.frontlinewildfire.com/wildfire-news-and-resources/wildfire-embers-how-homes-catch-on-fire/

Home Ignition by Wildfire

- Three causes of home ignition by wild fire:
  - Direct Contact with the fire.
  - Radiant heat from burning structures or vegetation.
  - Airborne embers.
- The first two of these ignition causes require close proximity to the fire.
- Airborne embers can cause home ignition a mile downwind from the fire front.
- This is why 50-90% of home ignitions by wildfire are caused by airborne embers.
  - Many embers and lots of flammable targets = more fires

Why install roof vent protection?

- Roof vent protection reduces home ignitions caused by airborne embers away from the fire front.
- The fire fighters will be at the fire front with all of the necessary equipment. New fires behind the lines diverts resources (manpower, equipment and water) and reduces chances of controlling the fire.
- Reducing home vulnerability to wildfire embers helps prevent secondary fires, allowing fire fighters to concentrate equipment and available water at the fire front.
- Longer ignition time makes

  more fire department setup time

We can Harden our Homes against Wildfire Embers

- This presentation shows simple measures to harden homes against embers from wildfires.
- Includes examples of retro-fit screening on roof vents typically found on homes in Sandia Heights.
- **These measures have been shown to be effective in big fires elsewhere,**
- **BUT**
- **You must decide if these measures or others described in the videos referenced are suitable for you, your home and your neighborhood.**

No remedy guarantees protection from all fires under all circumstances.

- Homes with vent protection may still be vulnerable to direct flame contact and radiant heat from nearby fires.
- The ignition of any home endangers nearby homes by creating new, closer sources of flying embers.
- High winds may overcome all protection measures, but vent protection may still buy some time for the fire department.

Homes in Sandia Heights often have 5 kinds of vents to the outside

- Parapet Vents
- Furnace & Water Heater Vents
- Bathroom & Kitchen Fan Vents
- Fireplace vents
- Dryer Vents

IF NOT PROPERLY PROTECTED, ALL OF THESE VENTS MAY ALLOW EMBERS FROM A DISTANT FIRE INSIDE YOUR HOME

Parapet vents

- Located on parapet back side (roof side) of many Sandia Heights homes.

- These are usually a rectangular metal cover with louvered openings (SEE next page pictures).

- Louver openings provide ventilation
  - **But are large enough to allow a wildfire ember the size of a pea to be driven inside the parapet AND inside the walls of your house where dust, debris or paper insulation backing may be ignited.**

What do Parapet Vents look like?

Typical roof vent. Notice the bent louvers which will admit larger particles.

Please Note: some homes which have been re-roofed do not have parapet vents. They have been covered.

What do Parapet Vents look like?

These vent covers were installed with louvers up which could scoop RAIN or EMBERS inside the walls.

DIY VENT SCREENS

- Installing ember-resistant vent covers is called the easiest and cheapest thing you can do to harden your home against wind-driven embers generated by wildfire.

MATERIALS NEEDED

- **Wire screening 1/8 inch mesh. Metal wire only. $30**
- EXAMPLE: 12 in. x 20 ft. Kwikmesh Utility Screen Roll. Made from 1/8 in. corrosion resistant galvanized expanded metal. Other lengths & widths available.
- Conveniently sized rolls recommended for ventilation, vent repair, rodent and insect control, and tree trunk protection.

Options & Cautions

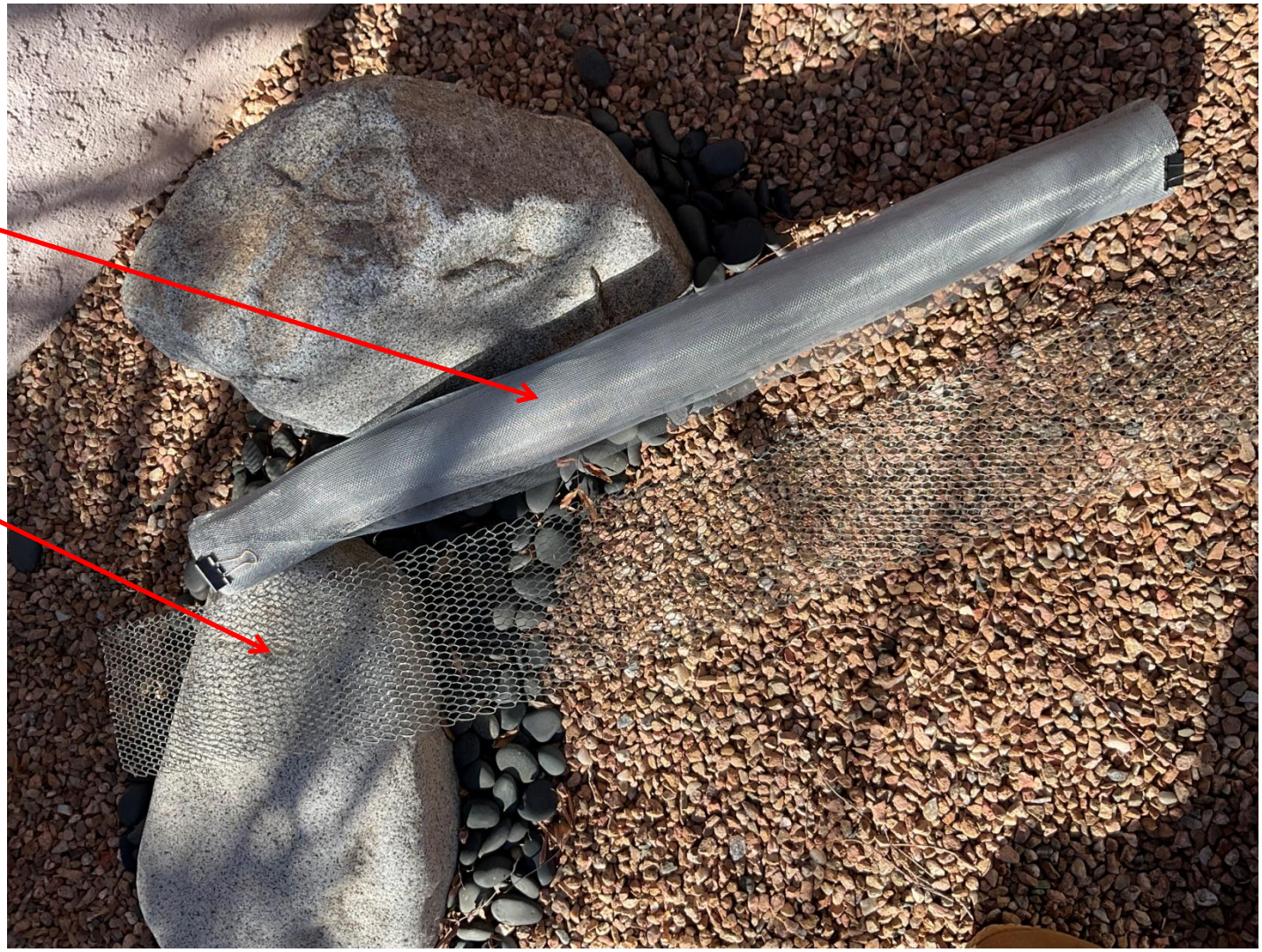
- Other stronger wire including stainless steel is available. If vent may be directly exposed to flames, the extra cost may be worth it.
- Vents closer to ground level may be more easily exposed to direct flame.
- **DO NOT** use cloth, fiberglass or “soft” screens which likely are flammable and may melt or burn sooner than metal.

Plaster Lath for Optional Screen Cover

Plaster Lath 6” x 8ft $9

1/8” Wire mesh roll.

Plaster Lath 6” x 8 ft.



Coarse and fine wire mesh: Plaster Lath and 1/8” wire mesh roll

Fasteners

Box of Self-Drilling (self starting) hex-head screws. $7

I used a hex-head driver in my drill to install the screws.

Buy the right screw heads for the driver of your choice.

Any good quality steel wire for wrapping screens.

TOOLS NEEDED

- Drill with driver for screws selected
- Extension cord (if needed)
- Metal snips or strong scissors.
- Pushing or molding tool to press wire into corners

LOUVERED SCREEN COVER OPTIONS

- **IF** louvered cover can be removed, cut the fine wire mesh screen to fit the louvered screen + 1-inch on all four sides.
- Wrap fine screen around louvered cover and replace on the parapet.
- **IF** removing louvered cover may damage stucco, leave existing louvered cover in place.
- Cut BOTH the fine wire mesh screen and the Plaster Lath to fit the louvered screen outside edge and screw to the existing cover with the plaster lath on the outside. (SEE NEXT PHOTOS)

Installation

Place the plaster lath over the 1/8’ screen and screw both pieces to the in-place louvered cover using the self-starting screws.

Start in center and add edge screws where necessary to insure a tight fit.

Fitting Wire Screen

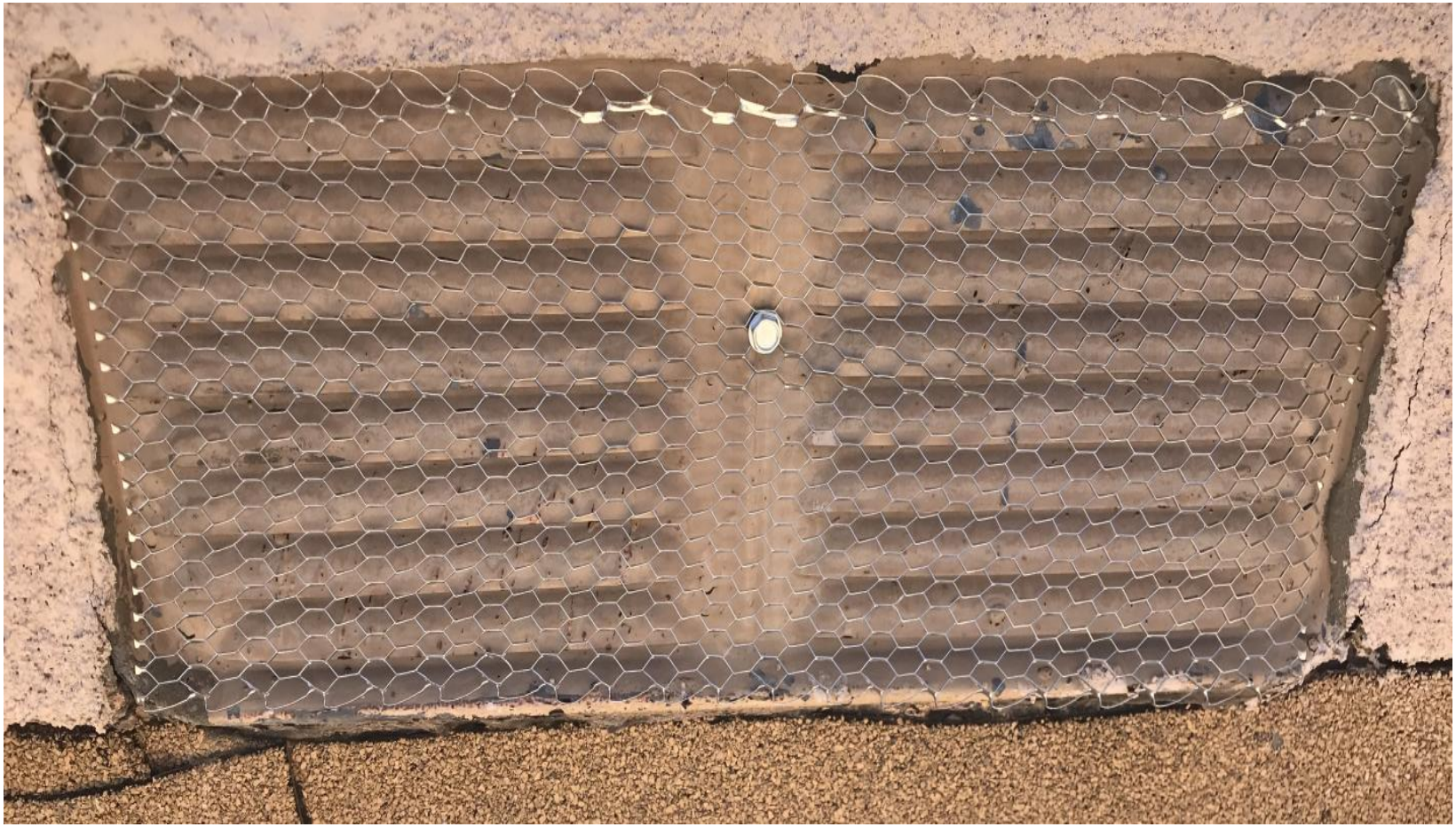
- Use a suitable tool to bend the edges of the lath so there are no gaps and no pockets along the edges to trap embers.

If the louvered cover can be removed without damaging stucco, the Plaster Lath may not be needed. Wrap the oversized wire mesh (cut 1-inch wider than the louvered cover on all 4 sides) around the cover and replace.

PLASTER LATH vs WIRE MESH

NOTE: The plaster lath alone **IS NOT** suitable for stopping small wind-blown embers.

The openings are too large to protect the vent. The plaster lath can be used to support the finer 1/8-inch screen making fewer screws necessary as shown in previous photos.



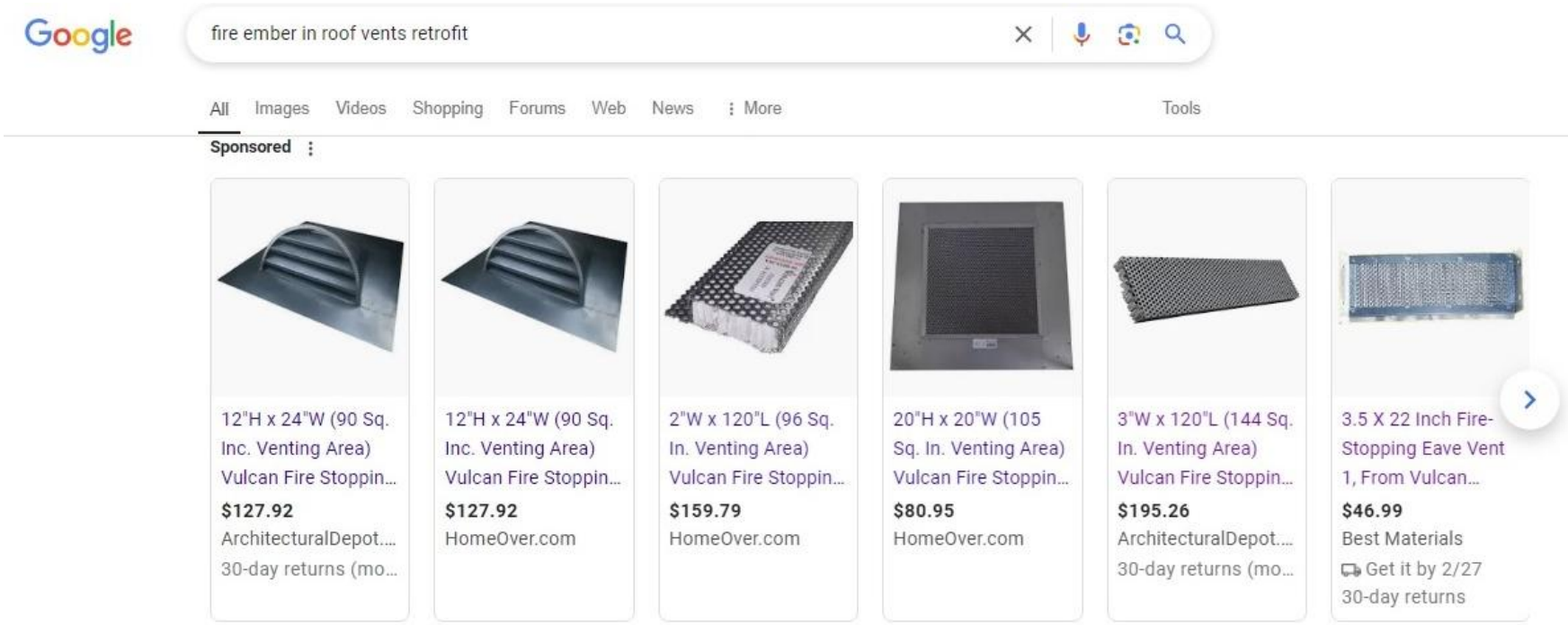
Commercially available roof vent protection

- Many commercially products are available which will fit into a standard sized vent hole.
- Some products contain layers of wire mesh in a metal frame.
- Some contain mesh treated with a coating which swells at 700°F, closing the vent to both embers and flames. These may cost $75 to $250 per vent.
- The typical small house in Sandia Heights may have at least 5 roof parapet vents.
- For examples of commercially available roof vent protection **GOOGLE:** wildfire roof vent protection

Commercially Available Alternatives

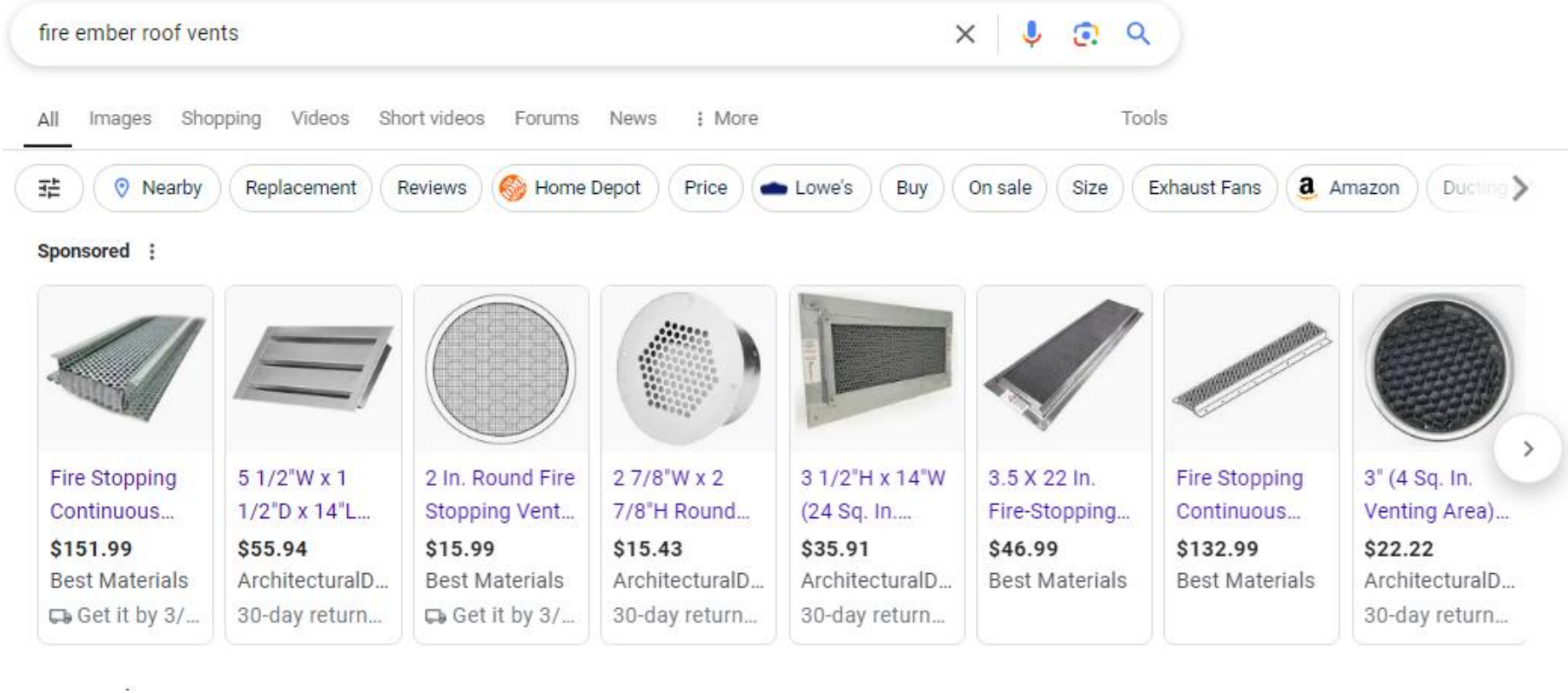
Screens which can exclude embers from vents are available from the usual hardware and building supply sources. Prices vary from $50 to $200 per vent.

GOOGLE: fire ember roof vents retrofit

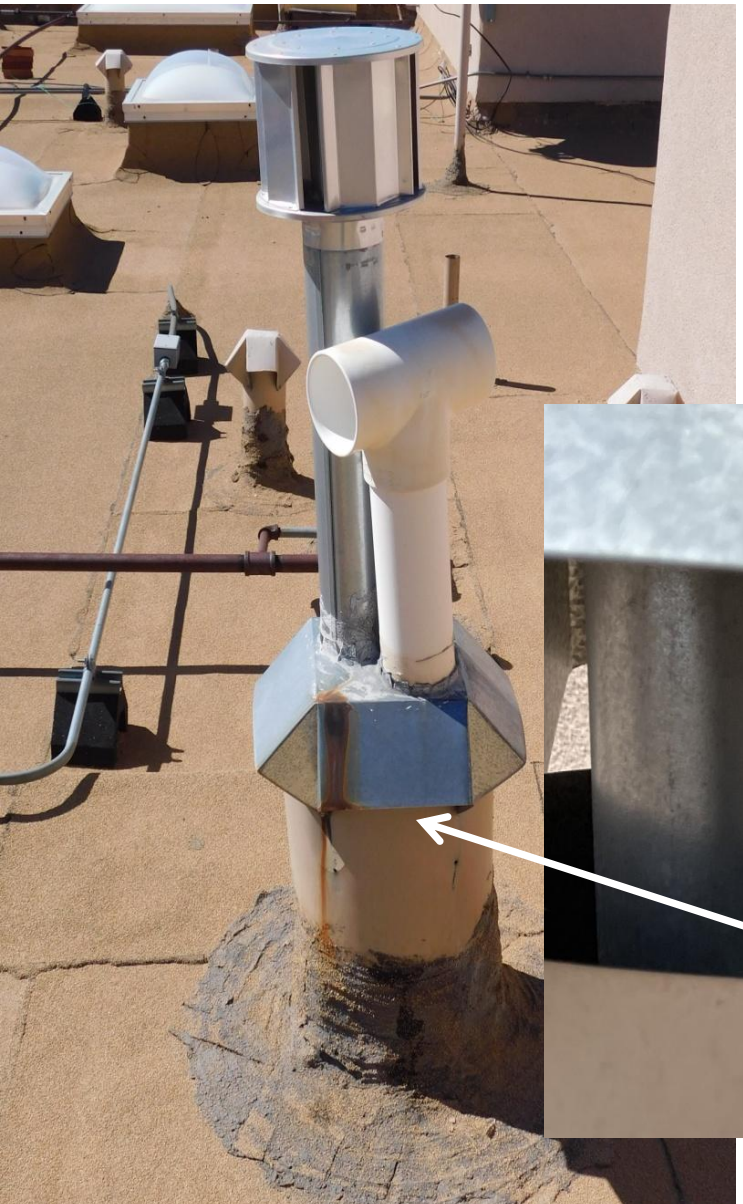


Commercially Available Alternatives

Specialty Screens Depending on your Needs



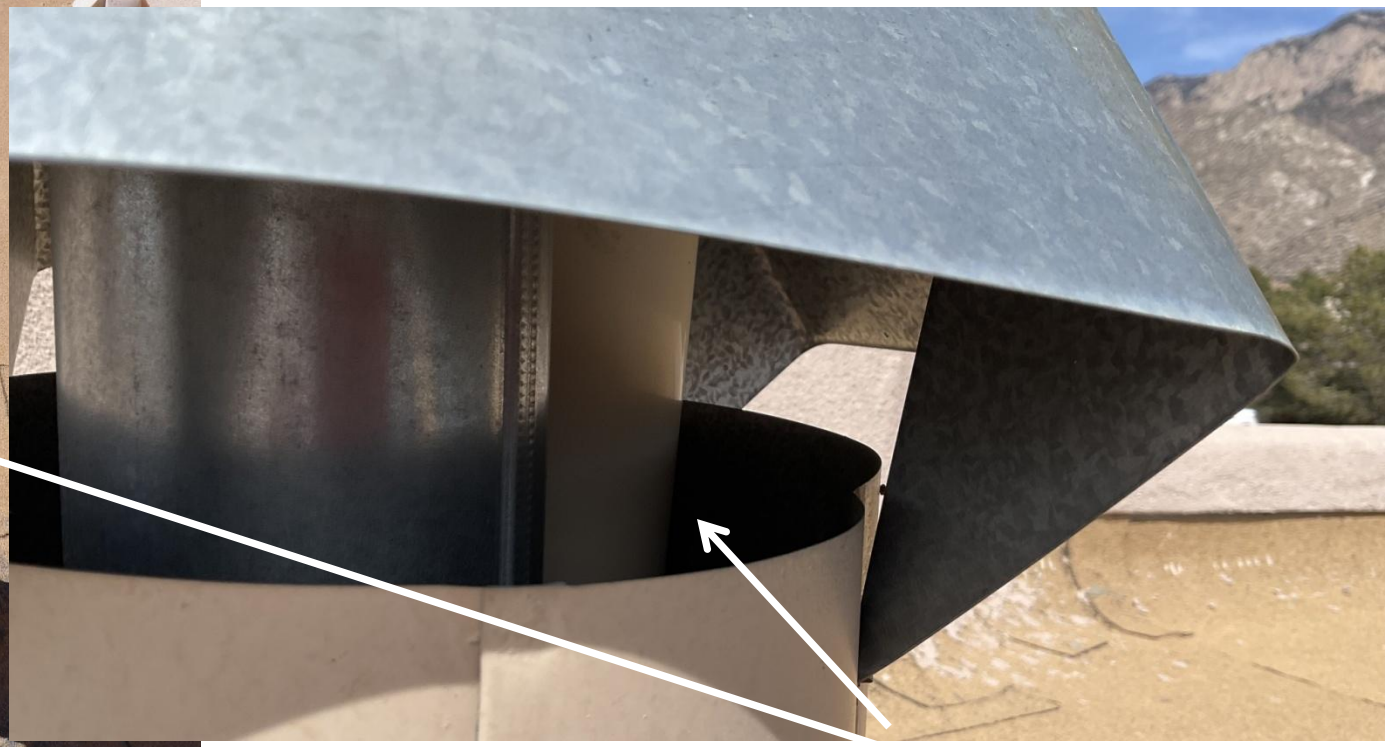
Chimney & Water Heater Vents (Outside)



Combination furnace (PVC) and water heater (galvanized) vent chimney in double wall chimney shown in left picture.

Photo below show ember pathway which could blow under the chimney top and enter the double wall space directly into the garage. (**SEE NEXT SLIDE**)

ALSO NOTE two ceiling fan vents in the left picture. SEE later pages for protecting these vents



Pathway for embers to inside of the garage.

Chimney & Water Heater Vents (Inside)

Inside view of combination furnace (PVC) and water heater (metal) vent chimney. Water heater chimney no longer used but was left open by installers. The double wall chimney space is open to the outside. **Embers could enter the garage along the pathway shown on the previous slide.**

Chimney & Water Heater Vents inside garage.#2

I checked 5 houses on my street. ***ALL 5 have this problem!***

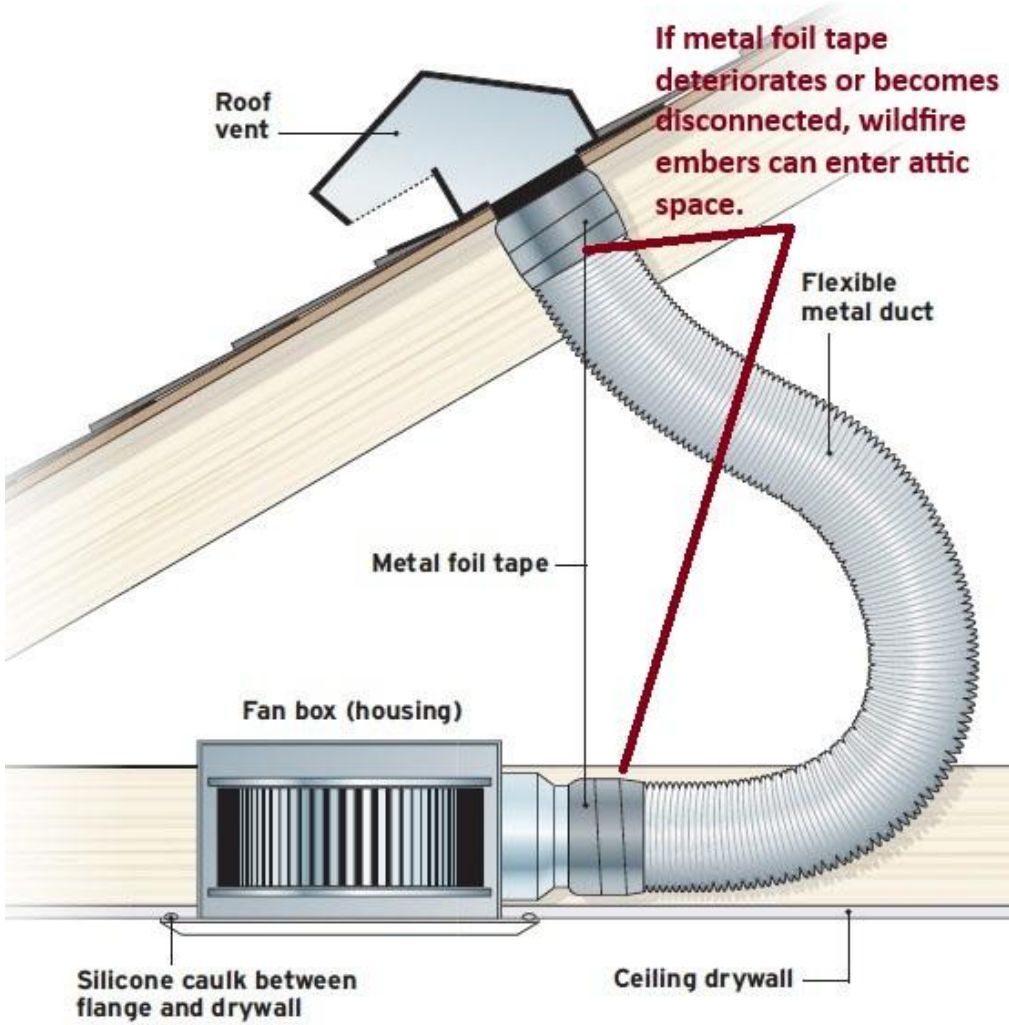
Large particles (wildfire embers OR 2” steel washers on a string) can get inside the garage from the roof. Supplemental screening on the roof is needed. See next page.

Mesh over Double Wall Chimney

Strip of wire mesh around chimney exhaust held in place with twisted black wire.

Oversize mesh basket to improve air flow over the entire double walled chimney held in place with twisted black wire.

The Problem with Bathroom & Kitchen Fan Vents!



This picture shows fan vent installed in a pitched roof. Installation in a flat roof is very similar.

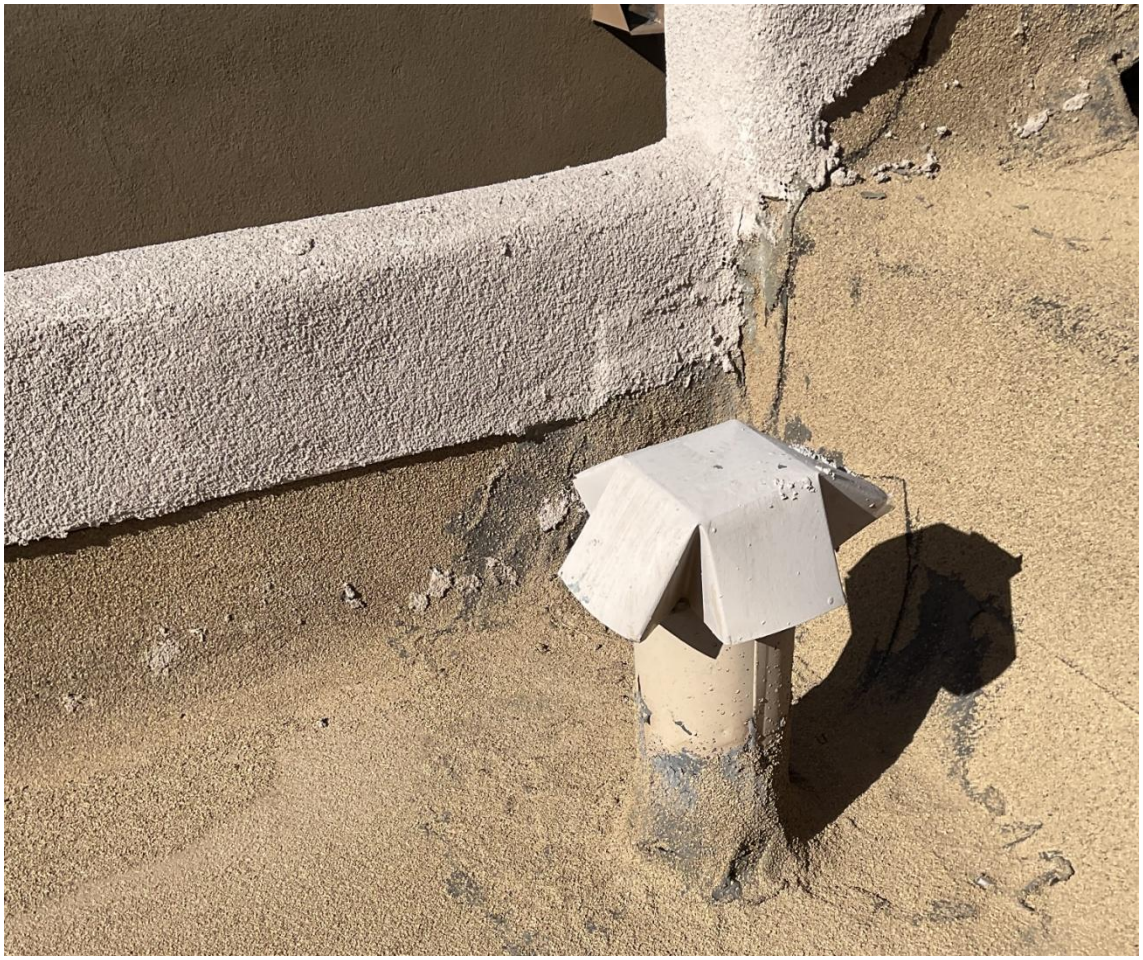
The glue on metal foil tape sealing both ends of the Flexible Metal Duct can deteriorate and disconnect from the roof or the fan.

When a new fan is installed, the fan end of the Flexible Metal Duct may shrink back into the roof. It may not be reachable and may not be reconnected.

If either end of the Flexible Metal Duct is loose, embers may enter the attic space where dust, debris or paper insulaton backing may be ignited.

Wire mesh over the roof vent avoids this problem.

What Do Other Roof Vents look like?



Bathroom & Dryer Fan Vents

Should be connected by Flexible Aluminum Foil Ducts to the fan.

BUT Sometimes hose is missing or not connected to the fan body.

Embers could enter the insulation space between the roof and interior ceiling if drafts and temperatures and wind directions are right.

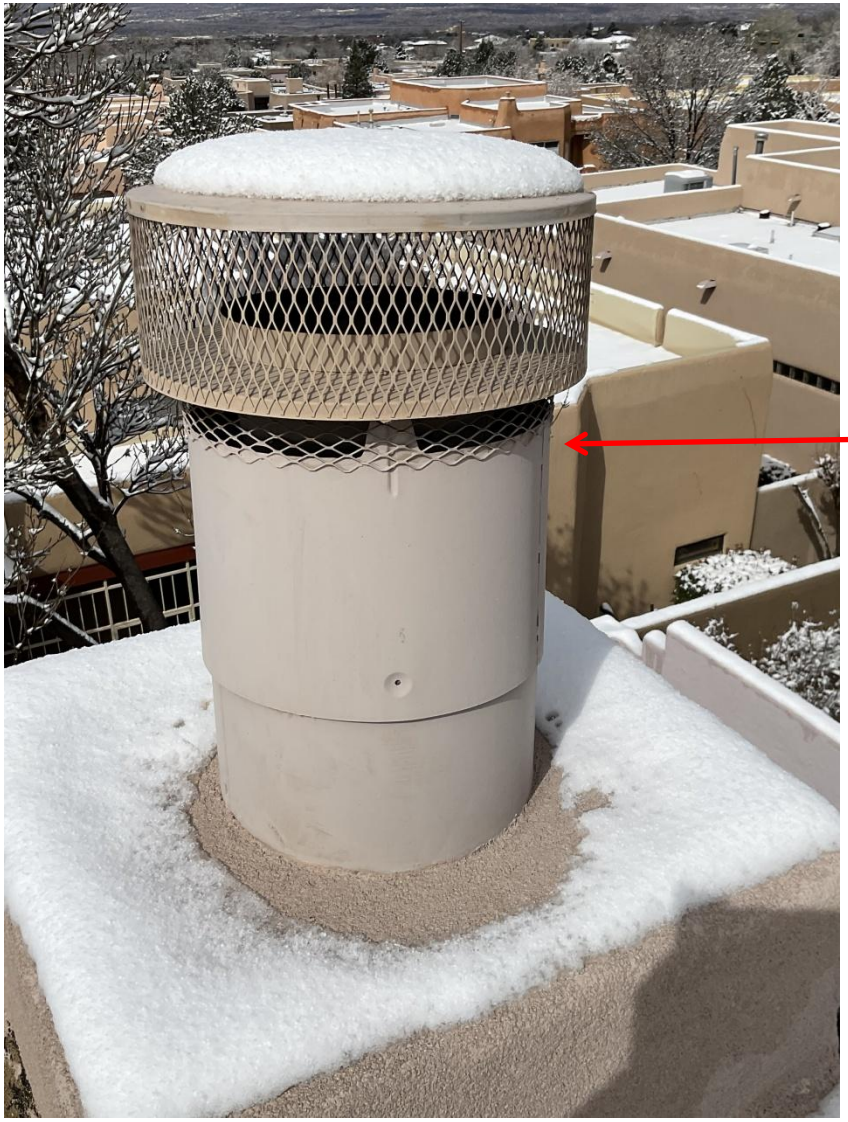
Roof space may be dusty or have exposed paper insulation backing which could ignite inside the roof.

Mesh over Fan Vents

Secure the screen with black wire OR sheet metal screws into the original vent housing. Over-size screening to improve air flow.

Mesh over Fireplace Vents

Screen added to double wall screen (lower), not firebox screen (upper).



IF your fireplace doesn't have a damper OR sealed doors, consider screening the upper vent OR installing a different chimney hood. The path from the firebox to the outside should not allow embers to flow down inside your home.

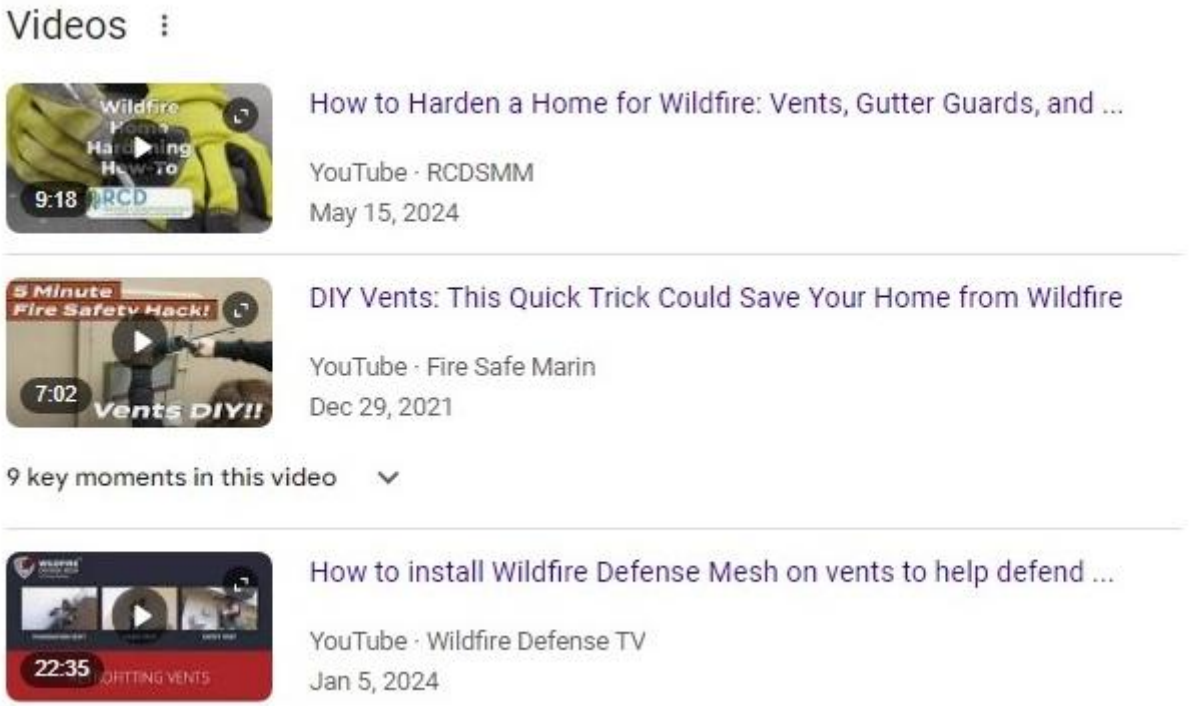
Educational video resources

- DIY Vent Protection: This Quick Trick Could Save Your Home from Wildfire

- https://www.youtube.com/watch?v=kEZPdnwdmGY

- https://www.youtube.com/watch?v=-twZRaQu4Ig

Additional Information



https://firesafemarin.org/harden-your-home/fire-resistant-vents/

https://www.chubb.com/us-en/individuals-families/resources/protect-your-home-from-wildfires-with-ember-resistant-vents.html

https://ibhs.org/wp-content/uploads/member_docs/Vulnerability-of-Vents-to-Wind-Blown-Embers_IBHS.pdf

https://www.pbs.org/video/weathered-inside-the-la-firestorm-l31r0b/