<u>Roof Vent Protection from</u> <u>Wildfire Embers</u>

Sandia Heights Homeowners Association Environment & Safety Committee

by Dave Jenkins, Sandia Heights NM April 24, 2025

Home Ignition by Wildfire

• "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)

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

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.

Embers go% of Structure Ignition Direct Flame Contact Contnuity of Fuels Radiant Heat Density of Structures Image: Direct Flame Contact Contnuity of Fuels Image: Direct Flame Contact Density of Structures Image: Direct Flame Contact Density of Structures Image: Direct Flame Contact Density of Fuels Image: Direct Flame Contact Density of Fuels Image: Direct Flame Contact Density of Structures Image: Direct Flame Contact Density of Fuels Image: Direct Flame Contact Density of Fuels Image: Direct Flame Contact Density of Structures Image: Direct Flame Contact Density of Fuels Image: Direct Flame Contact Density of Fuels Image: Direct Flame Contact Density of Structures Image: Direct Flame Contact Density of Fuels Image: Direct Flame Contact Density of Flame Contact Density of Structures Image: Direct Flame Contact Density of Structures Image: Direct Flame Contact Density of Structures Image: Direct Flame Contact Density of Structures Image: Direct Flame Contact Density of Flame Contact Density o

THREE REASONS HOUSES BURN DURING A WILDFIRE



Wildfire Embers: How Homes Catch on Fire | Frontline



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.

Wildfire Embers: How Homes Catch on Fire | Frontline

Home Ignition by Wildfire

- 50-90% of home ignitions by wildfire are caused by airborne embers
- These embers can cause home ignition a mile ahead of the fire.
- The fire fighters will be at the fire front
- Reducing our home vulnerability to wildfire embers helps prevent secondary fires, help the fire fighters and helps protect our neighborhood.

<u>We can Harden our Homes against Wildfire</u> <u>Embers</u>

- This presentation shows simple measures I installed to harden my home against embers from wildfires.
- Includes retro-fit screening on roof vents typically found on homes in Sandia Heights
- You must decide if these measures or others described in the videos referenced are suitable for you and your home.

<u>Homes in Sandia Heights often have 5 kinds of vents</u> <u>to the outside</u>

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

IF NOT PROPERLY PROTECTED, ALL OF THESE VENTS MAY ALLOW WILDFIRE EMBERS INSIDE YOUR HOME

<u>Homes in Sandia Heights often have Parapet</u> <u>vents</u>

- Located on parapet back side (roof side)
- These are louvered grates usually a rectangular metal cover.
- Louver openings large enough for ventilation
 - But also 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.

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

MATERIALS NEEDED

- <u>Wire screening 1/8 inch mesh.</u> <u>Metal wire only. \$30</u>
- 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 flame.
- <u>DO NOT</u> use cloth, fiberglass or "soft" screens which likely are flammable and may melt or burn sooner than metal.



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 PROBLEMS

- 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.
- <u>IF</u> 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. (SEE NEXT PHOTOS)

Installation

Place the plaster lath over the 1/8' screen and screw both pieces to the 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.



<u>Commercially available roof vent protection</u>

- 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.
- 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.

<u>GOOGLE:</u> 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 (left).

Photo below shows embers could blow under the chimney top and enter the double wall space directly into the garage. (SEE NEXT SLIDE)

Pathway for embers to inside of the garage.

Chimney & Water Heater Vents inside garage.

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 through the space shown on the previous slide.**



Chimney & Water Heater Vents inside garage.#2

Four ³/4"

washer

steel

Smith

Large particles (wildfire embers <u>OR</u> steel washers on a string) can get inside the garage.

Supplemental screening on the roof is needed. I checked 5 houses on my street. <u>ALL 5 have this problem.</u>

2" diameter steel washer

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.

Unfortunately, the metal foil tape sealing both ends of the Flexible Metal Duct can deteriorate and disconnect from the roof or the fan. ALSO, when a new fan is installed, the fan end of the Flexible Metal Duct may shrink back into the roof. It may not be accessible and may not be reconnected.

If either end of the Flexible Metal Duct is loose, embers may enter the attic space.

Wire mesh over the vents 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.

(Ember pathway is shown in next slides.)

Mesh over Fan Vents



Secure the screen with black wire OR sheet metal screws into the original vent housing

Mesh over Fireplace Vents

Screen added to double wall screen, not firebox screen



IF your fireplace doesn't have a damper OR doors, additional screening OR different chimney hood should be considered.

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=-twZRaQu4lg

Additional Information

Videos :



YouTube · Wildfire Defense TV Jan 5, 2024

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