Fire Resistant Materials

FOR HOME REPAIR AND CONSTRUCTION

"You don't have to live in a concrete block home with stainless steel doors and a metal deck all the way around it. You just have to to remember – it's the little things that count."

Jack Cohen,
Research Physical Scientist,
U.S. Forest Service

Texas A&M Forest Service

A home located within the Wildland Urban Interface (WUI) may be at risk in the event of a wildfire. Lands and communities adjacent to and surrounded by wildlands are part of the WUI. However, there are precautions that a homeowner can take to reduce a home's risk. It begins by learning what parts of your home might burn if exposed to direct flame contact, radiant heat or embers.

Several sections of a home are vulnerable to a wildfire because of their size or placement. For example, the roof is a large surface, capable of catching burning embers. The embers may get lodged between the shingles or ignite leaf or pine litter on a roof. Other sections that are vulnerable to wildfires are windows, decks, fencing, vents and eaves.

"Hardening a home" is a term used to describe the retrofitting process that reduces a home's risk to wildfire. This involves using non-combustible building materials and keeping the area around your home free of debris. The following pages will describe each section and offer alternative building materials that will reduce a home's risk to wildfire.

Firewise construction and landscaping helped protect this home from wildfire.

Roof and Gutters

Leaves and needles burning along roof edge with dormer. Photo by Institute for Business and Safety Research Center.

The pine needles on this roof burned, but the Class A roof did not. Photo by Institute for Business and Safety Research Center.

The roof is one of the most vulnerable areas of a home. It is a large surface that is capable of catching embers during a wildfire. A roof also can collect dead vegetation such as pine needles and leaf litter, which will readily ignite. So the maintenance of a roof is as important as the materials used to construct it.

The roof can be ignited along the surface and the edge where gutters are connected. In both cases the most likely cause will be embers landing and debris igniting. The flame then can penetrate the roofing materials and allow the fire to spread to the attic. A homeowner can prevent this by keeping combustible fuels cleared from the roof and using ignition-resistant roofing materials.

Recommended materials:

- Metal
- Tile (with bird stops)
- Class A shingles

Fire ratings for roofs are classified as either Class A, Class B, Class C or are unrated if a roof covering cannot meet the requirements for any of these classifications. Class A is the highest rating, offering the highest resistance to fire, and unrated is the worst. Examples of a Class A roof covering include concrete or clay roof tiles, fiberglass asphalt composition shingles and metal roofs. An example of an unrated covering is an untreated wood shake roof.

During a wildfire, vinyl gutters do not resist heat like metal gutters. The primary concern is at the roof edge. There may be an opening between the roof decking and fascia board (behind the gutter). Angle flashing should be placed over this exposure to keep embers out. Debris in the gutter can ignite and fire can spread to the eave. Vinyl gutters can melt and detach, leaving this area exposed.

Recommended materials:

- Metal gutters
- Gutter guards
- Angle flashing for edge protection

Recommended actions:

Install gutter guards to keep debris from accumulating. Maintain the roof where the gutter connects to make sure debris does not accumulate between the guard and roof.

This vinyl gutter melted from heat, exposing the wood and roof edge to embers and direct flame. Photo by Institute for Business and Safety Research Center.

Eaves and Soffits

There are typically two types of home eaves:

1. Open eaves
2. Boxed-in eaves (with soffit vents)

The primary function of the eave is to protect the home from rainwater. However, during wildfire events this section is vulnerable to embers and direct flame contact. The goal is to prevent embers entering the attic through vents. The vents should have screening attached to stop embers from passing through.

Direct flames also can spread to the eaves and ignite any combustible materials. Open eaves are especially vulnerable to direct flame contact. If a homeowner uses a boxed-in eave, they should use non-combustible materials.

Angle flashing also should be used, as discussed in the roof section of this guide.

Direct flame on siding burns into the eaves and roof. Photo by Institute for Business and Safety Research Center.

Recommended materials:

- Metal
- Cement board
- Stucco

Recommended actions:

Box in eaves with non-combustible material.

Without roof edge flashing, embers can enter into the attic. Photo by Institute for Business and Safety Research Center.

With roof edge flashing, fewer embers enter the attic area. Photo by Institute for Business and Safety Research Center.

Exterior Walls

This photo shows the difference between combustible siding (left) and fiber cement siding (right) when exposed to the same direct flame source. Photo by Institute for Business and Safety Research Center.

The exterior walls of a home will need to be resistant to radiant heat and direct flame contact. For homes with vinyl siding, the radiant heat from a wildfire may become intense enough to melt the siding. This could possibly expose crevices in a home and allow embers to enter.

If the siding is exposed to direct flame contact long enough, it could possibly ignite. Homes are at a higher risk of direct flame contact if they have combustible siding and are surrounded by dense vegetation.

Recommended materials:

- Cement board
- Masonry
- Stucco

Recommended actions:

Use non-combustible siding and make sure there are no crevices or holes that could potentially catch embers.

The vinyl siding and window frame on this home melted when exposed to radiant heat.

When this vinyl siding melted, it exposed other combustible materials.

Windows

The windows of a home are vulnerable to radiant heat and direct contact with flames. Plants placed below a window could potentially ignite and release significant heat, causing a window to break. After the glass has broken, the interior of the home will be exposed to embers.

The window's wooden framing can ignite, allowing a wildfire to spread to the interior of a home. Vinyl framing can melt, exposing the interior, allowing embers and direct flame to travel through.

The best preventative maintenance a homeowner can do is to arrange the landscaping in a way that limits vegetation (shrubs, plants and tall grasses) near a window. Creating space between plants and a home will help prevent direct flame contact. Reducing the vegetation near a home will decrease the amount of flammable fuel, which will reduce the radiant heat.

Window screens also play a vital role during a wildfire. They will absorb and redirect radiant heat, allowing the glass to absorb less. If the glass breaks, screens may also prevent embers from entering.

Radiant heat melted the interior blinds.

Recommended materials:

- Tempered-glass window
- Double-pane window
- Metal framing or aluminum coverings for wood or vinyl

Recommended actions:

- Install double-pane windows or tempered-glass windows and use a metal framing.
- Use a fiberglass or metal screen.

Although this glass cracked from radiant heat, the second pane provided an extra barrier that kept flames from entering.

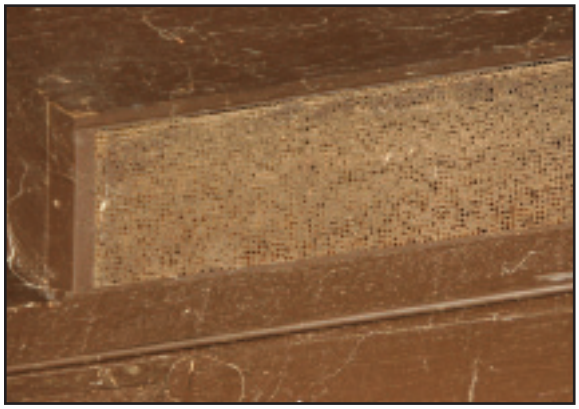
Metal frames are less likely to melt. Frames that melt or burn allow the window panel to fall out, letting embers and flames into the home.

Tempered glass also is recommended because it deflects more heat than non-tempered glass.

Photo by Institute for Business and Safety Research Center.

Vents

Screening helped capture these embers and prevent their entry into the attic. Photo by Institute for Business and Safety Research Center.



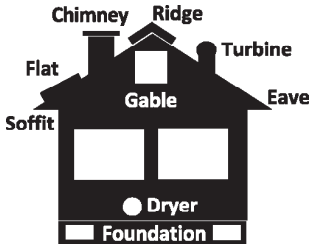
This screen prevented embers from entering. Photo by Institute for Business and Safety Research Center.

Combustible material like this mulch, near skirting or siding, leaves the home unprotected, even with screening in place. Photo by Institute for Business and Safety Research Center.

There are several different types of vents for a home. These vents play a vital role by supplying openings for air to flow through. However, these vents can allow embers to enter a home during a wildfire.

Types of vents Include:

Soffit	Gable
Flat	Eave
Chimney	Foundation
Ridge	Dryer
Turbine	



These vents should all be non-combustible with 1/8-inch screening. This will prevent the vent from melting and exposing the interior of a home. The 1/8-inch screening protects the home from embers.

However, using a 1/8-inch screen may reduce the amount of air flow designed for an area; this should be considered when installing a vent. Also, 1/8-inch screening may become clogged with debris. Regular maintenance should be completed to keep the vent clean.

Recommended materials:

- 1/8-inch metal screen
- 1/8-inch fiberglass screen

Recommended actions:

- Install 1/8-inch screening
- Clean vents to keep them free of debris, allowing them to keep embers out while allowing air flow for ventilation.

Vents can clog. This vent was painted over, reducing its effectiveness in providing ventilation. Photo by Institute for Business and Safety Research Center.

Decks, Fencing & Skirting

Decks and fencing

Decks and privacy fencing are common attachments that are vulnerable to wildfire. A wildfire can ignite and spread along a fence line, ultimately spreading to the home itself. Once a wildfire begins to burn fencing near the home, it will release embers into the eaves, possibly allowing direct flame contact. A deck will create the same type of embers and direct flame contact, but most likely will produce greater radiant heat.

The goal is to build these attachments with non-combustible material or to separate the section adjacent to the home using fire-resistant materials. This will create a buffer between the home and combustible materials. This also will separate the home from direct flame due to the wooden attachment.

Recommended materials:

- Brick/masonry
- Cement board
- Metal
- Composite decking material

Recommended actions:

- Clear vegetation from underneath the deck.
- Spread gravel or other non-combustible material under the deck.
- Screen in the bottom of the deck with metal 1/8-inch screening.

Materials under this deck could easily catch the home on fire.

This home escaped the flames when firefighters knocked down the burning fence that would have led flames to the home. Notice the burn marks on the fence.

The flammable skirting under this deck, along with mulch, could easily lead flames to the deck and home.

Skirting

Foundations should be enclosed with skirting. Exposed foundations will allow embers to travel underneath the home and possibly ignite flammable material. However, the wrong type of skirting can be vulnerable to radiant heat and direct flame contact. If a combustible skirting ignites or melts, embers and flame could get in.

Recommended materials:

- Masonry
- Cement board
- Metal

Construction Checklist

- ☐ Create 30 feet of defensible space
- ☐ Use non-combustible roofing materials
- ☐ Install guards on metal gutters
- ☐ Keep roof clean of debris
- ☐ Box in eaves with non-nombustible material
- ☐ Screen all vents with 1/8-inch screening
- ☐ Use non-combustible material for siding
- ☐ Install double-pane and tempered-glass windows
- ☐ Install window screens (fiberglass or metal)
- ☐ Use metal window frames or aluminum coverings
- ☐ Clear underneath deck of any vegetation
- ☐ Screen the underside of deck
- ☐ Use non-combustible decking material
- ☐ Create buffer between fencing and home
- ☐ Use non-combustible skirting

30 FOOT DEFENSIBLE SPACE

Without creating defensible space, retrofitting a home will not significantly reduce risk. The 30 feet of defensible space reduces the amount of hazardous vegetation, keeps the yard green and healthy, and creates a buffer between the home and the wildland environment. Defensible space combined with the use of non-combustible construction materials gives a home a better chance of surviving a wildfire.

If you want more information on protecting your home and property, request one of these brochures.

- Plan and Prepare: Is Your Home Ready?
- Be Embers Aware
- Firewise Landscaping
- Vegetation Management in the Wildland Urban Interface

TEXAS A&M FOREST SERVICE

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Insurance Institute for Business & Home Safety

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