

# Utilities and Exterior Equipment



FEMA

## Purpose

To provide information about measures that can be implemented to protect utility connections to buildings and exterior equipment from a wildfire. Guidance pertains to both new and existing buildings.

## Description

Utilities of all types that penetrate a building can be a threat to a building in a wildfire. Exterior equipment, such as solar panels and receiver dishes, can be vulnerable to damage by the high temperatures generated by a wildfire. The following utilities and equipment are particularly susceptible to damage in a wildfire:

### *Electrical Utilities and Exterior Equipment*

Electricity is delivered to homes through aboveground conductors and drop lines (the majority of homes) or through underground cables. Electricity is then provided to exterior equipment by cables that are connected to the equipment from inside the home.

### *Fuel-related Utilities and Exterior Equipment*

Many homes use pressurized gas (liquid petroleum gas, such as propane and butane, or natural gas) or liquid fuel (fuel oil or kerosene) for heating, hot water, and cooking. Propane and butane are stored in pressurized vessels. Natural gas is delivered through pressurized pipes that are connected to the home. Liquid fuel is delivered to the home by gravity from on-site storage tanks.

## Key Issues

### *General*

- Exterior equipment often contains combustible components that increase the risk of ignition of the equipment and the building it is attached to.
- Most utilities and exterior equipment require penetration of the building envelope for ducting and conduit (see Figure 1). The openings may allow heat, hot gases, and embers to enter the building and cause ignition of combustible materials in the building interior.



**Figure 1.** The gap around utility penetrations such as this one should be filled.

- Combustible debris can collect around exterior equipment, increasing the probability of ignition of the equipment and building.

### *Electrical Utilities and Equipment*

- Wildfires can affect power transmission by conduction, convection, direct flame contact, and heavy smoke. Wildfires can damage equipment such as power poles and power lines or cause a short circuit in the lines.
- Power surges and power outages caused by wind and fire can damage electrically powered equipment in homes that are miles away.
- As with any electrical power supply, water well power supplies are vulnerable during a wildfire. Water well systems can be essential to domestic and fire-protection needs.
- Equipment mounted on roofs has the same ignition potential as the roofing assembly.

### *Fuel-related Utilities and Equipment*

- Exposed, combustible delivery lines are vulnerable to wildfire. For example, gas meters are vulnerable to wildfire damage if pipe connections include a rubberized gasket.
- Pressurized and liquid fuels are flammable and explosive.
- Venting of fuel under pressure may cause significant damage or total destruction of a building, depending primarily on the location of the fuel container.

## **Guidance**

### *General*

- If possible, install utility and equipment connections underground, including all entry points into the building.
- If a utility or equipment connection cannot be installed underground, seal gaps and penetrations in exterior walls and roofs with fire-resistant caulk, mortar, or fire-rated expanding foam. Fill large gaps with intumescent or fire-protective sheets or pillows. Fire-resistant wrap may be used around ventilation features that are built into and penetrate exterior walls (such as air conditioners).

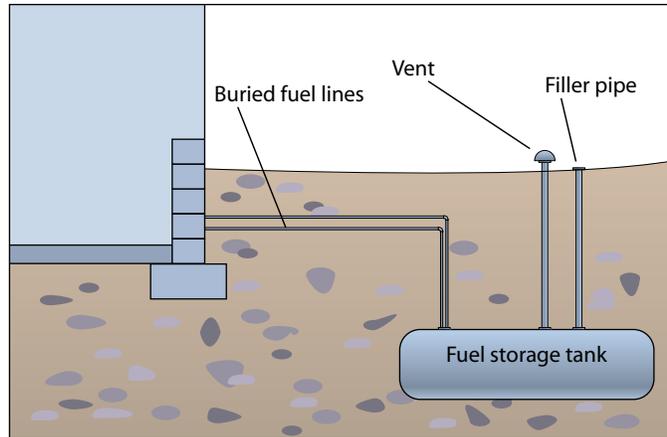
### *Electrical Utilities and Equipment*

- Shield power cables and other wiring with noncombustible or fire-resistant materials to protect the cables and wiring from convection, radiation, and conduction heat, and direct flame contact.
- Use noncombustible or fire-resistant materials for mounting systems of roof-mounted equipment.
- Use surge protectors to protect sensitive electronic equipment.

- Install Class A rated solar cell systems for the greatest protection. Solar cell systems are tested and rated under the same conditions as roofing assemblies and are available with Class A and Class C ratings (see Fact Sheet #5, Roofs).

### *Fuel-related Utilities and Equipment*

- Bury or shield fuel lines to protect them from radiation, conduction heat, and direct flame contact.
- Bury pressurized storage vessels underground (see Figure 2).
- Place fuel storage vessels 30 feet from the home and away from downhill slopes and enclose them behind a noncombustible masonry wall.
- Shield gas meters from hot air and gases, convection and radiant heat, and direct contact by flame, using noncombustible materials such as masonry or concrete.
- Ensure pressurized storage tanks have a pressure relief valve. As the outside temperature rises in a wildfire, the pressure inside the tank can increase. When the pressure setting is exceeded, the valve will open and relieve the pressure, preventing an explosion.



**Figure 2.** Buried fuel storage tank.

## Considerations

- Replacing pipes, cables, and other installations can damage sealants for wall penetrations. Fire-resistant sealants and noncombustible mortar must be removed and replaced each time a cable or pipe is reinstalled.
- Using defensible space for the location of utilities and exterior equipment (for example, electric water pumps, fuel tanks) should be considered (see Fact Sheet #4, Defensible Space).

## Effectiveness

All measures listed in this Fact Sheet are effective in all Fire Severity Zones.

## Resources

Fire-resistant expanding foam standards: ASTM E814, UL 1479, BS 476, Part 20.

Pressure relief valve standards: ASME (American Society of Mechanical Engineers) Boiler & Pressure Vessel Code, Section VIII Division 1 and Section I.

