

# Safety Zone: Solid Fuel Cooking Fire Safety

Cooking or smoking with solid fuels such as hardwoods and charcoal add additional flavors to certain foods restaurants offer. However, the use of solid fuels for cooking also adds another potential for restaurant fires. Three different types of solid fuel cooking are found in the restaurant industry: ovens, smokers and grills. These appliances can be a fire hazard because they are capable of producing high heat, grease and creosote.

## Different Types of Solid Fuel Cooking

### Solid Fuel Ovens

Typically, solid fuel ovens are used for baking pizzas and bread, but they can be used to bake any food product. These ovens can operate at different temperatures depending on the product requirements but generally bake food at temperatures above 400 degrees. These ovens utilize a smokestack to eject the products of combustion into the atmosphere, and they are typically found inside the building. Automatic extinguishing system (AES) protection is not generally found in ovens.



### Solid Fuel Grills

Solid fuel grills are used for “hot and fast” grilling, generally used for grilling chicken, pork and beef products. The grill sears the outside and cooks the inside. Searing a steak can be successfully accomplished between 300 and 500 degrees, and most grills are operated between 400 and 500 degrees, depending on the chef’s preference. Grills are open at the top, and products of combustion are ejected into the atmosphere by the commercial hood/duct ventilation system. Grills also receive the benefit of being protected by the AES. Most grills found in commercial kitchens are of commercial grade. However, some homemade type grills can be found as well.

### Solid Fuel Smokers

Solid fuel smokers normally operate under 250 degrees for the “low and slow” type of cooking. Smokers or BBQ pits should be used outside the building; however, they sometimes can be found inside. Smokers have a lid or are built in such a way to “seal” the unit to keep the heat and smoke inside the unit. Products of combustion will be ejected into the atmosphere by using a chimney. AES protection is not generally found in smokers.

## The Dangers of Solid Fuel Cooking Appliances

Solid fuel cooking appliances do not allow for automatic fuel shutoff, which is found with gas or electric-type appliances. Should there be a grease, hood/duct or chimney fire, the activation of the AES should also automatically shut off the fuel or electricity to conventional appliances. However, in solid fuel appliances, there is no good method of removing the heat source. Throwing water on hot coals will cause an explosion, as the water is rapidly converted into steam, and this conversion rapidly expands. Additionally, attempting to remove burning wood/charcoal from an appliance when on fire is not recommended.

Solid fuel cooking produces creosote, which can be highly flammable. There are three stages of creosote buildup:

- **Stage 1:** The first stage of creosote buildup consists of flaky soot that is easy to brush away with a basic chimney brush.
- **Stage 2:** Creosote in the second stage can be described as shiny, hard black flakes. The flakes contain hardened tar that is not easily brushed away, but can be removed without extreme measures. The most popular method for removing creosote in the second stage is with a rotary loop or chain flail. A powerful drill turns metal rods with these devices attached throughout the duct work to break up the accumulation.
- **Stage 3:** Third-stage creosote is something to be avoided. Not only is it extremely difficult to clean, but it also becomes a highly concentrated fuel resembling a coating of tar dripping down inside of your exhaust system or flue. This type of glazed creosote can become very thick as it hardens and becomes recoated with additional layers. A hot fire can easily ignite this type of creosote, which is extremely hazardous.

Grease buildup is another fire hazard associated with commercial cooking. Fats start to render from the meats around 180 degrees. During the cooking process, the fat rendering will also produce atomized particles of fat that can be ignited. Grease dripping on burning coals will cause flare-ups, leading to creosote buildup igniting. If the cooking appliance is not properly equipped with a grease drainage system that removes the grease from the inside of the appliance, the grease buildup can catch fire and cause the cooking appliance to reach temperatures in excess of 1,000 degrees.

For the above reasons, solid fuel appliances should be discouraged from being used inside the building.

# How to Reduce the Risk of a Commercial Kitchen Fire Caused by Solid Fuel Cooking

A few safety measures to implement to help reduce the risk of commercial kitchen fires caused by solid fuel cooking include:

- Solid fuel cooking should meet [National Fire Protection Association 96](#)
- Do not allow any inside storage of solid fuels
- Clean the chimney/ductwork at least semiannually
- Use a metal pail/bucket to remove waste ash
- Clean the firebox daily
- Wet down the waste ash and store it outside and away from the building
- Have the AES serviced and tested at least semiannually
- Provide grease drip trays/catch pans that funnel grease to the exterior of the cooking appliance
- Clean the grease drip device daily
- Firebox or combustion chamber should be inspected weekly for any damage or obstruction
- The cooking appliance should be at least 3 feet away from any combustible material
- Train employees on proper emergency action for all fires
- Do not throw or spray water on a solid fuel fire
- Contact the local fire department to inspect the facility and to pre-plan firefighting activities

For additional information and resources on this topic and other safety and risk management subjects, be sure to visit the [Loss Control](#) section on our website.

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