

# Solid Cooking Fuel Hazards

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The use of solid fuel increases the variety of cooking methods and flavors for a restaurant. Barbeque imparts a special flavor to food, and wood-fired pizza is growing in popularity. Then there are the wonderful tastes that tandoori ovens and smokers give for a special treat. They are all available in the restaurants we love with the use of solid fuel cooking appliances. However, the downside is the increased hazard that the use of solid fuel cooking equipment involves, and the need for stringent underwriting and inspection of the risks involved.

In the past decade the use of solid fuels—hardwood, charcoal, briquettes, coal and mesquite chips have exploded onto the restaurant scene. These installations are inside the restaurants, not some outside smoker or barbeque pit. The chefs are burning wood, in the kitchen, just on the other side of the wall or in the same room with customers at their tables. Where does the smoke go? What about the ashes? Solid fuel means solid waste that must be handled carefully.

Traditional commercial cooking installations use natural gas, electric or even propane to power ranges, grills, deep fat fryers and broilers. They are equipped with automatic fuel shutoff devices and high temperature controls, and protected by an automatic extinguishing system that discharges fire suppressant wet chemical to control or put out any accidental fire that may occur in the cooking equipment. Furthermore, a hood and duct system exhausts grease laden vapors to the outside, also protected by the automatic extinguishing system.

With solid fuel, many of these elements are not possible or are fundamentally different. One cannot automatically 'shut off' burning charcoal in a barbeque pit or wood in a stove. In fact, restaurants may not fully extinguish a solid fuel

appliance since it takes so long for the equipment to reheat. For example, wood-fired pizza is cooked at temperatures of 500–600 degrees Fahrenheit. A fire that is burning overnight while the restaurant is closed presents an increased risk of hostile fire.

There is no way to install a high temperature control in a coal fired pizza oven, but there are other controls that mitigate the hazard. "There are now a wide variety of solid fuel burning appliances in use in commercial applications," Nils Deacon, a senior inspector for MSO said. "I have inspected small specialty tandoori ovens to industrial sized wood burning matzah ovens. Luckily, we have comprehensive guidance from Standard 96. NFPA 96, the Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations devotes four densely packed pages to solid fuel cooking. Clearances to combustibles and other equipment are addressed. Ventilation of effluent-smoke and cinders is particularly taken into consideration."

This requires some explanation. Cooking on gas or electric appliances will produce grease laden vapors. In addition to grease laden vapors, solid fuel can produce smoke and cinders. Instead of grease, which can be controlled by the filters in the hood, there is now creosote build-up to manage. Creosote is the black oily residue from the combination of water and oils in the fuel. Carbon monoxide is a byproduct of combustion, which must be exhausted. Solid fuel cooking appliances use ambient air in the cooking process, so there is an increased need for adequate ventilation.

Anyone with a wood burning fireplace knows that the chimney must be cleaned on a regular basis to avoid creosote build-up, which can cause a chimney fire. Well, the same principle applies here. Cleaning of the fire box, hood and duct





system is very important and must be conducted more frequently than most other cooking installations. What is interesting and important to know is that creosote has a very low flash point—165 degrees—the point at which flammable vapors are given off. At the flash point, an ignition source, such as sparks or embers, is required for ignition. At high temperatures, around 600 degrees, creosote can auto ignite. Because of the creosote, spark arrestors (special metal screens) are required to ensure that there is no release of sparks into the exhaust system and to the outside. Solid fuel appliances venting effluent must have their own hood and duct system because of the creosote issue. Appliances that do not require a hood and automatic extinguishing system would be ovens and kilns. However, the cleaning requirement for the exhaust system would be the same.



Creosote in stove pipe



Cooking equipment should always be cleaned by qualified, licensed professionals. In New York City, for example, a Certificate of Fitness is required for anyone who cleans commercial cooking equipment.

Employees of cleaning companies must pass a test to be certified to clean commercial cooking equipment.

“Solid fuel equipment is commonly seen in the same cooking line as gas or electric appliances,” Deacon said. “Special attention must be paid to clearances to deep fat fryers. Clearance of 16 inches is required to the open flames of a range or char broiler that is gas fired. This can be achieved horizontally with a stand away approach or vertically with the use of a steel baffle or shield. Clearance to a solid fuel flame is 3 feet because of possible sparks escaping and not being drawn up to the hood.”

Of the fuel itself, whether wood, charcoal or one of the others previously mentioned, only a day’s supply should be kept inside the building. The fuel cannot be stored above the appliance and no closer than 3 feet if it is metal construction. Masonry hearths have reduced clearances. Outside storage is to be neat and orderly.

So, we have ventilation and clearances taken into account, but what about those open flames. How do we put them out if a fire gets out of control? If the equipment is under the hood, the automatic extinguishing system would activate to suppress the fire. However, supplemental fire defense may be needed.

This one is actually common sense; you can put them out with a water hose. A dedicated water hose is required under the NFPA standard. It should be a nozzle that is not capable of producing a straight stream of water. Think of the shower or mist setting on your garden hose. You don’t want the jet setting that would scatter the embers apart. An extinguisher that is compatible with the automatic extinguishing system (wet chemical) is also required.

The water hose should also be used to make certain all embers are out when the ashes are removed from the cooking equipment. The safe handling of these ashes is very important. The ash is to be wetted down and metal containers used to take the ashes outside to be stored until final disposal. We don’t want a lingering ember to cause a fire after the restaurant has closed when no one is around to see and respond to the fire.

With proper adherence to the standard, cooking with fire in kitchens can be safe and produce delicious food for all to enjoy.

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