



Feet to the Fire

Don Pfliegerer

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Owning up to the importance of kitchen grease exhaust and fire safety

In commercial facilities, restaurant fire safety starts with the cooking equipment and its exhaust systems. Catastrophic fires in restaurants and hotels can lead to tremendous property and personal losses.

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However, the fire-safety knowledge, standards and technological advances we have gained over recent years regarding kitchen grease exhaust vent systems can help prevent catastrophic grease exhaust vent fires. While we cannot completely eradicate fires, we can keep the grease or fuel loads in exhaust systems at a manageable level, allow suppression systems to easily extinguish grease fires.

Design and Construction

To prevent grease fires, grease exhaust systems and ductwork should be designed and built to the proper standards. The ductwork should not leak, have proper clearance combustibles and allow proper access for cleaning. The access should be either field installed with proper gasketing or UL listed for use in grease ducts. The access plate must also be leak proof. In addition, kitchen exhaust cleaning (KEC) vendors must be able to easily reach the vent access with a 10-foot ladder or have a working platform at the access plate beyond that platform. The access cannot be blocked. Even ceiling tiles need to be designed and laid out to avoid blockage and enable easy access. Make sure type 2 systems are never used for exhaust cooking equipment, as these systems avoid many of the safety standards required for a type 1 system. Even pizza and bakery ovens produce grease that can build up inches thick inside the exhaust system within a couple of years.

The exhaust portion of the fan should have proper access and hinging to allow it to be easily removed for cleaning and servicing, and it should keep the grease from dripping onto the roof. Standard small grease pans are generally not enough in high grease load situations; additional rooftop containment is often required.

Maintenance and Cleaning of Kitchen Exhaust

Wonderful new technologies exist to remove grease and odors from exhaust streams. UV systems use ultraviolet light to convert the molecular structure of grease into a form of diatomic oxygen and ozone. Regular cleaning of the bulbs (at least every 600 to 1,200 hours of run time) is critical to keep the units functioning properly. Once the bulbs are heavily coated with grease, they fail to properly remove the grease from the air stream and must be replaced.

As part of a PCU setup or as a stand alone, there are also water-wash systems that allow additional filtration to take place at the hood level.

Proper maintenance is even more important than the construction of the exhaust systems. Remember that the minimum standard of cleaning grease exhaust systems is to remove all of the grease and combustible material, including burnt-on grease, commonly called carbonized grease. I recently read a photo report that noted, "All grease removed; the only thing left is the non-flammable carbon buildup." That is untrue: carbon burns the same as grease. That particular system had buildup throughout and was a fire hazard.

When hiring KEC companies, buyer beware. Consider adding the following clause to all contracts to hold unscrupulous companies accountable: "Any subsequent cleaning cost incurred after the performed service that is due to improper or incomplete cleaning will be the original kitchen exhaust cleaner's responsibility." This could save you thousands of dollars. Several large chains are wrestling with finding funds for the major initial cleanups of old grease that was never removed by previous KEC vendors.

Water Leak Testing

One popular method is the water leak test for grease ducts. In the past, lights and air pressure were used to spot leaks. A University of Minnesota inspector, Kent Reese, found that even after these tests were performed, grease leaks were still present in the systems. Approximately 20 years ago, he approved the use of high-pressure water with a spinjet to test the ductwork during construction. It worked better than anyone could have imagined.

Carolyn Roberts from Chipotle started the leak test program several years ago for her stores, and the savings have been in the tens of thousands of dollars in repairs and prevented damage. Several additional concepts and municipalities have also adopted this procedure, and it will soon be an accepted standard for testing grease ducts.

In the past 500 leak tests we performed, our records indicate that fewer than 5 percent actually passed the first time without repairs. That means that 95 percent of the locations had grease leakage in the hidden areas above the ceilings. Not only is damage avoided from the grease leakage, extreme fire danger is also mitigated in the ceiling areas, where there is a lack of fire protection. And we do not have to mention the costs of repairing the leaks once the ceilings are in place and the ducts are wrapped. (Plus, in some cases, there is also the cost of replacing the saturated duct wrap.) This procedure is best done before the duct is wrapped. A welder should be on site to mark the leaks and to make the needed repairs so the system can be re-tested after each repair per NFPA-96 standards.

Scheduling Cleaning

Improper scheduling can leave your systems in as much danger as improper cleaning and can even waste money if done too often. Cleaning frequency should be based on the type of cooking and volume. The chart below shows the NFPA-96 recommended inspection frequencies.

For places you can reach, a duct-measuring comb can determine exactly how much grease buildup is in the system. This knowledge can assist in setting a proper cleaning schedule. NFPA states that cleaning should be done when the average grease buildup reaches 2,000 microns (0.078 inches) or the higher impact zones, called the critical depth, reaches 3,125 microns (0.125 inches). In layman's terms, if your grease buildup is approximately 1/8 inch, the system should be cleaned.

Inspections and Photo Programs

The old saying is "you expect what you inspect." The minimum standard for cleaning exhaust systems is to remove all the grease in the system. In reality, very few KEC vendors do this on a regular basis. Both visual inspections and the use of new digital photo programs are valuable tools that bring all vendors into compliance. Monopods and extensions allow cameras to view hard-to-reach areas of the ductwork.

While many companies now produce photo evidence to show they cleaned the systems, these photos are only valuable if they are complete and accurate, and if someone experienced actually looks at them and verifies the jobs are done correctly.

To hold KEC vendors accountable for their work, a multi-faceted approach is required. First, have a complete set of baseline photos for every system. Some KEC vendors may attempt to send fraudulent photos that were taken from other systems or taken at strategic angles to hide uncleaned areas; the baseline photos will help keep track of the cleaning.

Second, require that the photos follow a set series that shows all four sides of the duct; include reference points where possible. Ask to see both sides of the fan blades and the back of the upper filter rails showing the bottom of the vertical riser with the hood. The back of the fan blades and the connection right above the hood are the most often missed areas that can lead to the most damage from vibrations, air flow issues or fire when neglected.

Third, make sure you know where the system goes. If it has horizontal ductwork, make sure it is included. If there is a jog or "Y" above the hood, check that the photos show that area. Knowledge is power and can save not only money in the long run—it could save your facility.

As many facility managers have discovered, where there is no accountability for the KEC vendor, there is often years of grease left in a system. Neglect of the grease exhaust system

can be very costly, and the resulting losses can even be deadly.

Don Pfeleiderer is President of Enviromatic Corp. and has more than 37 years of experience in the exhaust system field.

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