

# 10 Tips on Combustion System Care

## Safety Note

### Keep Filters Clean

Any filter blockage will result in serious problems. As the system impedes under a clogged filter, your process may not get the required input. Clogged filters put undue strain on the combustion air blowers over time, so your electrical and motor maintenance costs may escalate. Additionally the burners may go fuel rich. This wastes fuel and can create carbon, which at its best is an insulator. At its worst, it is a fire hazard.

### Check Your Pressure

Combustion experts speak in terms of pressures, velocities and flows because these are critical to burner operation. By understanding and knowing burner pressures and flows, you can detect changes in performance early and help troubleshoot any problems.

A manometer is an inexpensive device for measuring air pressure. If you do not have one, get one. Ask your burner technician to show you where to check the pressure inputs on your burner, then check them monthly. If you notice a change in pressure, alert your combustion technician to get the burner back in tune.

### Make Sure Exhaust Systems Are Properly Functioning and Clean

Today's combustion equipment is sophisticated and sensitive to pressure fluctuations. If the exhaust is restrictive, the burners will struggle to get the proper input to the process. Clean exhaust also minimizes any chance of fire. Check flues monthly.

### Eliminate Excess Air

If controls have moved or another phenomenon has caused the burners to lean out, it could cost you a fortune. Most burners are designed to burn with a small percentage of excess air (less than 15 %). Exceptions include air heating equipment and low temperature operations where the excess air is used to control the temperature of the flame. If you have a burner designed to run at 10 percent excess air and the burner drifts into the range of 50 percent (that is a difference of 5 percent O<sub>2</sub> or 7.5 percent O<sub>2</sub> in the products of combustion), the difference in a 1,000 °F (538 °C) oven operation is 7 percent loss of efficiency. If you had a 1 million BTU/hr burner, and gas costs of \$5 per 1,000 cfm, keeping one burner in tune would save approximately \$2,600 per year.

## Use an Oxygen Analyzer

Measure the content of oxygen left over from the chemical process of combustion with an oxygen analyzer. Costs for simple portable units range anywhere from \$400 to \$3,000, but the devices should pay for themselves within a year. In oven or heater operations, have your combustion technician show you where to spot check the flue products so you can detect changes. If changes become dramatic, have your technician tune the burners. Remember, in some operations, O<sub>2</sub> levels may be high due to air entrainment from other sources, but the O<sub>2</sub> can still be measured and change may be recognizable. Check monthly.

## Commit to Educating Yourself and Your Staff

Combustion schools are offered by burner equipment manufacturers and trade organizations to help educate you and your staff on proper burner operation. Most are less than one week and cover combustion and application issues.

## Regularly Conduct Maintenance Inspections

Many times, combustion service groups are called to fix burners that do not require repair. The reason for diminished process operation is the loss of heat through the gradual breakdown of insulation or door seals. This is not a reflection on the equipment: thermal equipment is under tremendous duress day in and day out. Unless it is maintained, it will wear out. If there is a leak, the burners do not know there is a change, so their output remains the same. But if you notice the oven or heater begins to slow down production and call the combustion service company. Conduct walk-around inspections regularly. Does it feel warmer next to the oven than normal? It is probably not an accident; it is losing heat to the room. Maintain your process heating equipment according to the manufacturer's recommendations.

## Reduce the Amount of Time Spent Analyzing Performance Changes

If you commit to learning about combustion equipment and controls, you can be your own best helper when analyzing changes in performance or production. If you can call your technician and say, "My flue products have fluctuated 2 percent in oxygen and my air manifold pressures have changed 5" in water gauge pressure," you have already saved valuable time in analyzing the situation.

## Check Flame Color

If you notice a variation in flame color, that indicates something is wrong. Bright, luminescent flames generally indicate a gas-rich condition. The exception would be radiant tube or incinerator burners, which are designed to be luminescent. A bright white or wispy blue flame often indicates lean burn or excess air. The exception is air heat-type burners that, by design, burn with a lean flame. If you see soot or carbon on the floor, that indicates the combustion process is not working. With the exception of one or two industrial processes, a sooty flame is not desirable. If a sooty flame occurs, have a technician review the burner settings as soon as possible. Soot is a solid form of your fuel dollars.

## ABOUT US

---

Honeywell Combustion Safety is a part of Honeywell Thermal Solutions, an industry leader in commercial and industrial combustion solutions. Honeywell Combustion Safety, formerly known as CEC Combustion Safety, has been in business since 1984. With engineers and staff members that sit on Code committees such as NFPA 56, NFPA 85, NFPA 86, and NFPA 87, our inside expertise is integrated within all of our practices, and our global reach ensures that customers around the world are kept safe. Honeywell offers testing and inspections, engineering & upgrades/retrofits, gas hazards management, training, and field services for all industrial facilities and different types of fuel fired equipment. By assisting organizations and their personnel with the safe maintenance and operation of their combustion equipment, Honeywell aims to save lives and prevent explosions while increasing efficiency and reliability of combustion equipment.

## Listen Closely to Your Equipment

When a burner is properly tuned and running as designed and the process is working well, there usually is an identifiable noise associated with the equipment working in concert. What does a change in pitch on the combustion air blower indicate? Is the burner sputtering or has it changed from a low drone to a high pitched roar? When a burner changes sound or a valve creaks, it is never an indication of a positive change. If you heard the brakes on your car squeal, you would have them examined by a brake specialist. Afford the same concern to your combustion system to keep it running smoothly.

Whether a simple pilot burner or a large velocity burner, combustion equipment is designed to operate at a recognizable and repeatable level of performance. The days of low fuel costs and an open pipe belching flame are long gone. Learning about this equipment and appreciating how efficiently it can perform for you will save energy and maintenance budgets. Take advantage of the companies that are willing to teach you. Safety should be paramount in your mind.

### For more information

Learn more about Honeywell Combustion Safety, contact [info@combustionsafety.com](mailto:info@combustionsafety.com), visit [www.combustionsafety.com](http://www.combustionsafety.com) or contact your Honeywell Sales Engineer.

### Honeywell Process Solutions

Honeywell Combustion Safety  
2100 Apollo Drive  
Brook Park, OH 44142 USA  
Tel: +1 216-749-2992

SF-17-01-US  
September 2017  
© 2017 Honeywell International Inc.

**Honeywell**