

To The Point Combustion Control Devices

CHUBB®



Keep Fuel-Fired Appliances Working Smoothly, Safely, and Efficiently

Fuel-fired appliances have many building and production uses including boilers, furnaces, ovens, and dryers. The similarity of these appliances is the usage of fuel, typically natural gas or oil, delivered to a burner through a series of pipes and devices. These combustion control devices work to:

- Regulate the supply of fuel to the burner during operation to provide consistent burner operation
- Allow for safe lighting and operation of the appliance
- Allow for the fuel supply to be shut off when the appliance is not in use
- Shut off the fuel supply when an unsafe condition is present

Properly operating combustion controls keep appliances working smoothly, safely, and efficiently. However, when the combustion controls do not work correctly, operational efficiency can

decrease significantly; or if they fail, the potential for a large fire or explosion exists. Installing, inspecting, testing, and maintaining adequate combustion controls helps ensure that fuel-fired appliances operate safely and efficiently, and reduce the risk of a catastrophic fire or explosion at your facility.

Hundreds of fires and explosions occur annually, resulting in millions of dollars in damage to equipment and buildings as well as business interruption. Many more combustion control failures occur that do not result in a fire or explosion, but cause costly production outages leading to business interruption, loss of sale orders, and increased operational expenses.

Case In Point

A recent incident involved a restart of an appliance following a period of inactivity. While the appliance was idle, leaking valves caused fuel to enter the burner area. Following a purging and

Risk Engineering Services

ignition sequence (which may have been inadequate or incorrect) the appliance ignited, causing an explosion of the accumulated fuel and air mixture within the burner area. The explosion damaged the appliance, surrounding area, and building.

Inspections

While jurisdictional inspections may be required by the state or local municipality, these inspections often do not include a complete review of the combustion controls for the appliance. A review of these devices frequently results in the discovery of errors including:

- Improperly vented devices. The discharge vent should be located so that gas is released into the atmosphere without undue hazards.
- Vent line orifice reductions. This makes the lines ineffective and vulnerable to blockage.
- Devices manifolded together when not permitted. This practice is permitted only when manifolds are fed from similar components and if the cross-sectional area of the manifold is not less than the largest vent line plus 50% of the area for each additional vent line.
- Safety devices leaking fuel into combustion area. This presents the potential of a severe explosion hazard.
- Set points bottomed or topped out on devices. If this condition is observed, there are typically other problems with the fuel train or burner.
- Lack of testing and maintenance. This could result in leaking valves and unsafe conditions.

Efficiency aside, these issues increase the likelihood that a fire or catastrophic explosion will occur at your facility. The loss to the equipment is a small portion

of the impact, as the resulting business interruption could continue for months following an incident.

Mitigation Solutions

The following activities help to mitigate combustion control accidents:

- Verify that the installation complies with all current applicable codes and standards, such as ASME CSD-1 or NFPA 85 or NFPA 86. An existing installation may be considered grandfathered, only to find that significant safety combustion control devices are lacking or incorrect based on newer standards.
- Complete operator training annually. Knowledgeable and competent operators need to understand the operational issues of the appliances and realize the consequences of bypassing safety devices or short cutting operational procedures.
- Establish preventative maintenance procedures for inspection, maintenance, and testing to maintain the reliability of the devices. Follow the manufacturer's instructions for specific tasks and frequency. Conduct these tests and maintenance tasks at least annually.
 - Conduct bubble tests for tightness on all valves to verify that they do not leak
 - Exercise manual valves
 - Lubricate and leak test valves
 - Leak test safety shutoff valves and the valve proving system
 - Test gas limit switches for proper operation per manufacturer's guidelines
 - Inspect vent line terminations for blockage
 - Verify proper operation of flame-proofing and failure devices in accordance with manufacturer's guidelines

Resources

ASME CSD-1 Controls and Safety Devices for Automatically Fire Boilers

NFPA 54 National Fuel Gas Code

NFPA 85 Boiler and Combustion Systems Hazards Code

NFPA 86 Standard for Ovens and Furnaces

Connect With Us

For more information about protecting your business, contact your local Chubb Risk Engineer or visit us at www.chubb.com/engineering.

Chubb. Insured.SM