

Safe Use of LP Gas Fired Grain Dryers

Grain dryers can be categorized in a variety of ways. Dryers normally run on natural or LP gas. This bulletin will focus on LP gas as the fuel source. As with any other LP gas consuming appliance, the dryers shall be approved for this specific purpose.

A grain dryer fire can be costly to your business operations creating a loss of productive time, a loss of product, potential damage to other buildings or equipment and potential for employee injury.

The grain dryer manufacturer's guidelines for installation and preventative maintenance should be followed. A regular inspection program should be developed for the dryer, including preseason and at the end of the drying season.

Location

Dryers shall be located so as to minimize fire exposure to adjacent buildings and structures, to minimize ignition potential to operating and storage areas and to provide access for fire fighting.

Dryers shall not be located inside grain handling or grain storage structures.

Direct-heat grain dryers installed after March 30, 1988 shall be located:

- Outside the grain dryer
- In an area inside the grain elevator protected by a fire or explosion suppression system
- In an area inside the grain elevator which is separated from other areas of the facility by construction having at least a one hour fire-resistance rating

Dryers shall be located on a firm, level, non-combustible surface a minimum distance of ten feet from other buildings, equipment and combustible materials such as baled hay or excess weed growth.

For information on LP gas fuel tank installation that would provide the source of fuel to a dryer, please refer to Loss Control Bulletin, R-1, Liquefied Petroleum Gas (LP gas).

Installation

Piping used from the LP gas fuel source to the dryer shall be wrought iron, steel (black or galvanized), brass, copper, polyamide or polyethylene. Tubing shall be steel, stainless steel, brass, copper, polyamide or polyethylene. If copper is used, type K is recommended.

If metallic piping is used, a provision shall be made to compensate for expansion, contraction, jarring, vibration and settling. Any of these issues can damage LP gas connections and result in a fire. This may be accomplished with a flexible connection, hose or spiraled tubing.

All electric wiring should comply with the National Electric Code (NFPA 70).

Burner systems and their controls for dryers fired by LP gas shall comply with NFPA 86, Standard for Ovens and Furnaces.

LP gas vaporizing burner installation shall comply with NFPA 58, Liquefied Petroleum Gas Code.

The dryer and its auxiliary equipment shall be equipped with excess temperature limit controls to supervise:

- The airstream between the fuel burner and the drying chamber air inlet.
- The airstream at the discharge of the cooling and heating sections.

Excessive temperatures detected at either of the above locations shall initiate an automatic shutdown.

Fire safety

Outward opening doors or openings shall be provided to allow access to all parts of the dryer to permit inspection, cleaning and

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maintenance and the effective use of portable fire extinguishers or hose streams.

The automatic shutdown shall shut off fuel or heat to the burners, stop the flow of product out of the dryer, stop all airflow from fans into the dryer and sound an alarm.

In case of fire, dryers shall be designed with means for unloading (emergency dumping) of the contents to a safe outside location which would not cause fire to adjacent buildings, structures or equipment. A method shall be provided for the safe handling of burning material and for the extinguishment of the burning material as it is emptied from the dryer.

An emergency stop shall be provided that will enable manual initiation of the automatic shutdown.

All safety control equipment shall have to be manually reset before the dryer can be returned to operation.

Extra materials that are not normally part of the grain as it is received from the farm and could contribute to a fire hazard shall be removed before it enters the dryer.

A fire detection system shall be provided when the operation is intermittent during the drying season and if the dryer is shut down full or partially full of grain. This alarm must sound in a constantly attended location. The fire detection system shall be permitted to be deactivated when the dryer has been thoroughly emptied and cleaned or when the dryer has been emptied, cleaned and secured at the end of the drying season.

The grain dryer shall be shut down during refilling of LP gas tanks unless the point of transfer is more than 50 feet from the air intake of the dryer.

Preventive maintenance and inspections

Preventative maintenance should be performed in accordance with the manufacturer's guidelines.

Dust accumulation should be kept to a minimum of 1/8 inch or less on floors where the grain dryer is located inside the facility.

Regularly scheduled inspections of the mechanical and safety control equipment must be conducted. Records shall be maintained of each inspection.

Lockout/tagout procedures must be utilized which will prevent the accidental application of energy to the dryer while it is being repaired, serviced or adjusted which could lead to an employee injury.

In order to reduce the risk of fire, grain material should be regularly cleaned from the inside and outside of grain dryers. The air intake screens should be kept clean and in good condition to prevent combustible material from being drawn into the dryer.

A leading cause of grain dryer fires is the accumulation of fine grain particles in proximity to the burner system. Fine grain particles in close proximity to the open flame burner could lead to a fire. Grain fines must be cleaned from this area as part of a regular maintenance program. The accumulation of the fine particles can also cause reduced airflow and improper sensor operation which could also lead to overheating and possibly a fire.

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From NFPA 58: Liquefied Petroleum Gas Code, 2011 Edition; **NFPA 61:** Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities, 2008 Edition; and **OSHA 29 CFR 1910.272:** Grain Handling Facilities