

# CHAPTER 21

## INDUSTRIAL OVENS

### SECTION 2101 GENERAL

**2101.1 Scope.** This chapter shall apply to the installation and operation of industrial ovens and furnaces. Industrial ovens and furnaces shall comply with the applicable provisions of NFPA 86, the *International Fuel Gas Code*, *International Mechanical Code* and this chapter. The terms “ovens” and “furnaces” are used interchangeably in this chapter.

**2101.2 Permits.** Permits shall be required as set forth in Sections 105.6 and 105.7.

### SECTION 2102 DEFINITIONS

**2102.1 Definitions.** The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

**FURNACE CLASS A.** An oven or furnace that has heat utilization equipment operating at approximately atmospheric pressure wherein there is a potential explosion or fire hazard that could be occasioned by the presence of flammable volatiles or combustible materials processed or heated in the furnace.

**Note:** Such flammable volatiles or combustible materials can, for instance, originate from the following:

1. Paints, powders, inks, and adhesives from finishing processes, such as dipped, coated, sprayed and impregnated materials.
2. The substrate material.
3. Wood, paper and plastic pallets, spacers or packaging materials.
4. Polymerization or other molecular rearrangements.

Potentially flammable materials, such as quench oil, water-borne finishes, cooling oil or cooking oils, that present a hazard are ventilated according to Class A standards.

**FURNACE CLASS B.** An oven or furnace that has heat utilization equipment operating at approximately atmospheric pressure wherein there are no flammable volatiles or combustible materials being heated.

**FURNACE CLASS C.** An oven or furnace that has a potential hazard due to a flammable or other special atmosphere being used for treatment of material in process. This type of furnace can use any type of heating system and includes a special atmosphere supply system. Also included in the Class C classification are integral quench furnaces and molten salt bath furnaces.

**FURNACE CLASS D.** An oven or furnace that operates at temperatures from above ambient to over 5,000°F (2760°C) and at pressures normally below atmospheric using any type of heating system. These furnaces can include the use of special processing atmospheres.

### SECTION 2103 LOCATION

**2103.1 Ventilation.** Enclosed rooms or basements containing industrial ovens or furnaces shall be provided with combustion air in accordance with the *International Mechanical Code* and the *International Fuel Gas Code*, and with ventilation air in accordance with the *International Mechanical Code*.

**2103.2 Exposure.** When locating ovens, oven heaters and related equipment, the possibility of fire resulting from overheating or from the escape of fuel gas or fuel oil and the possibility of damage to the building and injury to persons resulting from explosion shall be considered.

**2103.3 Ignition source.** Industrial ovens and furnaces shall be located so as not to pose an ignition hazard to flammable vapors or mists or combustible dusts.

**2103.4 Temperatures.** Roofs and floors of ovens shall be insulated and ventilated to prevent temperatures at combustible ceilings and floors from exceeding 160°F (71°C).

### SECTION 2104 FUEL PIPING

**2104.1 Fuel-gas piping.** Fuel-gas piping serving industrial ovens shall comply with the *International Fuel Gas Code*. Piping for other fuel sources shall comply with this section.

**2104.2 Shutoff valves.** Each industrial oven or furnace shall be provided with an approved manual fuel shutoff valve in accordance with the *International Mechanical Code* or the *International Fuel Gas Code*.

**2104.2.1 Fuel supply lines.** Valves for fuel supply lines shall be located within 6 feet (1829 mm) of the appliance served.

**Exception:** When approved and the valve is located in the same general area as the appliance served.

**2104.3 Valve position.** The design of manual fuel shutoff valves shall incorporate a permanent feature which visually indicates the open or closed position of the valve. Manual fuel shutoff valves shall not be equipped with removable handles or wrenches unless the handle or wrench can only be installed parallel with the fuel line when the valve is in the open position.

### SECTION 2105 INTERLOCKS

**2105.1 Shut down.** Interlocks shall be provided for Class A ovens so that conveyors or sources of flammable or combustible materials shall shut down if either the exhaust or recirculation air supply fails.

## SECTION 2106 FIRE PROTECTION

**2106.1 Required protection.** Class A and B ovens which contain, or are utilized for the processing of, combustible materials shall be protected by an approved automatic fire-extinguishing system complying with Chapter 9.

**2106.2 Fixed fire-extinguishing systems.** Fixed fire-extinguishing systems shall be provided for Class C or D ovens to protect against such hazards as overheating, spillage of molten salts or metals, quench tanks, ignition of hydraulic oil and escape of fuel. It shall be the user's responsibility to consult with the fire code official concerning the necessary requirements for such protection.

**2106.3 Fire extinguishers.** Portable fire extinguishers complying with Section 906 shall be provided not closer than 15 feet (4572 mm) or a maximum of 50 feet (15 240 mm) or in accordance with NFPA 10. This shall apply to the oven and related equipment.

## SECTION 2107 OPERATION AND MAINTENANCE

**2107.1 Furnace system information.** An approved, clearly worded, and prominently displayed safety design data form or manufacturer's nameplate shall be provided stating the safe operating condition for which the furnace system was designed, built, altered or extended.

**2107.2 Oven nameplate.** Safety data for Class A solvent atmosphere ovens shall be furnished on the manufacturer's nameplate. The nameplate shall provide the following design data:

1. The solvent used.
2. The number of gallons (liters) used per batch or per hour of solvent entering the oven.
3. The required purge time.
4. The oven operating temperature.
5. The exhaust blower rating for the number of gallons (liters) of solvent per hour or batch at the maximum operating temperature.

**Exception:** For low-oxygen ovens, the maximum allowable oxygen concentration shall be included in place of the exhaust blower ratings.

**2107.3 Training.** Operating, maintenance and supervisory personnel shall be thoroughly instructed and trained in the operation of ovens or furnaces.

**2107.4 Equipment maintenance.** Equipment shall be maintained in accordance with the manufacturer's instructions.