


CITY AND COUNTY OF DENVER		POLICY	DENVER FIRE DEPARTMENT
Subject:	ANNUAL INDUSTRIAL OVENS OR FURNACES POLICY WITH PERMIT APPLICATION		
Reference:	2015 IFC Chapter 30		
Approved:			Manuel Almaguer Division Chief, Fire Prevention Division
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This policy is meant to provide basic information for the most common conditions and situations. In any given occupancy, many other Fire Code requirements may be enforced. The Fire Inspector will address these during a premise inspection. Questions can be addressed by contacting the Fire Prevention Division between 7:00 a.m. and 4:00 p.m. at 720-913-3474. Walk-in hours are 7:00 a.m. to 9:30 a.m. ONLY, Monday-Friday at 745 W. Colfax Avenue.

## I. APPLICATION OF POLICY

This policy shall apply to all occupancies engaging in the use of **INDUSTRIAL OVENS & FURNACES** for any process **EXCEPT**:

- A. Listed equipment with a heating system(s) that supplies a total input not exceeding 150,000 Btu/hr. (44 kW)

## II. TYPES OF OVENS & FURNACES

- A. **Class A ovens** and furnaces are 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. Such flammable volatiles or combustible materials can, for instance, originate from any one of the following:
  1. Paints, powders, inks, and adhesives from finishing processes, such as dipped, coated, sprayed, and impregnated materials
  2. 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 per Class A standards.
- B. (**Class B ovens and furnaces** are heat utilization equipment operating at approximately atmospheric pressure wherein there are no flammable volatiles or combustible materials being heated.
- C. **Class C ovens and furnaces** are those in which there is 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(s). Also, included in the Class C classification are integral quench furnaces and molten salt bath furnaces.
- D. **Class D furnaces** are vacuum furnaces that operate at temperatures that exceed ambient to over 5000°F (2760°C) and at pressures from vacuum to

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several atmospheres during heating using any type of heating system. These furnaces can include the use of special processing atmospheres. During gas quenching, these furnaces may operate at pressures from below atmospheric to **over a gauge pressure of 100 psi (690 kPag).**

### III. DEFINITIONS

#### A. ***Excess Temperature Limit Controller.***

A device designed to cut off the source of heat if the operating temperature exceeds a predetermined temperature set point.

#### B. ***Molten Salt Bath Furnace.***

A furnace that employs salts heated to a molten state, excluding aqueous alkaline baths, hot brine, or other systems utilizing salts in solution.

### IV. SUBMITTALS

- A. Before new equipment is installed or existing equipment is modified or updated, complete plans, sequence of operations, and specifications shall be submitted to the Denver Building Department for approval.
- B. Plans shall be drawn to show all essential details regarding location, construction, ventilation, piping, and electrical safety equipment. A list of all combustion, control, and safety equipment, including manufacturer, type and number shall be included.
- C. Upon approval of the Denver Building Department and the Denver Fire Protection Engineers an annual operational permit shall be obtained from the **Denver Fire Department, Fire Prevention Division at 745 West Colfax.**

### V. SITE INSPECTION FOR DENVER FIRE DEPARTMENT PERMIT

Upon successful approval of permit from the Denver Fire Department Fire Prevention Division, a Fire Inspector will conduct a field inspection of the site. Compliance with **all** Fire Code requirements shall be maintained always. Permit shall be kept on site and is only valid for the owner, time frame dates issued, and site address indicated on the permit.

#### **A permit may be revoked when:**

- A. Any of the conditions or limitations set forth in the permit have been violated
- B. Compliance with written orders has not been achieved
- C. False statements or misrepresentations of information provided in the permit application is discovered.
- D. The permit is issued in error or in violation of an ordinance, regulation or the Fire Code.

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## **VI. SPECIFIC REQUIREMENTS**

### **OPERATOR TRAINING EQUIPMENT / PROCESS**

- A. NFPA 86 7.4.8 - Personnel shall have access to operating instructions at any time.

### **EMERGENCY OPERATIONS**

- A. NFPA 86 7.4.4 - Operating procedures shall be established that cover normal and emergency conditions.
- B. Training shall be conducted on a regular basis to ensure that equipment operators are proficient in performing emergency procedures.
- C. Records of all training shall be kept for a period of 3 years.

### **SIGNAGE & LABELING TYPE OF EQUIPMENT & USE**

- A. NFPA 86 4.2.1 - A safety design data form, or nameplate, that states the operating conditions for which the furnace system was designed, built, altered, or extended shall be accessible to the operator.
- B. NFPA 86 4.2.2 - A warning label stating that the equipment shall be operated and maintained according to instructions shall be provided.
- C. NFPA 86 4.2.3 - The warning label shall be affixed to the furnace or control panel.

### **EMERGENCY SHUTOFFS FUEL**

- A. NFPA 86 6.2.4.1 - A remotely located shutoff valve shall be provided to allow the fuel to be turned off in an emergency and shall be located so that fire or explosion at a furnace does not prevent access to this valve.
- B. NFPA 86 6.2.5.1 - Individual manual shutoff valves for equipment isolation shall be provided for shutoff of the fuel to each piece of equipment.
- C. NFPA 86 6.2.5.1 - Manual shutoff valves shall have permanently affixed visual indication of the valve position.
- D. NFPA 86 8.2.8 - A manual emergency switch shall be provided to initiate a safety shutdown.
- E. NFPA 86 8.2.6 - Safety devices shall be located or guarded to protect them from physical damage.
- F. NFPA 86 8.2.7 - Safety devices shall not be bypassed electrically or mechanically.
- G. NFPA 86 8.2.3 - Electric relays and safety shutoff valves shall not be used as substitutes for electrical disconnects and manual shutoff valves.

### **DELAYED PURGING CONSIDERATIONS**

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- A. Class A Ovens shall require provisions for emergency shutdown operations during power failure by one of the following:
- B. An emergency standby power generator provided for emergency shutdown during a power failure.
- C. Alternate safety shutdown procedures for power failure are employed. NFPA 86 (10.2.9.2)

## **INTERLOCKS**

- A. Safety Interlocks shall be installed to initiate shutdown or prevent operation for any the following:
  - 1. Over/Under-Temperature, Over/Under Pressure, Ventilation failure (combustion, supply, exhaust, process, room etc.), Over/Under Voltage/Amperage, Over/Under Fuel Supply Pressure, Cooling System Failure, Over/Under required oxygen level, failure of any safety interlock device sensor or any other condition outside of normal operating parameters per NFPA 86.

## **FIRE PROTECTION SYSTEMS REQUIRED**

- A. 2009 IFC 2106.1 Required protection.
- B. Class A and C 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.
- C. 2009 IFC 2106.2 Fixed fire-extinguishing systems.
- D. 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.
- E. 2106.3 Fire extinguishers.
- F. Portable fire extinguishers complying with Section 906 shall be provided and installed no closer than 15 feet (4572 mm) or a maximum of 50 feet (15 240 mm) from the oven/furnace or in accordance with NFPA 10. This shall apply to the oven and related equipment.
- G. Agent used shall be compatible with equipment and materials being processed.

## **SPECIAL CONSIDERATIONS**

- A. NFPA 86 14.3.1 - Where water from a fixed protection system could encounter molten materials, such as molten salt or molten metal, shielding shall be provided to prevent water from contacting the molten material.

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- B.** NFPA 86 14.3.3 - Where sprinklers are selected for the protection of ovens, furnaces, or related equipment, the use of closed-head sprinkler systems shall be prohibited, and only deluge sprinkler systems shall be used where the following conditions exist:
1. In equipment where temperatures can exceed 625°F (329°C)
  2. Where flash fire conditions can occur.

### **SPECIAL HAZARDS PROCESSES**

- A.** NFPA 86 12.10.1 Salt bath equipment shall be located either inside acement-lined pit or within a curbed area.

### **CHEMICALS**

- A.** NFPA 86 12.10.1 Nitrate salts shall be stored in a separated, moisture-free room or area with walls, floor, and ceiling having a 2- hour fire-resistive rating, located away from heat, liquids, and reactive chemicals.
- B.** NFPA 12.10.1 The nitrate salt storage room or area shall be secured to prevent entry by unauthorized personnel at all times.

### **LOCATION CONSIDERATIONS**

- A.** NFPA 86 5.1.2.1 Furnaces shall be located and erected so that building structural members are not affected adversely by the maximum anticipated temperature.
- B.** NFPA 86 5.1.3.1 Furnaces shall be located to minimize exposure to power equipment, process equipment, and sprinkler risers.
- C.** NFPA 86 5.1.3.2 Unrelated stock and combustible materials shall be located at a distance from a furnace, a furnace heater, or ductwork so that the combustible materials will not be ignited, with a minimum separation distance of 10 feet.
- D.** NFPA 86 5.1.4.1 Furnaces shall be located with space above and on all sides for inspection and maintenance purposes.
- E.** NFPA 86 5.1.4.2 In addition to the requirement of 5.1.4.1, provisions shall be included for the installation of automatic sprinklers and the functioning of explosion venting, if applicable.
- F.** NFPA 86 5.1.4.3\* Furnaces shall be constructed **and located to keep temperatures at combustible floors, ceilings, and walls less than 160°F (71°C).**

### **VENTILATION of All Ovens**

- A.** NFPA 86 6.2.3.1- The fuel-burning system design shall provide a supply of clean combustion air delivered in amounts prescribed by the furnace designer or burner manufacturer across the full range of burner operation.

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## **CLASS A OVENS**

- A.** NFPA 86 10.1.1.6 - Safety ventilation shall be maintained until all flammable vapors are removed or have been released from the oven and other associated equipment.
- B.** NFPA 86 10.1.1.7 Class A ovens shall be mechanically ventilated
- C.** NFPA 86 10.1.1.9 Class A ovens shall be ventilated directly to outdoor atmosphere or indirectly to outdoor atmosphere through a fume incinerator in accordance with Chapter 9 or through other approved volatile organic compound (VOC) or particulate pollution control devices.

## **TESTING & MAINTENANCE**

- A.** NFPA 86 7.5.1 Safety devices shall be maintained in accordance with the manufacturer's instructions.
- B.** NFPA 86 7.5.4 All safety interlocks, set points, pressures, flow devices, pressure, and explosion relief devices, shall be tested for function at least annually.
- C.** NFPA 867.5.11\* Lubricated manual shutoff valves shall be lubricated and subsequently leak tested for valve closure at least annually.
- D.** NFPA 86 7.5.14 Whenever any set point, safety interlock, temperature, pressure, or flow device is replaced or altered, it shall be tested for function.
- E.** NFPA 86 7.5.16 An inspection shall be completed at least annually to verify that all designed safety interlocks are present and have not been bypassed or rendered ineffective.

## **RECORD RETENTION**

- A.** Records of inspection, testing, and maintenance activities shall be retained for a period of 3 years.

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**INDUSTRIAL OVEN / FURNACE PERMIT APPLICATION FORM**

THIS FORM IS TO BE COMPLETED BY A REPRESENTATIVE OF THE BUSINESS APPLYING FOR AN INDUSTRIAL OVEN PERMIT. IT SHALL BE DIRECTED TO THE FIRE PREVENTION DIVISION, FLAMMABLE GROUP.

A PERMIT WILL NOT BE ISSUED IF THIS FORM IS NOT COMPLETE AND ACCOMPANIED BY PAYMENT DUE.

NAME OF BUSINESS: \_\_\_\_\_

BUSINESS ADDRESS: \_\_\_\_\_

CITY, STATE, and ZIP CODE: \_\_\_\_\_

PERMIT SITE ADDRESS: \_\_\_\_\_

PERMIT SITE OCCUPANCY USE: \_\_\_\_\_

CONTACT'S NAME: \_\_\_\_\_

CONTACT'S PHONE NUMBER: \_\_\_\_\_ FAX \_\_\_\_\_

CLASS / TYPE OF INDUSTRIAL OVEN \_\_\_\_\_

SOLVENT / GAS USED \_\_\_\_\_ QUANTITY \_\_\_\_\_

INTENDED USE \_\_\_\_\_

RATED BTU OUTPUT \_\_\_\_\_

DATE OF LAST FACTORY INSPECTION / TESTING PROCEDURE \_\_\_\_\_

I HAVE READ AND UNDERSTAND THE DENVER FIRE DEPARTMENT'S POLICY ON INDUSTRIAL OVENS. I ALSO UNDERSTAND THE DENVER FIRE PREVENTION DIVISION WILL CONDUCT AN ON SITE INSPECTION. IF I DO NOT COMPLY WITH THE INTERNATIONAL FIRE CODE, OR THE REQUIREMENTS SET OUT IN THIS POLICY, MY PERMIT MAY BE REVOKED WITHOUT A REFUND.

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

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