CLARK COUNTY FIRE DEPARTMENT - FIRE PREVENTION BUREAU
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Permit Submittal Guideline

CARBON DIOXIDE FOG EFFECTS

This guide is to assist in the permitting process for obtaining a temporary or annual renewable operational permit for carbon dioxide (CO_2) fog effects. CO_2 liquids can displace oxygen as they vaporize which can create an asphyxiation hazard. A permit is required per section 105.5.9 of the IFC.

APPLICABLE CODES:

The following codes and standard apply to this permit.

- *International Fire Code*, 2024 edition (IFC)
- *Clark County Fire Code Amendments*, 2024 edition (CCFC)
- *Standard System for the Identification of the Hazards of Materials for Emergency Response, 2022 Edition NFPA 704*
- *Compressed Gases and Cryogenic Fluids Code,* 2023 edition NFPA 55

SUBMITTAL REQUIREMENTS:

The requirements listed in this guide are not intended to be all inclusive, nor do they entail a limit to the extent of the information, etc., which may be necessary to properly evaluate the submitted plans and documents. Not all items may apply to your project.

Permits are required for use of more than 875 ft^3 *(100 lbs) of CO_2 for temporary and permanent fog effects.

Provide all applicable information that pertains to your permit and upload PDF submittal to PLAN ROOM.

1. Project name, address, and Assessor's Parcel Number (APN).
2. Contractor's/Owner's contact information.
3. Name of event/venue location or room name/floor level
4. Provide documentation of the following features:

    - Overall Site Plan
    - Venue plan with area (ft^2) of the stage and audience set-back distance (ft)
    - Locations and direction of fog effects discharge nozzles
    - Location of the ventilation equipment and registers

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5. Fog Effect Equipment

    - Make and model fog effect apparatus
    - Manufacturers' data sheets and support details

6. Basis of Calculations

    - Provide area of the stage (ft^2)
    - Provide the volume of the venue (ft^3)
    - Exhaust at full capacity (cfm)
    - Duration of the show(minutes)
    - Percent of fresh outside air

7. Tank Specification

    - Tank location(s) and the separation distances(ft)
    - Make and model of the tank
    - Tank size and number of cylinders CO_2 in pounds.
    - Tank restraint(s)

ADDITIONAL INFORMATION FOR ANNUAL RENEWABLE PERMITS:

SIGNS:

- Provide the locations of the required signs on plans and provide examples of each on plans:
- An NFPA 704 hazard identification placard is required on the exterior door.

  Liquid CO_2 NFPA 704 placard:



- As required by the IFC, a CO_2 warning signage shall be posted outside of the room or enclosure and where the tank is located. It shall be at least 8 inches wide and 6 inches high and verbatim:

CAUTION – CARBON DIOXIDE GAS

VENTILATE THE AREA BEFORE ENTERING.
A HIGH CARBON DIOXIDE (CO2)
GAS CONCENTRATION
IN THIS AREA CAN CAUSE ASPHIXIATION

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PIPING:

- State the pipe type including make/model. Ensure it is suitable for gaseous/liquid carbon dioxide service.
- Provide fill box and vent location and routing to tank.
- Show the piping layout from tank to permanent fog effect.

NOTIFICATION:

- A CO_2 detection alarm horn and strobe are required at the exterior door (to warn people not to enter) and at the primary monitor at the tank (to warn people inside of an alarm).
- The CO_2 detection alarm strobe must be a tinted (colored) and not with a clear lens as not to be confused with fire alarm and audible must be at least 15dB louder than ambient.
- CO_2 detection alarms are local to the CO_2 system and are not required to be connected to a fire alarm system or monitored by a fire alarm supervising station.

8. SYSTEM ACTIVATION:

- The submittal should include these details verifying that the liquid CO_2 monitoring system will activate as intended.
- Monitor location (usually at the tank)
- CO_2 sensor's locations: including at the tank, and any room or compartment where the liquid filled lines pass through.
- Sensor set points: 5,000ppm for a supervisory alarm transmitted to a normally attended location and at 30,000ppm to activate an audible and visual alarm within the room or immediate area.
- CO_2 flow must shut off automatically when 30,000ppm or greater is detected (usually by solenoid).
- The sensor mounting height at 12 inches above finished floor or per manufacturer's specifications.

9. SYSTEM COMPONENTS:

- In addition to the fog effect, provide a copy of manufacturer's specification sheets for all components including the tank, supply lines, fill lines, CO_2 monitors, tank strapping, vent line, exterior fill box and CO_2 signage. All equipment shall be listed for its use.

PLEASE NOTE:

- Information may be needed from property management for the facility to complete submittal.
- Excel spreadsheet for calculating the allowable amount of Carbon Dioxide is available. Email FPPCQ@Clarkcountynv.gov.

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