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Permit Submittal Guideline

CARBON DIOXIDE IN CULTIVATION FACILITIES

This guide is to assist in the permitting process for obtaining an annual renewable operational permit for liquid/gaseous Carbon Dioxide (CO2) in Cultivation Facilities. An annual renewable operational permit is required per section 105.5.9 of the IFC.

PERMIT THRESHOLD:

FLUID STATE	AMOUNT
LIQUID	100 LBS
GAS	875 CU.FT.

This permit guide covers two practices of providing CO2 for enrichment purposes;

FLUID STATE FOR ENRICHMENT	PROCESS
GAS	Processes that use room temperature CO2 gas stored in high pressure cylinders; typically, at 2,000psi.
LIQUID	Processes that use CO2 liquid stored in refrigerated dewars at minus 109 ° F

PLEASE NOTE: CO2 generators (unvented fired heaters) are currently NOT allowed in Clark County, as they do not have a UL listing for the purpose of generating CO2.

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 REQUIREMENT CHECKLIST:

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.

Construction Documents: The submittal shall include all information per IFC Section 5307.4.1 and Chapter 13 of NFPA 55.

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

1. Project name, address, and APN (Assessor's Parcel Number).
2. Contractor's/Owner's contact information.
3. Provide **Plans** showing the following items:

a) BUILDING INFORMATION:

- Provide overall building site plan
- Provide scaled plan view of the building and all areas of the project.

b) COMPONENT INFORMATION:

- Provide location of cylinders/dewar on plans and include make and model including the size of CO2 in pounds (lbs.) Include information on restraint.
- Provide location of ventilation supply and exhaust grills in each room supplied with CO2.
- Provide solenoid location(s) on the plans; the main supply line from Cylinder/Dewar/Vaporizer must pass through an electric solenoid.
- Provide sensor mounting heights; 12" above finished floor (A.F.F.) or per manufacturer specification.
- **For Refrigerated Liquid CO2 Submittals**; Often but not always refrigerated liquid CO2 containers will be connected to a vaporizer to provide gaseous CO2 at a rapid rate. If used, provide vaporizer locations on plans, including make and model, and ensure it is deemed suitable for its intended service by its manufacturer.

c) PIPING INFORMATION:

- Clarify pipe or tubing type include make/model; ensure it is suitable for liquid or gas CO2 service.
- Show network piping to supply CO2 to all locations within the facility.
- Label delivery piping and show hanger locations (delivery piping to be secured per ASME B31. Reference Appendix A at the end of this document for additional information on pipe sizes and corresponding hanger spacing).
- Provide anticipated system working pressure.

d) SIGNAGE: Provide the location of the required signage on plans and provide examples of each:

- An NFPA 704 hazard identification placard is required on the cylinder or dewar and exterior door.
- **NFPA 704 placards:**

Refrigerated Liquid (in dewers) Placard: Gaseous CO2 Placard:





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- Hazard identification signs shall be posted at the entrance to the room and indoor areas where the CO2 enrichment process is located as well as the entrance to the room or area where the CO2 containers are located. The sign shall be no less than 8 inches wide and 6 inches high and indicate:

WHEN THE CO2 ALARM IS ACTIVATED

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

e) NOTIFICATION:

- The CO2 sensor to be operational 24 hours a day.
- The visible alarm strobe must be tinted (colored) and not with a clear lens as not to be confused with fire alarm
- The light is to be rotating and flashing mounted between 5 feet-0" to 8'-0" A.F.F. and normally placed above the door
- The alarm size limit is 2,500sq.ft. per audible/visual alarm device. If the room is larger additional devices will need to be added
- The audible must be at least 15dB louder than ambient.
- A CO2 detection alarm horn and strobe are ONLY required at the exterior door if the exterior door opens directly into the room supplied with enriched CO2
- CO2 sensors are local alarm only and are not required to be connected to a fire alarm system or monitored by a fire alarm supervising station

f) GAS DETECTION:

- Gas detection system complying with IFC 916 shall be provided in the following areas;
  - in rooms or indoor areas where carbon dioxide enrichment process is located.
  - In rooms or indoor areas where container systems are located
  - In other areas where carbon dioxide is expected to accumulate
  - Sensors shall be located 12" above the floor where gas is expected to accumulate or leaks are most likely to occur
- The system shall be designed as follows;
  - Activate a low-level alarm upon detection of carbon dioxide concentration of 5,000 ppm.
  - Activate a high-level alarm upon detection of carbon dioxide concentration of 30,000 ppm.

g) SYSTEM ACTIVATION:

The submittal should include details verifying that the CO2 monitoring system and all components will activate as intended.

- **ELECTRIC SOLENOID:** When activated, at 5,000 ppm, must stop flow of CO2 to piping system. If the system has multiple tanks dedicated to individual rooms, there will be multiple solenoids dedicated to each room and when activated only the flow of CO2 for that room would be in alarm. Must also fail closed in event of power loss.

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- **ALARM TASKS**: The sensors must have a set point not to exceed 5,000 ppm, which is the OSHA Permissible Exposure Limit (PEL) for CO2. **Activation of the low-level gas detection alarm shall automatically:**
    1. Stop the flow of carbon dioxide to the piping system
    2. Activate the mechanical exhaust system
    3. Activate an audible and visible supervisory alarm signal at an approved location within the building.
- **Activation of high-level gas detection system alarm shall automatically;**
    1. Stop the flow of carbon dioxide to the piping system
    2. Activate the mechanical exhaust ventilation system
    3. Activate an audible and visible evacuation alarm both inside and outside of the carbon dioxide enrichment area, and the area in which the carbon dioxide containers are located.
- **VENTILATION:** Rooms or indoor areas in which carbon dioxide enrichment is provided shall be maintained at a negative pressure in relation to the surrounding areas of the building. The mechanical ventilation system shall be provided in accordance with the international Mechanical Code that complies with all of the following;
    1. Mechanical ventilation in the room or area shall be at a rate of not less than 1cfm per square foot.
    2. When activated by the gas detection system, the mechanical ventilation system shall remain on until manually resets.
    3. The exhaust shall be taken from points within 12" of the floor
    4. The ventilation system shall discharge to the outdoors in an approved location.
    5. Provide Make and Model number of Exhaust fans; include exhausting capacity.
    6. Please Note: A Mechanical Permit will be needed to ensure the make-up air is sufficient.

4. **MANUFACTURER'S DATA SHEETS;** Provide a copy of manufacturer's specification sheets for all components including the cylinder/dewar, restraint, supply piping lines, exhaust fans/grills, CO2 sensors, solenoids, vaporizer, exterior fill box and CO2 signage. All equipment shall be listed for its use.

PERMIT DURATION:

Carbon Dioxide in Cultivation Facilities are Operational Permits and are limited to a duration of one (1) year and shall be renewed annually. If any changes are made, revisions will need to be submitted.

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