



FIRE PREVENTION PERMIT GUIDE

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 annually renewable operational permit is required per section 105.6.8 of the IFC.

PERMIT REQUIREMENTS:

New Operational Permits are required if the system exceeds 100lbs of Carbon Dioxide (CO₂). This permit guide covers two practices of providing CO₂ for enrichment purposes;

- A. CARBON DIOXIDE- GAS: Processes that use room temperature CO₂ gas stored in high pressure cylinders; typically, at 2,000psi.
- B. CARBON DIOXIDE-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*, 2018 edition (IFC)
- *Clark County Fire Code Amendments*, 2018 edition (CCFC)
- *Standard System for the Identification of the Hazards of Materials for Emergency Response*, 2017 Edition NFPA 704
- *Compressed Gases and Cryogenic Fluids Code*, 2016 edition NFPA 55

Link to CCFC: See the amendments to codes using the link below:

https://cms8.revize.com/revize/clarknv/Building%20&%20Fire%20Prevention/Codes/ClarkCounty_FireCodeAmendments2018.pdf?t=1598331770575&t=1598331770575

SUBMITTAL REQUIREMENT CHECKLIST:

The listed requirements 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. Provide all applicable information that pertains to your permit;

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 the sensors locations on plans; each cultivation room shall contain 1 sensor or 1 sensor per every 10,000sq.ft. whichever is less.
- Provide sensor mounting heights; 3'-0" 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, include 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 dewars) Placard:



Gaseous CO2 Placard:



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

- 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**

f) NOTIFICATION:

- The CO2 sensor to be operational 24 hours a day.
- The visible alarm strobe must be a 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 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 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

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 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.
- **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:
 - i. Activate an audible and visible local alarm signal
 - ii. Stop the flow of CO2 to the piping system by closing the solenoid at the source supply to either the entire building or the rooms served by the activated sensor
 - iii. Activate the mechanical exhaust ventilation system
- **VENTILATION:**
 - i. Exhaust fan capacity must be at least 1cfm/ft2 until CO2 concentration drops to 5,000 ppm.
 - ii. Provide location of the Exhaust system intakes; shall be set within 12 inches of the floor.
 - iii. The ventilation system shall discharge to the outdoors in an approved location.
 - iv. Provide Make and Model number of Exhaust fans; include exhausting capacity.
 - v. 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.

HOW TO SUBMIT:

Plans are to be submitted electronically. Paper plans are no longer accepted. Consolidate your files and uploaded via the Clark County Citizen Access Portal:

<https://citizenaccess.clarkcountynv.gov/CitizenAccess/Default.aspx>

COMMUNICATION:

Once your plans are submitted you will receive a permit number (example= FP20-00000). Plan status can be viewed by logging into your account in the Citizen Access Portal and typing in your permit number. <https://citizenaccess.clarkcountynv.gov/CitizenAccess/Default.aspx>

CONTACT PERSON ON APPLICATION: Ensure the correct contact person is provided on the application as this will be the correspondent who receives all the email updates on the permit status once plan is submitted.

ADDITIONAL INFORMATION NEEDED: If you receive this request Fire Annual/Operational In-take has reviewed your submittal and there is additional action needed for the plan to be placed back in the Review Queue.

PLANS APPROVED: Once plans are approved, and fees are verified; an email will be sent to the contact person. In order for inspections to be scheduled any outstanding **fees** will need to be paid.

PLANS-CORRECTIONS REQUESTED: Once corrections are issued an email will be sent to the contact person indicating the additional changes needed for an approval. Customer will log in to Citizen Access Portal and download Redlined plans for comment.

FIRE PLAN REVIEW STAFF CONTACT LINK:

https://files.clarkcountynv.gov/clarknv/Building%20&%20Fire%20Prevention/Phone/WEBSITE%20PHONE%20LIST_Fire%20Prevention.pdf?t=1616562454375&t=1616562454375

RE-SUBMITTALS, REVISIONS AND RENEWAL:

CORRECTIONS: Corrections will be submitted using the Citizen Access Portal. A letter describing the changes shall be provided with your revised submittal. **Please Note:** The Redlined plans are already in the file and do not need to be uploaded again.

REVISIONS: If plans are revised after approval; revisions will need to be submitted and approved prior to **FINAL** sign off. Revisions will be submitted the same way as the original (see How to Submit above). All changes should be **clouded and keyed** to Plan Revision# (FP20-00000-R001). A Revision Letter shall also be provided indicating what changes were made and where they occur.

RENEWAL: After approval of your initial permit; the permit will be set up on an automatic reminder. Approximately 30-60 days prior to the expiration of your permit, a renewal notice will be emailed to you with instructions for the renewal.

SUBMITTAL SERVICE LEVEL OPTIONS/FEE SCHEDULE:

https://www.clarkcountynv.gov/government/departments/building_fire_prevention/permit_issuance/fees.php

INSPECTION OPTIONS/INSPECTION SCHEDULING:

Use the following link for scheduling permits for construction.

https://www.clarkcountynv.gov/government/departments/building_fire_prevention/inspection/schedule_an_inspection.php

Annual Renewable Permits will be tentatively scheduled upon approval by Fire Prevention Plans Check and payment of all fees. A Clark County Fire Prevention Inspector will contact you.

DRAFT

Appendix A

Piping Hangers (from ASME B31)

- A. Steel pipe shall be adequately supported by pipe hanger and supports. Hangers for insulated pipes shall be sized to accommodate insulation thickness.
- B. Horizontal steel piping shall be supported as follows :

<u>NOMINAL PIPE SIZE</u>	<u>ROD DIAMETER</u>	<u>MAXIMUM SPACING</u>
3/8" - 1¼"	3/8"	7'- 0"
1½"	3/8"	10'- 0"
2½"	1/2"	11'- 0"
3"	1/2"	12'- 0"
3½"	1/2"	13'- 0"
4"	5/8"	14'- 0"

- C. Horizontal copper tubing shall be supported as follows:

<u>NOMINAL TUBING SIZE</u>	<u>ROD DIAMETER</u>	<u>MAXIMUM SPACING</u>
1/4" - 3/4"	3/8"	5'- 0"
1"	3/8"	6'- 0"
1¼"	3/8"	7'- 0"
1½"	3/8"	8'- 0"
2"	3/8"	8'- 0"
2½"	1/2"	9'- 0"
3"	1/2"	10'- 0"
3½"	1/2"	11'- 0"
4"	1/2"	12'- 0"

- D. Provide means of preventing dissimilar metal contact such as plastic-coated hangers, copper colored B- Line DURA- COPPER™ epoxy paint, or non-adhesive isolation tape (B-Line Iso-Pipe™). Galvanized felt isolators sized for copper tubing may also be used, B-Line B3195CT.
- E. Support horizontal cast iron pipe adjacent to each hub, with 10 feet maximum spacing between hangers.
- F. Install hangers to provide a minimum of 1/2 inch space between finished covering and adjacent work.
- G. Place a hanger within 12 inches of each horizontal elbow.
- H. Support vertical piping independently of connected horizontal piping. Support vertical pipes at every (other) floor. Wherever possible, locate riser clamps directly below pipe couplings or shear lugs.
- I. Where several pipes can be installed in parallel and at the same elevation, provide trapeze hangers as specified in Section 2.02 C. Trapeze hangers shall be spaced according to the smallest pipe size, or install intermediate supports according to schedule in Section 3.01 B.
- J. Do not support piping from other pipes, ductwork or other equipment which is not building structure.

Providing proper support for long runs of PEX tubing

Supporting your PEX tubing

PEX = Cross-Linked Polyethylene

- A. Long runs of PEX tubing have to be supported with proper hangers. It is generally recommended to fasten the tubing at every 32 inches when running it alongside a joist and at least every 6 feet if the tubing is supported by beams and running across them. Plastic straps and hangers are recommended but metal supports that are designed for use with plastic tubing can also be used. You shouldn't use supports that are too small or can cut, scratch or in any way damage the tubing. Since PEX tubing expands and contracts when water temperature changes, it should be able to easily move in its support. It is also necessary to inspect all of the supports to make sure that there are no sharp edges that could damage the tubing.
- B. Vertical runs of PEX tubing should be supported at every floor and at the mid-floor level, or approximately, every 4-6ft. When penetrating metal studs or other rigid surfaces, protect the tubing by using sleeving materials on all the penetrations. Regular nylon suspension pipe clamps may offer an easy and cost-effective solution. It is also important to understand that PEX tubing expands and contracts as water temperature in the system changes. That is why it is recommended to allow 1/8" slack per foot of installed tubing (or approx. 1.5" per every 10ft). You can also create a loop in the PEX that is about 8-10 times the OD diameter of the tubing. Expansion will be accommodated by the tubing's flexibility for sizes smaller than and including 1" size tubing.
- C. Among the products supplied by PexUniverse.com, the following can be used for horizontal and vertical support.

