FIRE CONSTRUCTION PERMIT SUBMITTAL CHECKLIST

SERVING THE CITIES OF LAKE STEVENS, MONROE AND SULTAN

GAS DETECTION SYSTEMS

PROJECT INFORMATION	
Site address:	**Associated Permits:**
Project Name / Tenant:	**Property Owner:**

Electronic file standards

File naming standard: Electronic plans and documents shall be named as specified in bold type under "permitting requirements". For example, the seating plan must be named "Seating Plan".

Acceptable file types: Plans, calculations, specifications and supporting documents shall be uploaded as a PDF file.

Document Orientation: All plans must be uploaded in "Landscape" format in the horizontal position. All other documents can be in "Portrait" format.

CODE EDITIONS

2021 Washington State Fire and Building Code and as applicable -
Lake Stevens Municipal Code 14.84, Monroe Municipal code 15.04.110 and Sultan Municipal Code 15.05.

PERMITTING REQUIREMENTS

A Fire Construction Permit is required to install or modify a ***Gas detection system*** required by Section 105.6.10 of the 2021 Washington State Fire Code and local code amendments. **The following information is required at time of application for the Fire Construction Permit.**

- Completed Fire Construction permit submittal application
- Completed "Gas detection system submittal checklist"

- Plans
- Documentation of the gas detection system design and equipment to be used that demonstrates compliance with the requirements of this code shall be provided with the application for this permit.

PLANS

The following is a list of information required on all plan submittals for review of a "Gas detection system" permit application. The plan shall be drawn to 1/8"=1'-0" minimum scale. The applicant is required to submit all of this information so an accurate and timely review may be done:

Floor Plan showing:

- Room(s) where detection to be installed
- Usages of rooms/areas
- Locations of visual/audible warning appliances
- Type of gas detection system installed
- Indicate location of all equipment that is being monitored by gas detection system.
- Indicate any piping, how it is installed, where it is installed

Indicate type of gas detection system to be installed

- Carbon dioxide used in beverage dispensing operations
- Carbon dioxide enrichment systems
- Highly toxic gases
- Ozone gas production
- Hazardous production materials
- Repair garages used for repair of vehicles fuel by non-odorized gases, including but not limited to, hydrogen and non-odorized LNG.
- Processing or extraction of marijuana
- Refrigerant detection system

All Plan requirements

- Indicate on plans that the gas detection system shall be permanently connected to the building electrical power supply or shall be a cord connected to an un-switched receptacle using an approved restraining means that secures the plug into the receptacle.
- Standby or emergency power shall be provided, or the gas detection system shall initiate a trouble signal at an approved location if the power is interrupted.
- Indicate location and placement of the detection sensors where leaking gases are expected to accumulate, as referenced from the floor level.
- Indicate that gas sampling shall be performed continuously, and sample analysis shall be processed immediately after sampling, except as follows:
    - For HPM gases, sample analysis shall be performed at intervals not exceeding 30 minutes.
    - For toxic gases that are not HPM, sample analysis shall be performed at intervals not exceeding 5 minutes
    - Where a less frequent or delayed sampling interval is approved.
- A gas detection alarm shall be initiated where any sensor detects a concentration of gas exceeding the following thresholds:
    - For flammable gases, a concentration exceeding 25% of the LFL.
    - For non-flammable gases, a concentration exceeding ½ of the IDLH, unless a different threshold is specified by the section of this code requiring a gas detection system.
- Indicate the location of the audible and visual signaling device that is provided to notify occupants of a gas leak. Audible and visible alarm signals associated with a gas detection alarm shall be distinct from fire alarm and carbon monoxide alarm signals.
- Indicate a sign to be provided to be posted adjacent to the audible and visual notification appliance that advises occupants of the nature of the signals and actions to take in response to the signal.
- **Gas sensors and gas detection systems shall not be connected to fire alarm systems unless approved and connected in accordance with the fire alarm equipment manufacturer's instructions.**

Insulated liquid carbon dioxide systems used in beverage dispensing operations

- Gas detection shall be provided in rooms or indoor areas and in below-grade outdoor locations with insulated liquid carbon dioxide systems.
- Carbon dioxide gas detection sensors shall be provided within 12 inches of the floor in the area where the gas is expected to accumulate
- The CO2 gas detection system shall be designed as follows:
    - Activates an audible and visual supervisory alarm at a normally attended location upon detection of a CO2 concentration of 5,000 ppm.
    - Activates an audible and visible alarm within the room or immediate area where the system is installed upon detection of a carbon dioxide concentration of 30,000 ppm.

Carbon dioxide enrichment systems gas detection requirements

- A gas detection system shall be provided in rooms or indoor areas in which the carbon dioxide enrichment process is located, in rooms or indoor areas in which container systems are located, and in other areas where carbon dioxide is expected to accumulate.
- CO2 detection sensors shall be provided within 12 inches of the floor where gas is expected to accumulate, or leaks will most likely occur.
- The CO2 leak detection shall be designed as follows:
    - Activates a low-level alarm upon detection of a CO2 concentration of 5,000 ppm.
        - Stop the flow of CO2 to the piping system
        - Activate the mechanical exhaust ventilation system.
            - Ventilation shall remain on until manually reset
        - Activate as audible and visible supervisory alarm at an approved location within the building.
    - Activates a high-level alarm upon detection of a CO2 concentration of 30,000 ppm.
        - Stop the flow of CO2 to the piping system.
        - Activate the mechanical exhaust ventilation system.
            - Ventilation shall remain on until manually reset
        - Activate an audible and visual evacuation alarm both inside and outside of the CO2 enrichment area, and the area in which the CO2 containers are located.

Highly toxic compressed gas detection requirements

- A gas detection system shall be provided to detect the presence of gas at or below the PEL (permissible exposure limit) or ceiling limit of the gas. The system shall be capable of monitoring the discharge from the treatment system at or below one-half the IDLH limit and shall initiate a response if the gas detection alarm is activated.
- The gas detection system shall initiate a local alarm and transmit a signal to a constantly attended control station when a short-term hazard condition is detected.
    - The alarm shall be both audible and visual and shall provide warning both inside and outside the area where gas is detected.
    - The alarm shall be distinct from all other alarms.
- The gas detection shall automatically close the shutoff valve at the source on gas supply piping and tubing related to the system being monitored for whichever gas is detected.

Ozone gas detection requirements

- Ozone gas generator rooms shall be equipped with a gas detection system that will shut off the generator and sound a local alarm when concentrations above the permissible exposure level occur.
- Ozone gas generators shall be designed to shut down automatically if the gas detection system fails.

Hazardous production materials gas detection (semiconductor manufacturing facilities)

- A gas detection system shall be installed where the physiological warning threshold level of the gas is at a higher level than the accepted PEL for the gas and for flammable gases.
- A gas detection system shall be provided in fabrication areas where the HPM gas is used in the room.
- A gas detection system shall be provided in gas cabinets and exhausted enclosures for HPM gas.
- A gas detection system shall be provided in gas rooms where HPM gases are not located in gas cabinets or exhausted enclosures.
- A gas detection system shall be provided where HPM gases are transported in piping placed within the space defined by the walls of a corridor and the floor or roof above the corridor. The system shall be located both within the walls, roof, floor of the corridor and inside the corridor.

Operation of gas detection system

- The gas detection system shall be capable of monitoring the room, area or equipment in which the HPM gas is located at or below all the following gas concentrations:
    - IDLH values where the monitoring point is within an exhausted enclosure, ventilated enclosure or gas cabinet.
    - PEL levels where the monitoring point is in an area outside an exhausted enclosure, ventilated enclosure or gas cabinet
    - For flammable gases, the monitoring detection threshold level shall be vapor concentrations in excess of 25 percent of the LFL where the monitoring is within or outside and exhausted enclosure, ventilated enclosure or gas cabinet.
- The gas detection system shall initiate a local alarm and transmit a signal to the emergency control station when a short-term hazard condition is detected. The alarm shall be both visible and audible and shall provide warning inside and outside the area where the gas is detected. The alarm shall be distinct from all other alarms.
- The gas detection system shall automatically close the shutoff valve at the source on gas supplied piping and tubing related to the system being monitored for which gas is detected when a short-term hazard condition is detected.

Repair garages used for repair of vehicles fuel by non-odorized gases, including but not limited to, hydrogen and non-odorized LNG.

- Gas detection shall be designed to detect leakage of non-odorized gaseous fuel.
- Where lubrication or chassis pits are provided in garages used for repairing non-odorized LNG-fueled vehicles, gas sensors shall be provided in such pits.

System Activation:

- Activation of the gas detection alarm shall result in all of the following:
    - Initiation of local audible and visual alarms in approved locations
    - Deactivation of heating systems located in the repair garage.
    - Activation of the mechanical exhaust system, where the ventilation system is interlocked with gas detection.
- Failure of the gas detection system shall automatically deactivate the heating system, activate the mechanical exhaust ventilation system where the system is interlocked with the gas detection system and cause a trouble signal to sound in an approved location.

Processing or extraction of marijuana gas detection requirements

- For extraction processes utilizing gaseous hydrocarbon-based solvents, a continuous gas detection system shall be provided.
- The gas detection threshold shall not exceed 25 percent of the LEL/LFL limit of the materials.