

# Building Code Guidelines for Commercial Marijuana Extraction and Grow Facilities

The information contained within this guideline is provided solely for the convenience of the reader to help clarify how the Oregon Structural Specialty Code (OSSC) is applied to marijuana extraction processes and equipment at commercial facilities licensed by the Oregon Liquor Control Commission within unincorporated Jackson County. This guideline is based upon the 2014 OSSC and all interpretations represented in this guideline are under authority of OSSC 104.1, General, as excerpted in part below:

***OSSC 104.1, General.*** *The building official shall have the authority to render interpretations of this code and to enforce supplemental regulations in order to clarify the application of its provisions. Such regulations and provisions shall be in conformance with the intent and purpose of this code.*

Because every process and building differs, this guideline is not intended to identify or discuss every code requirement applicable and it is not intended to be a regulatory document; therefore, it is the responsibility of the persons performing these processes and/or otherwise responsible for the design or construction of extraction rooms, equipment, and operations to follow all applicable Codes and Standards as adopted by the State of Oregon.

## Part I – Extraction Process Equipment

Extraction equipment, including equipment used for winterization or other oil refining processes, that use hazardous materials (i.e. flammable / combustible liquids, Carbon Dioxide (CO<sub>2</sub>), liquefied petroleum gases (i.e. butane, propane), are required to be listed with quantities and storage method in the submittal documents. As this section deals with just the equipment, see also information on submittal requirements in sections IIA and IIB for occupancy factors and alternative means and methods plan and report requirements.

### I.A Liquefied Petroleum Gas (LPG) and CO<sub>2</sub> Extraction Equipment

Only closed-loop type LPG extraction equipment is permitted. Open blasting extractions or equipment that releases butane to the atmosphere during the extraction process is strictly prohibited per Oregon Fire Code, NFPA Standards and OLCC Administrative Rules. Because there is no listing (such as UL, ETL, etc) available for compressed-gas extraction systems using hazardous materials, extraction equipment approval is required from the Jackson County Development Services, Building Safety Division (JCBD).

To obtain equipment approval, an engineering report (signed and sealed by a licensed Oregon engineer) must be submitted for approval. This approval report is required by OSSC 104.11.1, Alternative material, design and methods of construction and equipment. It is the responsibility of the engineer to justify how the system meets the OSSC, OFC and any other national standards as a basis of design, including an analysis / description of every component of the system. Thus far, for an approved LPG system, (i.e. butane or propane) only closed-loop systems have been designed to applicable sections of NFPA 58. Open-blast LPG extractions are prohibited. In addition to the engineering report, an owner's operation manual must be submitted with specific instructions regarding proper use of the equipment and any safety provisions identified. Equipment may be submitted will only be approved either by a Manufacturer's Engineering Report, a Site Specific Engineering Report or by an approved third party testing / certification agency.

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In addition to this equipment and system engineering report approval process, if the extraction equipment uses electrical components, a National Recognized Testing Laboratory (NRTL) listing is also required in addition to the engineering report certifying that the electrical components are compliant with appropriate electrical standards.

**Site Specific Engineering Report:** Site specific engineering reports can be submitted which approve extraction equipment exclusively to a location and specific equipment. Any modification of the equipment or relocation of equipment to a new address voids the equipment approval.

**Manufacturer's Engineering Report** – For manufacturers of extraction equipment, a Manufacturer's Engineering Report can be submitted for approval in lieu of submitting the Site Specific Report. Once approved, the report may be referenced and included at other specific locations provided the Engineer of Record certifies the location address and serial number of the equipment on-site meets the approved Manufacturer's Engineering Report. Any modification of the equipment or moving addresses voids the equipment approval.

## **I.B Flammable liquid distillation or evaporative process equipment**

There are numerous methods to perform distillation or evaporative extraction / refinement processes. In general, electrified equipment used in these processes are required to be listed by a NRTL for their intended use and are required to be operated within the manufacturer's guidelines. Equipment such as rotary evaporators are typically listed for distillation processes. Where distillation stills or heated evaporation processes are performed, the heating source shall be listed as explosion-proof (i.e. rated for the electrically classified location) unless it can be shown that the equipment has been tested during its listing to heat flammable liquids without the explosion-proof classification. Approval of the proposed process equipment must be submitted as part of the permitting review

## **I.C Vacuum Ovens**

Vacuum ovens shall not be used to process volatile gases (i.e. alcohol/oil mixtures, oil containing off-gassing LPG, other flammable liquids, etc) unless the vacuum oven is rated to process these vapors (typically an explosion-proof classification). It is the responsibility of the extraction process operator to ensure the material being introduced into the oven does not contain volatiles. All vacuum ovens shall be listed by a NRTL.

## **I.D Refrigerators**

Refrigerated storage or processing of flammable liquids including oil-laden with flammable liquids must only use refrigerators/freezers rated to store flammable liquids. At minimum, a "Lab-Safe" or "Flammable Safe" rated refrigerator/freezer must be used. Residential type refrigerators are not rated by the manufacturer for flammable liquid storage or processing. See NFPA 45 for further information regarding refrigerators used for flammable liquid storage.

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## Part II – General Requirements

### Occupancy Classification, Alternative Methods or Materials, Extraction Room Construction, Exhaust, Ventilation & Electrical Systems Requirements

#### II.A Occupancy Classification

The Use and Occupancy Classification of Marijuana Business Functions may be found in Chapter 3 of the Oregon Structural Specialty Code and Oregon Building Codes Division (BCD) has issued a White Paper, *Guide to the Oregon Building Code and Marijuana Operations, April 1, 2016* addressing occupancy classification. From the BCD guide, typical occupancies are summarized as follows:

- U occupancies include buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy.
- R or residential occupancies are primarily homes. The state building code does not create additional provisions for the growing or keeping of plants in a residence.
- M or mercantile occupancies include any building for the display and sale of merchandise, including drug stores, markets, and retail or wholesale stores.
- F or factory industrial occupancies include buildings used for processing and packaging. Buildings for processing high-alcohol volume beverages, food, and hemp products are classified as moderate-hazard factories, or F-1. (The presence and quantity of materials that pose a safety hazard or that readily support combustion may require construction requirements for H (high-hazard) occupancy.)
- S or storage occupancies include any building used for storage that is not classified as hazardous.

The table below is a guideline for occupancy classification associated with marijuana operation uses within a specified land use designation.

Land Use	<i>Occupancy Classifications for Facilities</i>			
	<b>Production/Growing</b>	<b>Processing</b>	<b>Storage</b>	<b>Sale</b>
<b>Agricultural, Exempt Farm</b>	N/A	N/A	N/A	N/A
<b>Agricultural, Non-Exempt</b>	U-Agricultural	F-1	S-1	M
<b>Commercial / Industrial</b>	U	F-1	S-1	M
<b>Residential</b>	R-3 or U-Accessory	F-1	S-1	M

Also Note, concerning possible Hazardous (H) facilities:

- Liquefied petroleum gas (LPG) is not specifically listed in Oregon Fire Code (OFC) Chapter 50, Table 5003.1.1 (1) for a maximum allowable quantity (MAQ). However, it can be considered as a flammable gas (liquefied). Therefore, if the MAQ for flammable gas (liquefied) is exceeded, the occupancy would be considered H-2. LPG is also specifically regulated in Chapter 61 of the OFC and NFPA 58 and subject to regulations by the State or local Fire Marshal.
- Carbon dioxide is also a common solvent used in the extraction process, and is classified as an asphyxiant gas. Asphyxiant gases are not regulated in the MAQ per Control Area tables.
- An “H” occupancy classification may also apply to a solvent based extraction systems where flammable liquids such as alcohol and/or flammable gases, such as, butane and propane are

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used. The facility's chemical inventory and MAQ per Control Area (MAQs) Tables, found in the OSSC and OFC should be consulted to determine whether an "H" occupancy may be applicable.

## II.B Alternative Methods or Materials [Research Report and Tests, Approved Materials and Equipment, Technical Assistance]

OSSC provides authority to the authority having jurisdiction (AHJ) to require an owner to provide a research report (OSSC 104.11.1) and / or a technical opinion report (OSSC 414.1.3) from a registered design professional or qualified specialist, laboratory or fire safety specialty organization that demonstrates that the equipment, devices, systems, products, technologies, materials and uses attending the design, operation or use of a building or premise comply with all applicable local and state building codes, fire codes, electrical codes and other laws. Typically, an AHJ, in this case JCBD accepts listed or tested equipment; however, most, if not all of the developing equipment, is not listed and has not been tested. Therefore, this technical opinion and/ or research report becomes critical to ensure safe operating compliance based on at least some reasonable criteria. If a nationally recognized testing laboratory (NRTL) listing of a submitted or proposed appliance(s)/equipment is not available, a third party technical report or certification may be an acceptable alternative. JCBD may require a detailed report examining and evaluating a given piece of extraction equipment, device or appliance for compliance with the building code, fire code, recognized standard or best practices. This report should be prepared by an approved 3rd party agency. Common examples include solvent extraction devices which use flammable gases, liquefied petroleum gases, and high pressure carbon dioxide systems.

Any "approval" for equipment or a 3rd party agency as discussed above comes from JCBD. If the report is sufficiently addresses compliance with building and fire code, JCBD then may "approve" various devices, processes or people. Additional justification may be required in order to substantiate an approval; justification will be detailed by the jurisdiction. Design code analysis, process hazard analysis or consequence analysis reports should be compiled for the proposed facility/process. This may be a narrative evaluation of the existing occupancy and its proposed use, including change of occupancy evaluation, related to, in this situation, marijuana concentrate extraction. The report should cite all applicable building and fire codes/standards and identify compliance and/or noncompliance facility issues with corrections or recommendations listed for final inspection. These documents are useful as design and inspection tools

## II.C Room Construction

Although not building code, OLCC requires extraction rooms to be located in a room dedicated to the extraction process. (For convenience the relevant OAR 845-25 sections as they pertain to extraction room requirements are listed below this section) There must be no other equipment within the room (i.e. refrigerators, cooking appliances, electrical panels, computers, cell phones, etc) that is not "spark proof". Spark proof per Oregon Electrical Specialty Code (OESC) would mean equipment and wiring would be rated as explosion proof and a Class I, Division I location.

Additionally in a Class I, Division 1 location, there must be no penetrations into the room that are not essential for the extraction process (i.e. gas lines, HVAC systems, plumbing, etc.) Booths constructed in compliance with flammable finish requirements of OFC Chapter 24 will be accepted as meeting these construction requirements. Acoustic-type drop ceilings that conflict with large LPG extraction exhaust

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systems will not be permitted. Hand sinks and eye wash stations that are required by OLCC or other codes can be located in the room.

Post oil processing typically uses small volumes of flammable liquids and may be performed outside of the dedicated extraction room. This process can also typically be performed under a bench-top chemical fume hood.

## **845-025-3260 Cannabinoid Concentrate and Extract Processor Requirements**

*(Underlines added for emphasis where the language impacts building code)*

*(2) Cannabinoid Extracts. A processor with an endorsement to make cannabinoid extracts:*

*(a) May not use pressurized canned butane.*

*(b) Must:*

*(A) Process in a:*

*(i) Fully enclosed room clearly designated on the current diagram of the licensed premises.*

*(ii) Spark proof room equipped with evacuation fans and lower explosive limit (LEL) detectors.*

*(B) Use a commercially manufactured professional grade closed loop extraction system designed to recover the solvents and built to codes of recognized and generally accepted good engineering practices, such as:*

*(i) The American Society of Mechanical Engineers (ASME);*

*(ii) American National Standards Institute (ANSI);*

*(iii) Underwriters Laboratories (UL); or*

*(iv) The American Society for Testing and Materials (ASTM).*

*(C) If using CO2 in processing, use a professional grade closed loop CO2 gas extraction system where every vessel is rated to a minimum of nine hundred pounds per square inch.*

*(D) Have equipment and facilities used in processing approved for use by the local fire code official;*

*(E) Meet any required fire, safety, and building code requirements specified in:*

*(i) Applicable Oregon laws;*

*(ii) National Fire Protection Association (NFPA) standards;*

*(iii) International Building Code (IBC);*

*(iv) International Fire Code (IFC); and*

*(F) Have an emergency eye-wash station in any room in which cannabinoid extract is being processed.*

*(G) Have all applicable material safety data sheets readily available to personnel working for the processor;*

*(3) Cannabinoid Concentrates. A processor with an endorsement to make cannabinoid concentrates:*

*(a) May not:*

*(A) Use denatured alcohol.*

*(B) If using carbon dioxide, apply high heat or pressure.*

*(b) Must only use or store dry ice in a well ventilated room to prevent against the accumulation of dangerous levels of CO2.*

*(c) May use:*

*(A) A mechanical extraction process;*

*(B) A chemical extraction process using a nonhydrocarbon-based or other solvent, such as water, vegetable glycerin, vegetable oils, animal fats, isopropyl alcohol or ethanol; or*

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*(C) A chemical extraction process using the hydrocarbon-based solvent carbon dioxide, provided that the process does not involve the use heat over 180 degrees or pressure.*

## II.C Suppression Systems

Generally an LPG or CO2 extraction room is considered an F-1 occupancy (see Guide to the Oregon Building Code and Marijuana Operations white paper April 1, 2016) and not required to be provided with an automatic fire suppression system unless the building fire area is over 12,000 S.F. or it exceeds the other conditions listed in OSSC 903.2.4 and OSSC / OFC 903.2.11.6. Note that the presence and quantity of materials that exceed the maximum allowable quantities of OSSC T307.1 may require construction requirements for an H (high-hazard) occupancy which in turn always require an automatic fire sprinkler system.

Where the building is required to be sprinklered, the sprinkler system shall be extended to the room, booth, or hood.

## II.D Interior Finishes

It is common for marijuana grow facilities to use a Visqueen® or Mylar® type plastic/polyethylene or polyester sheeting to cover walls and ceilings. Any use of plastic to enclose rooms or cover walls and/or ceilings must be installed in accordance with building and fire code requirements. Interior finishes must comply with flame spread ratings in accordance with OSSC 803.1.1 for flame spread and smoke developed indexes. Hanging plastic from ceilings or suspended overhead structures to create wall dividers is typically NOT compliant with code provisions for a wall partition or interior finish.

## II.E Exhaust Systems and Ventilation Systems

JCBD has been granted a local amendment from BCD for mechanical system requirements for odor control of grow, processing, and retail facilities as detailed in the Jackson County Land Development Ordinance (LDO) 3.13. The odor control requirement is for all grow or processing in General Industrial or Light Industrial zones and any retail operations where allowed by the LDO. The local amendment requirements as they pertain to general exhaust and ventilation requirements is listed below:

### **JACKSON COUNTY BUILDING CODE ORDINANCE FOR MARIJUANA FACILITIES**

Marijuana ventilation systems must follow one of the following paths:

1. A prescriptive path for exhaust and ventilation; or
2. A system designed by an Oregon engineer.

### **PRESCRIPTIVE SYSTEM**

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**Exhaust System** - All growing, drying, processing and other sales locations must be installed according to the following requirements:

- A minimum negative pressure of 0.01 " water column relative to the building exterior and to adjacent spaces without product <sup>1</sup>;
- A minimum exhaust rate of 0.2 CFM per square foot of floor area or greater (as required by the Oregon Mechanical Specialty Code Chapters 4 and 5);
- Exhaust outlet location(s) per 2014 OMSC 501.3.1, part 2, for other product conveying outlets; and
- Chemical adsorption filter(s), such as activated charcoal.

**Ventilation System** - All growing, drying, processing and other sales locations must be installed according to the following requirements:

- A minimum 1 CFM per square foot of floor area of continuous recirculation air with chemical adsorption filtration;
- A design air flow velocity across the face area of the chemical adsorption filter(s) that does not exceed 350 feet per minute.

## **ENGINEERED SYSTEM**

An *approved* engineered system must provide equivalent ventilation and dilution of product and production chemicals (this requirement is not intended to supersede structural, mechanical or fire code or requirements set by other state or federal agencies, such as hazardous materials ventilation and control).

## **DUCT CONSTRUCTION AND INSTALLATION**

Contractors should install air distribution system ducting 18" or smaller in diameter with 26 gauge steel. They should install ducting larger than 18" in diameter with at least 24 gauge steel. Contractors must ensure ducts and other connections are mechanically fastened and supported at intervals not exceeding 12 feet. Installation of flexible air ducting is not allowed.

## **EQUIPMENT INSTALLATION**

Contractors should install all equipment according to the manufacturer's installation instructions or the Oregon Mechanical Specialty Code, if applicable. No marijuana exhaust and ventilation system should create a lesser standard of care than prescribed by the minimum safety standards adopted in the state building code.

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<sup>1</sup> American Institute of Architects "Guidelines for the Design and Construction of Hospital and Health Care Facilities"

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## Part III – Specific Gas Detection, Exhaust, Ventilation & Electrical Systems Requirements Based on Type of Extraction Process Used

### III.A LPG Extraction Process

#### III.A.1 LPG Gas Detection Systems

The Lower Explosive Limit (LEL) detector is an OLCC requirement and not building code but when installed must meet applicable building, mechanical and fire code installation requirements. The LEL detector must be installed in accordance with the manufacturers' guidelines and depending on the size and configuration of the room, booth, or hood, additional detectors may be required. The fixed detection alarm is a local alarm only and does not require off-site monitoring and does not require full occupant notification of the building or extraction room (including ADA visual notification) as a fire alarm system may require. Fixed detection of atmospheric monitoring must give an audible alarm indicating the presence of gas in the air has reached its permissible exposure limit (PEL). The method of alerting the extraction operator (audible / visual notification) is based on the type of the gas detector chosen. Some detectors have integrated visual alarms only that can be accepted when installed within clear view of the extraction operator; i.e. at eye level with the sensor extended to the floor. Otherwise, a remote visual or audible local alarm can be accepted.

#### III.A.2 LPG Extraction Hazardous Exhaust Systems

A hazardous exhaust system is required to be installed in accordance with the Oregon Mechanical specialty Code (OMSC) section 510 for extraction processes using LPG. There are many different ways to design a hazardous exhaust system including fume hoods, walk-in hoods, booths, and exhausted rooms. There are manufacturers of booths and hoods that meet this requirement in a complete off-the-shelf package. Exhaust systems can also be built specifically to suit the needs of a location or process. The engineer of record must design and/or specify a system to meet the minimum requirements of a hazardous exhaust system.

The intent of the exhaust system provided is to be designed with capture and containment velocities across the work area (OMSC 510.5.4) as typically seen with other industrial or laboratory processes using hazardous materials. There are several work areas that must be considered in this design and may be different for each extraction equipment manufacturer. The extraction process equipment location, the location of oil retrieval, and the location of LPG-laden plant material removed from the extraction equipment for degassing are all work areas that are intended to be provided with exhaust system capture and containment velocities. The assumption that a "closed-loop" system does not release LPG into the atmosphere will not be accepted as a basis in the design of these exhaust systems, since all extraction systems must be opened at some point in the process with vapor released. It is recommended that the ACGIH Industrial Ventilation Handbook be consulted for exhaust system and capture and containment velocity design.

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## III.A.3 LPG Extraction Electrical Systems

The location of the LPG extraction process must be considered a Class I Division I location in accordance with the OESC; depending on the type of exhaust system provided, this could be the entire room or the area inside of a hood or booth. This Class I Division I requirement is based on flammable gas metering done at several extraction processes of by the City of Denver, Colorado during their legalized marijuana extraction process testing and will be interpreted the same in Jackson County, Oregon unless proven otherwise. All of the extraction facilities tested exceeded minimum LFLs during equipment opening for oil retrieval and removal of LPG-laden plant material in addition to other known equipment and accidental process failures releasing LPG. Flammable gasses can be and are present during normal extraction operations, therefore this location meets the definition of a Class I Division I location per the OESC.

The location adjacent to the Class I Division I location must be classified by the design engineer (i.e. doors to the extraction room, hoods opening into the extraction room, etc.). This is dependent on the type of exhaust system provided and the room configuration. Normally, adjacent locations are Class I Division II; however, the OESC does not define a required distance that an “adjacent location” must be from the Class I Division I location in order to be classified as a Class I Division II location. The OESC defines Class I Division II as a location where flammable vapors could be present from accidental rupture or breakdown of containers. Therefore, this location classification should be established on a total extraction equipment failure. This classification has been intentionally left to the determination of the responsible engineer since many factors can influence this area, such as mechanical exhaust sizing, total LPG within the extraction equipment, etc.

Based on the Class I Division I location, all equipment in the extraction room must be rated for use in Class I Division I locations. This includes lighting, power receptacles, vacuum pumps, recovery pumps, and any other electrical equipment in the room. The need for explosion-proof rated equipment can be minimized. Lighting located behind a vapor-tight glazing panel outside of the extraction room/booth is not required to be classified as Class I Division I; this concept is similar to flammable finish spray booth lighting systems. Other extraction process support systems such as air compressors to drive recovery pumps, heated/ chilled water circulation pumps, vacuum air systems, etc can all be located outside of the Class I location and piped into the process area. Where electrical equipment is needed, it must be rated for the Class I location in which it is installed in. To reduce the possibility of spark from static discharge, all metal objects including ductwork, hand sinks, water piping, etc. must be grounded / bonded in accordance with the OESC. This will also require the extraction equipment to be grounded / bonded. The room lighting and room power receptacles (where provided) are required to be interlocked with the exhaust system such that the room power and lighting will not operate without the exhaust system running. Power serving room flammable gas detectors is not required to be part of this interlock requirement.

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## **III.B Flammable Liquid Extraction**

### **III.B.1 Flammable Liquid Extraction & Post Oil Processing Gas Detection Systems**

None Required.

### **III.B.2 Flammable Liquid Extraction & Post Oil Processing Exhaust Systems**

For the purposes of this section, exhaust system requirements for extraction processes using flammable liquids are also required for post oil processing using flammable liquids. Post oil processing is an oil refining or winterization process occurring after the initial extraction is completed. There are many different methods available to perform flammable liquid extractions as well as a variety of equipment available; therefore, all processes cannot be described in detail within this guideline. Generally, these processes can be grouped into two categories; distillation extractions where most of the flammable solvent is recollected OR a heated boil-off (evaporative) process where flammable liquid is evaporated to the atmosphere without recollection.

A hazardous exhaust system is required complying with OMSC Section 510 for flammable liquid processes when the thresholds in OMSC are exceeded. These thresholds are dependent on room configuration, exhaust systems used, or other operational features of the process and although there are no MAQ's which would trigger the hazardous exhaust ventilation, quantities less than 5 gallons will be considered as not requiring the hazardous exhaust system unless proved otherwise by design professional's analysis. Flammable liquid extraction systems typically include boil/evaporative processes, distillation processes, and flammable liquid plant wash processes. This exhaust system is intended for larger processes where dispensing of flammable liquids also occurs in greater volumes, flammable liquid laden plant material is removed from equipment and/or vapors are present from heated extraction processes. The exhaust system must provide capture and containment velocity across the work area per OMSC Section 510.5.4 and is typically provided in the form of a standard lab-type exhaust hood. It is suggested that the ACGIH Industrial Ventilation Handbook be consulted for exhaust system and capture velocity design. Distillation process using less than 5 gallons can be performed under a chemical fume hood designed to contain fumes within the hood and exhaust them to the exterior. This system does not have the duct gauge thickness and other requirements of a full hazardous exhaust system. This exhaust system is typically for smaller bench-top type of distillations and also small flammable liquid dispensing volumes. Listed solvent distillation units complying with Oregon Fire Code (OFC) section 5705.4 are not subject to these exhaust system requirements.

### **III.B.3 Flammable Liquid Extraction & Post Oil Processing Electrical Systems**

For rooms, booths, or hoods containing flammable liquid extraction or post oil processes, the electrical location classification must be specified by the responsible Oregon licensed design professional. It is expected that this classification is included on building permit drawings and that supporting information is submitted justifying how the location classification was determined. Because there are numerous methods of performing flammable liquid extractions, the process must be

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evaluated and the classification determination must be established by the Oregon licensed design professional. Note that the licensed design professional must consider not only the process equipment, but also the dispensing (i.e. filling and removal) of flammable liquids, soaking (i.e. plant wash) material in open containers, and the removal of plant material saturated with flammable liquids, because these operations may have an impact on the location classification. Also see section I.B of this guideline for further information.

## III.C CO2 Extraction Process

### III.C.1 CO2 Extraction Process Gas Detection Systems

Carbon Dioxide is a very common gas used within the marijuana cultivation operation and can also be used to remove the oil from the plant. It is also an asphyxiant gas as discussed earlier in this document. Bottles of compressed CO2 are used within the grow operation to enrich the atmosphere with CO2 to assist in plant growth. If the amount of the CO2 used within a room is an amount that could create an asphyxiation hazard then detection and local alarms should be provided although it is not a code requirement. This hazard level would need to be determined by the design professional based quantity of the CO2 versus the cubic feet of the room. Where a gas detection system is installed, the meter is required to be listed and labeled in accordance with UL 2075.

The system if installed is intended to alert the extraction operator of a potential asphyxiation hazard. There is no requirement to alarm the building nor to have ADA compliant visual notification as typically required for fire alarm systems.

### III.C.2 CO2 Extraction Exhaust Systems & Electrical Systems

CO2 extraction equipment is required per OLCC to be a “closed loop professional grade system.” Stored cylinders shall be secured to a fixed object to prevent falling. See OFC Chapter 53 for compressed gas storage requirements. There are no further exhaust system or electrical requirements above ordinary requirements of the OSSC, OMSC, and OESC except for the odor control exhaust and ventilation requirements found in section II.E of this document.