

Colorado Fire Marshals' Special Task Group

# Marijuana Facility Guidance v.3

Based on the 2015 International Fire Code

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## Scope

Information contained within the Marijuana Facility Guidance document is provided to assist members of the Fire Marshals Association of Colorado (FMAC) and the marijuana industry with applicable code requirements and best practices as the code relates to cultivation, extraction processes, and the businesses related to medical and recreational marijuana. This document was developed by a task group who reviewed the applicable requirements in the 2015 International Fire Code (IFC) as well as other applicable codes and standards that apply to the marijuana industry. Because every process and building differs, and every jurisdiction operates differently, this document is not intended to identify or discuss every code and standard requirement. Applicants are required to follow all codes and standards that have been adopted within the appropriate governmental jurisdiction.

This information is afforded solely for the guidance of the reader and is not intended to be used as an exclusive or adopted “enforcement” document.

In this document, the terms, marijuana facility and marijuana, applies to both medical marijuana and recreational marijuana. Each jurisdiction should consult licensing laws specific to these facilities.

## Purpose

The purpose of this document is to provide a reasonable level of life safety and property protection from the hazards associated within marijuana industries.

## Applicability

This guideline applies to the process of growing (cultivating) marijuana and extracting oils from marijuana. The guide can also be applied to the hemp industry as the cultivation and oil extraction process of this plant material is the same as marijuana.

It should be noted that any indoor plant cultivation process should consider the code references cited in this document. Although marijuana is unique in its recent popularity, legalization debate, and high demand for the product, the growing of any indoor plants, of any variety, in high volume would be required to follow the code references and considerations outlined in this document.

## Administration and Definitions

### Definitions

These definitions are for the items discussed within this document. Local variations in terms or definitions may be different. Locally defined terms should be used as applicable.

Water-Based Medical Marijuana Concentrate	A Medical Marijuana Concentrate that was produced by extracting cannabinoids from Medical Marijuana through the use of only water, ice or dry ice.
THCA	Tetrahydrocannabinolic acid.
THC	Tetrahydrocannabinol.
Standardized Serving Of Marijuana	A standardized single serving of active THC. The size of a Standardized Serving Of Marijuana shall be no more than 10mg of active THC.
Solvent-Based Medical	A Medical Marijuana Concentrate that was produced by extracting cannabinoids from Medical Marijuana through the

Marijuana Concentrate	use of a solvent approved by the Division pursuant to Rule M 605. Flammable solvents; Flammable combustible liquids; ethanol, isopropanol, butane, propane, CO2 Solvent; dry ice.
Retail Marijuana Store	An entity licensed to purchase Retail Marijuana from a Retail Marijuana Cultivation Facility and to purchase Retail Marijuana Product from a Retail Marijuana Products Manufacturing Facility and to sell Retail Marijuana and Retail Marijuana Product to consumers.
Retail Marijuana Products Manufacturing Facility	An entity licensed to purchase Retail Marijuana; manufacture, prepare, and package Retail Marijuana Product; and sell Retail Marijuana and Retail Marijuana Product to other Retail Marijuana Products Manufacturing Facilities and to Retail Marijuana Stores, but not to consumers.
Retail Marijuana Product	A product that is comprised of Retail Marijuana and other ingredients and is intended for use or consumption, such as, but not limited to, edible product, ointments and tinctures.
Retail Marijuana Establishment	A Retail Marijuana Store, a Retail Marijuana Cultivation Facility, Retail Marijuana Products Manufacturing Facility, or a Retail Marijuana Testing Facility.
Retail Marijuana Cultivation Facility	An entity licensed to cultivate, prepare, and package Retail Marijuana and sell Retail Marijuana Retail Marijuana Establishments, but not to consumers.
Retail Marijuana Concentrate	A specific subset of Retail Marijuana that was produced by extracting cannabinoids from Retail Marijuana. Categories of Retail Marijuana Concentrate include Water-Based Retail Marijuana Concentrate, Food-Based Retail Marijuana Concentrate and Solvent-Based Retail Marijuana Concentrate.
Retail Marijuana	All parts of the plant of the genus cannabis whether growing or not, the seeds thereof, the resin extracted from any part of the plant, and every compound, manufacture, salt, derivative, mixture, or preparation of the plant, its seeds, or its resin, including marijuana concentrate that is cultivated, manufactured, distributed, or sold by a licensed Retail Marijuana Establishment. "Retail Marijuana" does not include industrial hemp, nor does it include fiber produced from stalks, oil, or cake made from the seeds of the plant, sterilized seed of the plant which is incapable of germination, or the weight of any other ingredient combined with marijuana to prepare topical or oral administrations, food, drink, or other product.
Public Way	A street, alley or other parcel of land open to the outside air leading to a street, that has been deeded, dedicated or otherwise permanently appropriated to the public for public use and which as a clear width and height of not less than 10 feet.
Professional Engineer	An individual who is licensed by a State, as a professional engineer.
Primary Care-Giver	A person, other than the patient and the patient's physician, who is eighteen years of age or older and has significant responsibility for managing the well-being of a patient who has a debilitating medical condition. The primary care-giver controls the acquisition of such marijuana and the dosage and frequency of its use by the patient.
Patient	A person's medical use of marijuana as defined by local or state jurisdiction.
Pesticide	Any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest or any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant; except that the term "pesticide" shall not include any article that is a "new animal drug" as designated by the United States Food and Drug Administration."
Original Equipment Manufacturer (OEM)	The original manufacturer of equipment or devices.
Medical Marijuana-Infused Products Manufacturer	A Person licensed pursuant to the Medical Code to operate a business as described in section 12-43.3-404, C.R.S. A Medical Marijuana-Infused Products Manufacturer that engages in the production of Medical Marijuana Concentrate, regardless of the method of extraction or category of concentrate being produced. A Medical Marijuana-Infused Products Manufacturer may produce Water-Based Medical Marijuana Concentrate and Food-Based Medical Marijuana Concentrate. A Medical Marijuana-Infused Products Manufacturer may also produce Solvent Based Medical Marijuana Concentrate using only the following solvents: butane, propane, carbon dioxide, ethanol, isopropanol, acetone, and heptane. The use of any other solvent is expressly prohibited unless and until it is approved by the Division.
Medical Marijuana-Infused Product	A product infused with Medical Marijuana that is intended for use or consumption other than by smoking, including but not limited to edible products, ointments, and tinctures. Such products shall not be considered a food or drug for purposes of the "Colorado Food and Drug Act," Part 4, Article 5 of Title 25, C.R.S.
Medical Marijuana Concentrate	A specific subset of Medical Marijuana that was produced by extracting cannabinoids from Medical Marijuana. Categories of Medical Marijuana Concentrate include Water-Based Medical Marijuana Concentrate, Food-Based Medical Marijuana Concentrate and Solvent-Based Medical Marijuana Concentrate.
Medical Marijuana Center	A Person that is licensed pursuant to the Medical Code to operate a business as described in section 12-43.3-402, C.R.S., and that sells Medical Marijuana to registered patients or primary caregivers as defined in Article XVIII, Section 14 of the Colorado Constitution, but is not a primary caregiver.
Medical Marijuana Business	A licensed Medical Marijuana Center, a Medical Marijuana-Infused Products Manufacturer, or an Optional Premises Cultivation Operation.

Medical Marijuana (MMJ)	Marijuana that is grown and sold pursuant to the State Medical Code and includes seeds and immature plants.
Marijuana, Marihuana (MJ)	<p>The plant species <i>Cannabis sativa</i> L. typically refers to the dried leaves, flowers, stems, and seeds of that plant. <i>Cannabis sativa</i> L. has two main subspecies, <i>Cannabis sativa</i> and <i>Cannabis indica</i>. Hybrids of these main subspecies produce what are often referred to as “strains” of marijuana.</p> <p>All parts of the plant, genus <i>cannabis</i>, whether growing or not, the seeds thereof, the resin extracted from any part of the plant, and every compound, manufacture, salt, derivative, mixture, or preparation of the plant, its seeds, or its resin, including marijuana concentrate fall within the definition. The definition does not include industrial hemp, nor does it include fiber produced from the stalks, oil, or cake made from the seeds of the plant, sterilized seed of the plant which is incapable of germination, or the weight of any other ingredient combined with marijuana to prepare topical or oral administrations, food, drink, or other product.</p>
Limited Access Area	A building, room, or other contiguous area upon the licensed premises where Retail Marijuana is grown, cultivated, stored, weighed, packaged, sold, or processed for sale under control of the Licensee.
Licensee	Any Person licensed or registered pursuant to the state and local jurisdiction’s Medical Code, including an Occupational Licensee.
Key License	An Occupational License for an individual who performs duties that are necessary to the Medical Marijuana Business’ operation and have the highest level of responsibility. Examples of individuals who need this type of license include, but are not limited to, managers and bookkeepers, but do not include an Owners.
Licensed Premises	The properties specified in an application for a license pursuant to the state and local jurisdictions the Medical Code that are owned or in possession of the Licensee and within which the Licensee is authorized to cultivate, manufacture, distribute, sell, or test Medical Marijuana in accordance with the provisions of the Medical Code and these rules.
Immature Plant	A non-flowering Retail Marijuana or Medical Marijuana plant that is no taller than eight inches and no wider than eight inches produced from a cutting, clipping or seedling.
Hemp	A tall widely cultivated Asian herb ( <i>Cannabis sativa</i> of the family Cannabaceae, the hemp family) that has a tough bast fiber used especially for cordage and that is often separated into a tall loosely branched species ( <i>Cannabis sativa</i> ) and a low-growing densely branched species ( <i>Cannabis indica</i> ); the fiber of hemp; a psychoactive drug (as marijuana or hashish) from hemp; a fiber (as jute) from a plant other than the true hemp; also: a plant yielding such fiber.
Hexane	Used to extract edible oils from seeds and vegetables, as a special-use solvent, and as a cleaning agent. Hexane is a colorless volatile liquid that is insoluble in water and highly flammable. The odor threshold for hexane is 130 parts per million (ppm), with a faint peculiar odor reported. The vapor pressure for hexane is 150 mm Hg at 25 °C.
Harvest Batch	A specifically identified quantity of processed Medical Marijuana that is uniform in strain, cultivated utilizing the same Pesticide and other agricultural chemicals and harvested at the same time.
Food-Based Medical Marijuana Concentrate	A Medical Marijuana Concentrate that was produced by extracting cannabinoids from Medical Marijuana through the use of propylene glycol, glycerin, butter, olive oil or other typical cooking fats. If used in the production of a Food-Based Medical Marijuana Concentrate, ensure that propylene glycol or glycerin is food-grade.
Flowering	The reproductive state of <i>Cannabis</i> in which the plant is in a light cycle intended to stimulate production of flowers, trichomes, and cannabinoids characteristic of marijuana.
"Flammable Solvent"	A liquid that has a flash point below 100 degrees Fahrenheit.
Edible Medical Marijuana-Infused Product	Any Medical Marijuana-Infused Product that is intended to be consumed orally, including but not limited to, any type of food, drink, or pill.
Dry sieve hash (sometimes “dry sift”)	A mechanical separation process which generally uses a variety of screens and agitation to separate trichome from plant material. Dry sieve hash is also traditionally known as “kief.”
Cannabinoid	Any of the chemical compounds that are the active principles of marijuana.
HHO: Hexane Hash Oil	Made by passing hexane liquid through an extractor filled with cannabis plant matter.
PHO: Propane Hash Oil	Made by passing propane gas (liquefied petroleum gas [LPG]) through an extractor filled with cannabis plant matter.
Hash Oil	<p>A concentrate from marijuana that involves extracting Tetrahydrocannabinol (THC) and other cannabinoids from the plant material using a light hydrocarbon or other process. The final product is typically a pliable waxy substance similar to caramel and honey. Also known as, Honey Oil, Weed Oil, Dabs, Concentrate, Ear wax, Amber Glass, Moon Rocks, Shatter and 710.</p> <p>A firm liquid made by dissolving cannabis plant matter and/or hash in a solvent “like alcohol, liquefied petroleum gas (LPG), acetone and others.”</p> <p>A dark green or black tar-like material made by solvent extraction of either cannabis resin or herbal cannabis. May exceed 60% THC. Hash oil is a resinous matrix of cannabinoids obtained from the cannabis plant by solvent extraction. The solvent is removed after the extraction.</p>
Butane Hash Oil (BHO)	Made by passing butane gas through a tube or “extractor” filled with cannabis plant matter.
Flammable Gas Extraction System	A professional grade, closed-loop extraction system capable of recovering the solvent for the production of a Solvent-Based Medical Marijuana Concentrate.

## Occupancy Classification

The Use and Occupancy Classification of Marijuana Business Functions may be found in Chapter 3 of the International Building Code (IBC), and International Fire Code (IFC). Typical occupancies are summarized as follows:

- 1) Medical / Recreational Marijuana Center, Store, or “Dispensary” – M Occupancy; B Occupancy if there is patient care and similar
- 2) Marijuana Plant Cultivation Locations or “Grow Facilities” – F-1 Occupancy [Retail Marijuana Cultivation Facility]
- 3) Marijuana Oil Extraction Operations – F-1 Occupancy\*<sup>1</sup>
- 4) Marijuana-Infused Product Kitchens/Bakeries – F-1 Occupancy

International Building Code lists “Hemp products” and “Tobacco” as examples of uses to be classified as F-1 Occupancies, which very closely matches the functions occurring in items 2, 3, and 4 listed above.

Note:

- Liquefied petroleum gas (LPG) is not specifically listed in 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 specifically regulated in Chapter 61 of the IFC and NFPA 58.
- 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.

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

Fire code officials have the authority to require an owner to provide a technical opinion report 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 authority having jurisdiction (AHJ) 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 or 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. The AHJ may obtain 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

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<sup>1</sup> An “H” occupancy classification may apply to an infused product manufacturer using solvent based extraction systems where flammable liquids and/or flammable gases, such as, butane and propane are used. The facility’s chemical inventory and Maximum Allowable Quantities Per Control Area (MAQs) Tables, found in the IBC and IFC should be consulted to determine whether an “H” occupancy may be applicable.

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 the AHJ or, in this case, the fire code official. The fire code official “approves” 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.

## **Operational Permits**

As with any specific hazard operation, the fire code official may require facilities to obtain operational permits. Common permits in marijuana cultivation and infused products manufacturing facilities include: Carbon Dioxide Systems used in beverage dispensing applications (amended for cultivation use and extraction), Compressed Gases, Combustible Fibers, Flammable and Combustible Liquids, Fumigation and Insecticidal Fogging, Hazardous Materials, High Piled Storage (high rack system cultivation), and Liquefied Petroleum (LP) Gas.

Section 105 of the IFC should be consulted for the described permit conditions and may also consider amendments to the code to suit the local AHJ’s requirements. Further discussion on hazardous materials is found in the Hazardous Materials section of this document.

## **Construction Permits**

As with any specific installation or system, the building or fire code official may require facilities obtain construction permits. Common permits in marijuana cultivation facilities and infused products manufacturing facilities include: Building Construction, Electrical, Mechanical, Compressed Gases, Flammable and Combustible Liquids, Hazardous Materials, LP Gas, Automatic Fire Extinguishing/Suppression systems, Fire Alarm and Detections systems, and related equipment.

Section 105 of the IFC should be consulted for described permit conditions. The fire code official may consider amendments to the code to suit the local requirements.

## **General Safety Provisions**

### **Hazard Communication**

When storing or using any type of hazardous materials, IFC Section 407 should be followed and the appropriate paperwork made accessible to the fire code official. Additionally, IFC Sections: 5001.3 - 5001.6.3 should be consulted.

Section 407 of the IFC gives responders the information of the hazardous chemicals that is on the property.

- Material Safety Data Sheets (MSDS) shall be on property and made easily accessible.
- Containers and/or packages related to hazardous materials shall be properly labeled and warning signage shall be properly displayed and easily visible.

- All persons shall be trained on what to do in the event of an emergency involving hazardous material on the property.
- When required by the fire code official, a permit and authorized paperwork should be submitted to the AHJ.
- If shutting down or relocating, a facility closure plan may need to be submitted to the fire code official for the hazardous materials as well.

## Building and Equipment Design Features

### Fire Protection

Plant cultivation operations in commercial buildings are typically classified as F-1 occupancy. There are several common triggers for plant cultivation operations that require the installation of a fire sprinkler system. Section 903.2.4 of the IFC specifically addresses F-1 sprinkler requirements with the most common trigger being a fire area exceeding 12,000 square feet. Another common trigger is the desire for these businesses to have a sealed limited access building that leads to the creation of a story without openings (Section 903). An additional consideration would be a building that exceeds height and/or above grade area limitations. Per Section 903.2.5 of the IFC, Marijuana facilities that fall under a Group H occupancy classification require further consideration for a fire sprinkler system.

### Interior Finishes

It is common in 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 Table 803.3 of the IFC.

(Note: 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.)

### Exits and Exit Signage, Egress

Security measures are often extreme in marijuana facilities. The desire for security in no way overrides the minimum requirements for exiting and egress. Common issues associated with exits and egresses are as follows:

- Number of exits shall be in accordance with Table 1006.2.1 and Table 1006.3.2(2) and Section 1017.2 of the IFC.
- Means of egress cannot be concealed in any way.
- Exit doors and their function cannot be eliminated without prior approval.
- Exterior doors that have been rendered non-functional and that retain a functional door appearance are required to have a sign affixed to the exterior of the door with the words THIS DOOR BLOCKED; reference Section 504.2 of the IFC.
- Where 2 or more exits are required, egress doors are required to swing in the direction of egress travel.
- Where more than one exit is required, illuminated exit signs are to be provided that must be readily visible from any direction of egress travel.
- Intermediary exit signs may also be required per Section 1013 of the IFC.
- H occupancies require specific considerations for exiting.

## Locks and Key Box

Where security and life safety objectives conflict, alternative measures may be required or permitted by the AHJ.

**SECURITY GATES** – Due to the increased security measures typically required, and the potential hazards associated with marijuana facilities, the AHJ is authorized to require that any security gate be installed across a fire apparatus road first be approved before installation.

**KEY BOXES** – Due to the increased security measures required, and the potential hazards associated with marijuana facilities, the AHJ is authorized to require the installation of a key box in an approved location, which will permit timely access to the facility in the event of an emergency.

**LOCKS** – Due to the increased security measures required, and the potential hazards associated with marijuana facilities, the AHJ is authorized to require the installation of “approved” locks on any and all gates or similar barriers, which will permit timely access to all areas of the facility’s property in the event of an emergency. If the facility has electronic access controls, the AHJ may require an access code or electronic access card be provided.

**BOLTS, BARS, LOCKS & LATCHES** – Egress doors are required to open easily when exiting without the need for a key, without using extra effort and/or without having special knowledge in order to operate the installed hardware. Door handles, pulls, latches, locks and other operating devices should be free of tight grasping, tight pinching or twisting of the wrist to operate. Slide bolts, security bars, dead bolts, thumb latches and similar hardware items are prohibited from being installed on emergency egress doors. The AHJ may permit an exception to this where a set of double-doors is installed and still meets all other requirements set forth in the fire and building codes.

**ALTERNATIVE LOCKING DEVICES** - Delayed egress locks and electromagnetic locks are permitted for use in other occupancy types, and must be approved for use by the AHJ.

## Aisles

Clear aisles are necessary to facilitate rapid evacuation of occupants and provide emergency egress in the event of an emergency. When considering product, equipment and fixture placement within a space, keep in mind that persons working in the area should be able to quickly stand and walk to an emergency exit door without having to twist or contort their body in order to avoid protruding objects from either side or above. Aisles require a clear width ranging from 28” to 44” or greater, depending on the occupancy load of a space. The AHJ may need to make a determination in this area with respect to the required widths based on obstruction and required responder egress.

## Control Areas

*\*Section Currently Being Written\**

## Cultivation/Grow

*\*Section Currently Being Written\**

## Ventilation

Marijuana facilities must implement and maintain appropriate ventilation and filtration systems to satisfy unwholesome or noxious odor nuisance standards that may be in place within the local jurisdiction. Generally, the AHJ may require that the odor of marijuana must not be perceptible at the exterior of the building, at the licensed premises or at any adjoining use of the property.

The AHJ may or may not mandate particular equipment specifications with regard to filtration; however, all marijuana establishments are strongly encouraged to adopt best management practices with regard to implementing state-of-the-art technologies in mitigating marijuana odor, such as air scrubbers and charcoal filtration systems.

Marijuana product manufacturing facilities and testing facilities must implement appropriate exhaust ventilation systems to mitigate noxious gasses or other fumes used or created as part of any production process. Exhaust ventilation equipment is required to be appropriate for the hazard involved and must comply with local fire and mechanical codes.

## **Portable Fire Extinguishers**

Approved portable fire extinguishers are required to give the occupants the means to suppress a fire during its initial or incipient stage. A readily available portable fire extinguisher can contribute to the protection of the occupants.

Each occupancy type is considered unique in design, intended use of spaces, and types of materials within each space. Portable fire extinguishers are classified according to the types of fire (A, B, C & D) for which they are intended to extinguish. Class A and B extinguishers are also rated according to performance capability, which is represented by a number.

The size, classification, total number, and distribution of portable fire extinguishers required for occupancy type will be determined by the AHJ based on fire code requirements. The installation requirements for portable fire extinguishers vary according to size, weight and type of specific hazard. The AHJ will ensure that all portable fire extinguishers are located where they are readily visible and accessible at all times.

Proper maintenance of the installed portable fire extinguishers is the responsibility of the occupant or property owner.

## **Electrical: Wiring, Extension Cords, Appliance, Lighting, Extraction Equipment, Kitchen**

Electrical systems are a common cause of ignition for fires. In 2011, an estimated 64,100 structure fires across the United States were reportedly caused by some type of electrical failure or malfunction. When firefighters are working to extinguish a fire in a building, they need to be able to turn the electricity off so they can operate more safely. For these reasons, there are several considerations that must be taken by marijuana facilities in order to ensure that electrical systems are installed and maintained safely.

General electrical requirements for all facilities follow Section 605 of the IFC:

1. Doors into electrical control panel rooms are required to be marked with a sign stating ELECTRICAL ROOM. The means for turning off electrical power to each electrical service and each individual electrical circuit must be clearly and legibly marked.
2. Electrical panels and electrical disconnect switches must be accessible at all times. A clearance of 30 inches wide (wider for panels and equipment that exceeds 30 inches in width), 36 inches deep, and 78 inches high is required to be maintained free from storage.
3. Electrical systems must be maintained in good repair without exposed wiring, open junction boxes, or damaged equipment that could present an electrical shock or fire hazard.

4. Power strips with built-in overcurrent protection (“circuit breakers”) are allowed, provided they are plugged directly into a permanent electrical receptacle. Power strips may not be plugged into additional power strips (daisy chaining). A power strip’s cord may not be run through walls, above ceilings, or under doors or floor coverings. If power strips show evidence of physical damage, they must be replaced.
5. Extension cords may only be used to provide temporary power to portable electric appliances. Extension cords may not be used as a substitute for permanent wiring, and may not be affixed to structures, extended through walls, ceilings or floors, or under doors or floor coverings. Multi-outlet extension cords that do not have built-in overcurrent protection (“circuit breakers”) are not allowed. If extension cords show evidence of physical damage, they must be replaced immediately.

Special requirements for cultivation and extraction:

The amount of electricity needed for a cultivation operation can easily exceed that of other types of businesses. If the cultivation business/facility moves into an existing building, there is a strong likelihood that the electrical panel and the wiring inside the building will require upgrading in order to accommodate the required power needed to cultivate plants utilizing grow lamps and ventilation equipment. It is not uncommon to have the electrical utility provider upgrade the amount of electricity feeding the building from the transformer outside.

Flammable gases and liquids often used for marijuana oil extraction have the potential to create an explosive environment for which the electrical system can be an ignition source. Rooms or areas where extraction equipment utilizes these materials are subject to special wiring and equipment requirements to minimize this risk. These requirements keep the electrical system isolated from the remainder of the space in a way that typical electrical systems do not.

## Premise Identification

Most cultivation and extraction operations try to remain discrete. This is often part of their overall security method and not wanting to draw a lot of attention to what they are doing. It is not unusual for the businesses to remove all markings from the building. All buildings are required to be provided with address identification. This address must be visible from the street or road fronting the property and contrasting with the background of the building. Signage that identifies the name of the business is not regulated by fire code, but may be regulated by local city or county government.

## Security

While it is understood that security is very important to marijuana facilities, this security cannot create risks to employees, the general public, and emergency responders. Not only do occupants need to be able to exit the facility in an emergency, but firefighters must be able gain access. There are several factors that must be considered when balancing security with fire code compliance:

1. Egress doors are required to be readily openable from the egress side without the use of a key or special knowledge or effort, and cannot have hardware that requires tight grasping, tight pinching, or twisting of the wrist to operate. This means that double-cylinder deadbolts that allow the door to be locked with a key from either side are generally prohibited. Also prohibited are many styles of doorknobs and deadbolts that are often marketed for residential use. Door bars, surface bolts, and other security devices which require more knowledge or effort than the typical operation of a door latch are prohibited. (Section 1010)
2. The unlatching of an egress door cannot require more than one operation. This means that adding several locking devices to a door for increased security is prohibited. For example: the installation of a deadbolt to

a door that has an existing locking door latch is prohibited. Again, if it takes any more effort than the typical operation of a door latch, the device is most likely not permitted on an egress door. (Section 1010)

3. The installation of security features designed to disable, injure, maim or kill intruders is prohibited.

### **Appliances: Extractor, Still, Vacuum Oven, Kitchen, CO2 Generator, Sulfur Evaporator**

If required by the AHJ, a code analysis regarding compliance with the IFC in the use of all processing phases can be required to be provided by a third party, State Certified Professional Engineer or Fire Protection Engineer. The code analysis should cite all applicable building code, fire code/standards and identify compliance and/or non-compliance. Operational processes involving compressed gases should be documented in the analysis including annual LPG use and storage amounts; annual CO2 enrichment system process and storage amounts – including natural gas generators and for any system containing more than 100 lbs. of CO2; annual compressed gas use and storage (required for 6,000 cu/ft. or more of an inert – 1 lb. of CO2 = 8.74 cu/ft).

The AHJ should provide a list of requirements prior to the construction of a medical infused products (MIP) facility or processing room using the above listed appliances in the extraction, cultivation or processing of marijuana. Areas of interests include atmospheric monitoring, ventilation, posted proper emergency procedures, loading and offloading of compressed gases, storage of compressed gases and proper placarding on the building.

The AHJ is to confirm the recommendations made by the third party peer review that the room or space of use is in compliance with their recommendations before issuing a certificate of occupancy. Once the Engineer and the AHJ have both signed off on the proper setup of the room and all state regulations, such as proper licensing, has been completed the owner will then be granted permission to use the space as designed. Any alterations to the room of appliance will require a second review following the same requirements listed above.

### **Fire Department Access**

Buildings/facilities must have at least one all-weather road that is wide enough and strong enough to support the size and weight of fire department apparatus. Roads must extend close enough to buildings to allow for firefighting operations. Roads may have special requirements for “fire lane” signage to disallow parking. A means for turning fire department apparatus around may be required for roads that contain dead ends or no outlet. Gates or barricades that obstruct roads must be approved by the fire department.

All required exterior doors must remain operable for emergency access by firefighters. Eliminating the function of any exterior doors requires prior approval that cannot be granted in every circumstance, and where allowed, the door must be marked with a sign stating THIS DOOR BLOCKED.

Certain equipment rooms contained within a building may require identifying signage to aid firefighters.

1. Rooms containing fire protection equipment (fire alarm panels, fire sprinkler valves, etc.)
2. Rooms containing controls for air-conditioning equipment
3. Rooms containing utility equipment for gas or electrical service
4. Rooms containing hazardous materials

## Special Occupancies and Operations

### Combustible Fibers

Within most cultivation operations combustible fibers will rarely be a consideration but should also not be forgotten. The Hemp industry may have a processing operation that combustible fibers may need to be mitigated.

### Fumigation and Insecticidal Fogging

In marijuana facilities, fumigation and insecticidal fogging may be used to kill insects, rodents, other vermin, plant parasites, weed seeds, and fungi that adversely affect growth. Some fumigants are flammable under certain circumstances, and all fumigants are poisonous or toxic. Definitions of “fumigation” and “insecticidal fogging” should be looked at closely to determine if these processes are being utilized. To protect the public and firefighters, there are several requirements that must be followed when performing these operations:

1. Permits may be required by the AHJ.
2. Fire departments may require notification, at least 48 hours in advance, of performing these operations, including specific information about the location within the building, the products being used, and contact information for those conducting the operation. In these instance, the products being used must be approved by the fire department.
3. Written notice must be given to building occupants with enough notice to allow evacuation and must include information about the duration of the operation and all hazards associated with the operation. Only those directly conducting the operation are allowed to remain in the building.
4. Sources of ignition must be secured before these operations commence and must remain secure until after the space has been ventilated. Sources of ignition include electricity, portable electronic devices (such as cell phones), telephone lines, and any other sources of spark or flame. Certain types of electrical appliances deemed safe for hazardous atmospheres may be allowed when approved by the fire department.
5. Materials used to seal the affected structure or space must comply with flame propagation performance standards and must be approved by the fire department prior to installation.
6. Every access point to the affected structure or space must have both a warning sign and watch personnel to protect against unauthorized entry. The style and content of the warning signs and the duration of their posting must be approved by the fire department.
7. Personnel engaged in these operations must have proper respiratory protection available.
8. At the end of the operation, the affected structure or space must be safely and properly ventilated, and all fumigation or fogging product containers, residues, debris, and other materials must be properly disposed of.

Sulfur burners used to burn sulfur prills is a form of fumigation and must be treated as such. This method is typically utilized to treat powdery mildew on the plants.

### Rack Storage

Rack storage systems present unique challenges for firefighting operations. They allow a larger volume of combustible material than would be present if only the floor was being used, and they place that combustible material in a vertical orientation that increases the potential for fire spread. For these reasons, rack storage systems are very heavily regulated by fire and building codes. There are provisions for structural stability of the

racks, aisle widths, exterior access doors for firefighters, special types of fire protection systems, and building features to control the spread and ventilation of smoke.

Permits are required prior to the installation of any rack storage system. A qualified design professional will be required to analyze your space and submit documentation for rack storage to the local building department and fire department.

## Hazardous Materials

### Hazardous Materials

Marijuana manufacturing processes utilize various hazardous materials subject to the activity. The AHJ should require a detailed chemical inventory in accordance with the fire code to determine the hazards and classifications of the materials used within any cultivation, infused product manufacturing, and concentrate extraction occupancy facility.

Marijuana cultivation or grow operations include similar materials to that of other indoor botanical or greenhouse operations. They may employ the use of pesticides, insecticidal fumigation or fogging techniques, in addition to nutrients and fertilizers. The materials can range from benign to toxic. Each state's Department of Agriculture may have regulations and defined enforcement related to hazardous materials and should be consulted as a resource.

Carbon dioxide (CO<sub>2</sub>), an asphyxiant gas, is also commonly used in marijuana grow operations. Growing in a greenhouse or indoors, the CO<sub>2</sub> levels can be reduced as the plants use CO<sub>2</sub> during photosynthesis. Enriching the air with CO<sub>2</sub> supports plant growth and development. Carbon dioxide may be stored in mini-bulk cryogenic liquid cylinders that are vacuum jacketed, in steel or aluminum cylinders as liquefied compressed gas or be produced by carbon dioxide generators. Supply gases for CO<sub>2</sub> generators are natural gas and/or propane.

Infused product manufacturing and concentrate extraction processes, also known as hash oil extraction, may utilize flammable and combustible liquids, flammable gases (LP Gas), and asphyxiant gases. Water-based marijuana, food-based marijuana, and solvent-based marijuana are typical marijuana concentrates.

Each concentrate requires different processes, as well as the use of different materials to extract the product from the plant. Processing may employ the use of closed-loop solvent extraction, pressurized equipment, steam distillation, heat, ice, water or other methods that do not require solvents.

Processing types include, but or not limited to:

1. Water-based marijuana concentrates extract cannabinoids through the use of water, ice or a solid form of carbon dioxide, better known as dry ice. Materials in this category are typically non-hazardous.
2. Food-based marijuana concentrates extract cannabinoids through the use of food products such as propylene glycol, glycerin, butter, olive oil or other typical cooking fats. Materials in this category may be hazard classified as physical hazards or combustible liquids.
3. Solvent-based marijuana concentrates extract cannabinoids through the use of pressurized closed loop systems and non-closed loop systems. Materials in this category may be classified as physical hazards using flammable liquids (hexane, isopropanol, ethanol, grain alcohol); flammable liquefied gas - LP Gases butane, n-butane, propane; and health hazards, such as, high pressure carbon dioxide gas systems. Note

that most of these are not ‘closed systems’ as they have to be opened at some time to get product and waste out, thereby releasing volatile gases.

## Compressed Gases

Compressed gases of varying materials may be used in multiple processes in cultivation or extraction and are governed by Chapter 50 and Chapter 53 of the IFC. Listed below are highlighted sections and only refer to common requirements surrounding compressed gases in marijuana facilities. This list is not all-inclusive. Examples of these gases include, but are not limited to, butane, propane, and carbon dioxide.

A code analysis regarding compliance with these chapters in the related processing phases shall be provided by a third party, State Certified Professional Engineer or Fire Protection Engineer. The code analysis should cite all applicable building and fire codes/standards and identify compliance and/or non-compliance. Operational processes involving compressed gases that should be documented in the analysis should include annual LPG use & storage amounts; annual CO<sub>2</sub> enrichment system process and storage amounts – including natural gas generators and for any system containing more than 100 lbs. of CO<sub>2</sub>; annual compressed gas use & storage (required for 6,000 cu/ft. or more of an inert – 1 lb. of CO<sub>2</sub> = 8.74 cu/ft).

## Flammable Gases

Flammable gases of varying materials may be used in multiple processes in cultivation or extraction and are governed by Chapter 50, Chapter 58 and Chapter 61 of the IFC. Other referenced standards and/or documents from the IFC include, NFPA 58, Appendix B of NFPA 58, NFPA 70 and the *International Fuel Gas Code*. Sections listed below are highlighted sections of each, only refer to common code issues surrounding flammable gases in Marijuana Facilities, and are not inclusive of all requirements. Some examples of these gases include, but are not limited to butane and propane.

A code analysis regarding compliance with these chapters in the related processing phases shall be provided by a third party, State Certified Professional Engineer, or Fire Protection Engineer. The code analysis should cite all applicable building codes and fire codes/standards, as well as identify compliance and/or non-compliance. Operational processes involving flammable gases that should be documented in the analysis should include annual flammable gas usage and storage amounts.

## Pesticides and Fertilizers

Cultivation and extraction operations generally contain hazardous materials regulated by fire code, such as fertilizers, pesticides, and flammable gases and liquids. In some cases, retail facilities sell flammable liquids or gases for do-it-yourself extraction. There are several factors that need to be considered to remain compliant with the storage and use of these materials:

1. All hazardous materials must be classified in accordance with the categories and definitions provided in fire code. This can be a complicated process and may require professional assistance.
2. Once hazardous materials have been classified, there is a maximum allowable quantity that can be stored in a facility. It is possible, and even likely, that different products share a classification and must be counted together towards the maximum allowable quantity. There are options to increase the maximum allowable quantity in a facility, such as use of special hazmat cabinets, building rooms with fire-resistive construction to create control areas, and installation of fire sprinkler systems.
3. Facilities where hazardous materials are stored in certain quantities must have special signage installed outside to make firefighters aware of what is located in the building.

## Gas Detection and Alarms

Detection of gas or vapor release is typically not required unless the MAQ of hazardous materials are exceeded. However, Chapter 50 of the IFC states, if the release of hazardous material can cause immediate harm to a person or property a means to mitigate the release shall be provided. This could include the need of a gas detection system.

When using a flammable gas or flammable liquid, processes that are extracting oil from the marijuana plant will typically have some type of leak or gas detection.

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 as discussed within the Hazardous Material section. The IFC does not require detection of CO<sub>2</sub> unless it is used within a “beverage dispensing application” where the CO<sub>2</sub> system exceeds 100 pounds (Section 5307 of the IFC). Although this section within the IFC is not related to marijuana, the hazard of an oxygen depleted atmosphere would be the same. Bottles of compressed CO<sub>2</sub> are used within the grow operation to enrich the atmosphere with CO<sub>2</sub> to assist in plant growth. If the amount of the CO<sub>2</sub> used within a room is an amount that could create an asphyxiation hazard than detection and local alarms should be provided. This would need to be determined by the AHJ based quantity of the CO<sub>2</sub> versus the cubic feet of the room.

When a gas detection system is required, the meter is required to be listed and labeled in accordance with UL 2075. Mechanical interlocks that shut down the flow of gas to the unit when gas is detected are required in any facility that is not constantly attended. If personnel are constantly attending the process in which gas is being used and can physically shut off the gas supply, the interlock is not required. In either case, atmospheric monitoring must give an audible alarm indicating the presence of gas in the air has reached its permissible exposure limit (PEL). Shutdown procedures must be followed by the manufactures recommendations and the room must be vacated until all alarms read normal. All equipment used in the detection of flammable and/or toxic gases must be approved by the AHJ and may require construction and mechanical permits. Emergency plans for administrative controls and shutdown should be reviewed and approved by the AHJ

## Liquefied Petroleum Gases (LPG), Indoor and Outdoor

Sites that have LPG such as propane and butane are regulated under Chapter 61 of the IFC and NFPA 58. Although LPG is flammable it is not regulated by IFC-Chapter 58 Flammable gas code. LPG gases are heavier than air and seek low lying areas. LPG has an extremely high expansive ratio, meaning amounts of LPG can lead to dangerously explosive levels quickly.

LPG Requirements:

- Allowed locations if LPG containers within a building are found in NFPA 58 and subject to the approval of the fire code official.
- Compliance for portable containers is determined by NFPA 58 and IFC Sections 6103.2.1.1 through 6103.2.1.7
- Use of LPG in basements, pits or similar locations is prohibited in areas where heavier than- air- gas can collect.
- Within F occupancies, where manifolded, the water capacity of containers can reach 735 pounds per manifold.
- Because of the physical properties of LPG, special consideration should be given as to the location of LPG. The locations allowed are regulated by NFPA 58 as well as the approval of the fire code official.
- LPG needs to be used with approved equipment for LPG.
- LPG can only be released to atmosphere with accordance to NFPA 58 Section 7.3.

- No Smoking signs, as required by the fire code official, need to be present, as well as combustible material must to be maintained a distance of 10 feet from containers. If containers, regulators and piping are subject to vehicle traffic then protection is required in accordance with NFPA 58.
- Locations for extinguishers need to be in compliance with IFC Section 906 and placed according to NFPA 58.
- LPG containers cannot be stored near a means of egress.
- No more than 200 lbs. of the 2.5 lb containers may be stored within buildings accessible to the public.

## Highly Toxic and Toxic Materials (pesticide or agricultural products storage)

*\*Section Currently Being Written\**

### Flammable and Combustible Liquids

Flammable and combustible liquids are used for solvent based extraction of marijuana concentrated products. Hazards involved are the release of the solvent and low level ignition sources. Often these liquids are under pressure and a release could easily result in an explosion.

Classified locations are for areas where flammable liquids are stored, handled, dispensed and or mixed. The locations are held to the requirements of IFC Table 5703.1.1

Piping systems for flammable and combustible liquids need to be in accordance with IFC Sections 5703.6.1 through 5703.6.11 and the design of such systems need to be in accordance with NFPA 30 Chapter 27.

### Ventilation

Flammable/combustible liquids and compressed gases used in extraction or processing in Marijuana Facilities are required to be vented in accordance with IFC Chapters 50 and 53 and portions of the *International Mechanical Code*. This ventilation may include systems for gas rooms, exhausted enclosures, gas cabinets, indoor storage areas and storage buildings. Listed below are highlighted sections of the IFC that refer only to common code issues surrounding ventilation of flammable/combustible liquid vapors and compressed gases in Marijuana Facilities and are not inclusive of all requirements.

A code analysis regarding compliance with these chapters in the related processing phases may need to be provided by a third party, State Certified Professional Engineer or Fire Protection Engineer. The code analysis should cite all applicable building codes and fire codes/standards and identify compliance and/or non-compliance.

## Referenced Standards

Current Editions of the following

- NFPA 13- Standard for the Installation of Sprinkler Systems
- NFPA 30- Flammable and Combustible Liquids Code
- NFPA 55- Compressed Gases and Cryogenic Fluids Code
- NFPA 58- Liquefied Petroleum Gas Code
- NFPA 70- National Electrical Code®
- NFPA 497- Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas

## Considerations for other Regulatory Departments

### Building Department

#### Construction

Cultivation/grow facilities should comply with the AHJ adopted fire and building codes for Use and Occupancy for a Factory (F-1), moderate hazard occupancy, primarily due to unconventional electrical systems, fumigation, carbon dioxide enrichment, maze like rooms, and the usual close proximity to other occupancies.

Dispensaries should meet AHJ adopted fire code and building code for the use and occupancy for Mercantile (M) occupancy.

Many times other MJ industry centered facilities will be based on a use and occupancy classification of a Mercantile Occupancy, “M” International Building Code (IBC 309.1) or possibly a “B” if there is patient care and similar.

“Use of a building and or structure or portion thereof, for the display and sale of merchandise and involves stocks of good, wares or merchandise incidental to such purposes and accessible to the public.”

When a building department determines a structure or portion thereof to be a “classified” occupancy, the designer of record may be required to demonstrate “declassification” through ventilation designs or other methods.

#### Electrical

Apart from being a demanding electrical consumer, most cultivation facilities are no different to the electrical reviewer than any other F1 occupancy; however, when dealing with a hazardous process some AHJs and designers have chosen to classify the location according to NFPA 70 Article 500.

#### Mechanical

Colorado state laws require that the MIPP operation be located in a designated room and most AHJs require a hazardous exhaust system installed to capture any potential release of flammable gas.

Many AHJs require a system be installed to ensure that the odor from such locations cannot be detected at the exterior of the facility. Confirm with Uniform Mechanical Code (UMC) for confirmation of air changes required.

#### Technical Assistance

The fire code official is authorized to require the owner or agent to provide, without charge to the jurisdiction, a technical opinion or report.

In MJ cases, a qualified professional can provide engineer certification to a piece of equipment for compliance with fire code, standards or best practices. The professional can also provide an Occupancy Evaluation Report that evaluates the occupancy and identifies facility compliance with the fire and building codes specific to the MJ operation.

## Zoning

Marijuana dispensaries, in many jurisdictions, have historically been required to adopt the same zoning restrictions as businesses that sell alcohol, pornography, and firearms. Businesses that sell these types of “vices” are prohibited from locating in residential or mixed-use neighborhoods and are pushed into much less affluent neighborhoods. Each jurisdiction might have specific requirements and should be evaluated prior to purchase, lease or occupancy.

## Licensing

Most jurisdictions adopt licensing code and regulations that are supplementary to the State MJ code and rules, and therefore deal mainly with the licensing and disciplinary procedures and processes. The regulation piece may also have an inspection process involved.

## Law Enforcement

Most law enforcement agencies maintain a licensing database, and MJ/MMJ licensees and businesses are subject to inspections (scheduled or compliance audits) at any time by police units.

## Health Department

The Colorado Department of Public Health and Environment (CDPHE) may regulate and inspect MJ/MMJ businesses. The Hazardous Materials and Waste Management Division regulates solid and hazardous wastes, which includes the proper handling and disposal of waste pesticides, fluorescent lamps, compressed gases, and solvents. The Air Pollution Control Division regulates air emissions and odor issues. Municipalities may also develop odor regulations. If you send wastewater, including irrigation water, to a sanitary sewer system, you should ask the wastewater treatment facility, or your city or county, about their permit requirements. In general, wastewater should not be released from your facility to the ground, waterways, storm sewers, or to septic systems. In addition, the Colorado Marijuana Enforcement Division (MED) does have basic “sanitary standards” for licensee compliance. The CDPHE handles registrations for “red card” holders (MMJ patients).

## State Department of Agriculture

*\*Section Currently Being Written\**

## Referenced I-Codes

- International Building Code
- International Mechanical Code
- International Existing Building Code
- International Fuel Gas Code
- International Plumbing Code

## Annex A – Denver Fire Marijuana Operations

### MARIJUANA OPERATIONS (Denver Fire proposed changes 10/15/2015)

#### SECTION 3901

##### GENERAL

**3901.1 Scope.** This section shall apply to all occupancies engaging in marijuana (i.e. cannabis and extract derivatives) sales locations, growing, processing, extraction, and/or testing. These occupancies shall comply with this chapter and other applicable provisions of this Code.

**3901.2 Permits.** Permits shall be required as set forth in Section 105.6 & 105.7

**3901.3 Existing Operations.** Buildings containing existing growing or extraction operations shall comply with this code by October 1st 2016.

#### SECTION 3902

##### DEFINITIONS

*Chemical Fume Hood.* A ventilated enclosure designed to contain and exhaust fumes, gases, vapors, mists, and particulate matter generated within the hood.

*Extraction.* The process of using solvents to remove essential oils or other botanic material from the marijuana plant.

*Post Oil Processing.* The process of refining essential oils after the extraction, including but not limited to dewaxing & winterization processes.

#### SECTION 3903

##### EXTRACTION OPERATIONS

###### 3903.1 Construction Requirements.

**3903.1.1 Location.** Extraction processes shall be performed in a room dedicated to the extraction process.

**3903.1.2 Egress.** Exit doors from the extraction room shall swing in the direction of egress and be provided with panic hardware where hazardous materials are used in the extraction process.

**3903.1.3 Extraction Rooms.** Other than openings and penetrations allowed by Section 3903.1.4, extraction rooms shall be fully enclosed. The floor, ceiling, and walls of extraction rooms shall be constructed in accordance with the Denver Building Code and be continuous, non-combustible, and smooth. Rooms designed in accordance with Section 3903.4.1.1 shall be constructed to permit the free passage of exhaust air from all parts of the room.

**Exception:** Enclosed booths constructed in accordance with Sections 2404.3.2.1 through 2404.3.2.3.

**3903.1.4 Openings and Penetrations.** Openings and penetrations into extraction rooms shall only be provided for egress, mechanical, electrical, or plumbing systems serving the extraction room. Penetrations shall be sealed vapor tight. Non-operable glazing is permitted where glazing does not interfere with required exhaust systems.

**3903.1.5 Extraction Room Illumination.** Luminaires inside the extraction room shall comply with 3903.2.2. Luminaires attached to the walls or ceilings of an extraction room or booth, but outside of any classified area and separated from the flammable vapor areas by vapor-tight glass panels, shall be suitable for use in ordinary hazard locations. Such luminaires shall be serviced from outside the flammable vapor areas.

**3903.1.6 Fire Protection.** Extraction rooms, booths, or hoods, including ductwork where required for hazardous exhaust systems, shall be protected by an approved automatic fire extinguishing system complying with Chapter 9 where any of the following exist:

1. Extraction processes utilizing LPG or off gassing LPG from spent plant material or oil,
2. Vapors are released exceeding 25% of the lower flammable limit (LFL) from flammable liquid extraction processes or flammable liquid post oil processing.

**3903.2 Sources of ignition.** Extraction or post oil processing operations which use flammable liquids or Liquefied Petroleum Gas (LPG) shall be in compliance with 3903.2.1 through 3903.2.3

**3903.2.1 General Open flame and sparks.** Smoking, open flames, direct fired heating devices, etc. shall be prohibited in areas where flammable vapors exist.

**3903.2.2 Electrical equipment.** Electrical equipment installed in rooms designed in accordance with 3903.4.1.1, hoods, or booths, containing LPG extraction processes shall be in accordance with NFPA 70 as a Class I Division I location. Areas adjacent to classified locations shall be in accordance with NFPA 70. Electrical equipment installed in areas of flammable liquid extractions or post oil processing shall be in accordance with Chapter 50 and NFPA 70.

**Exception:** Subject to Approval of the Fire Code Official, rooms or booths containing LPG extraction equipment that is not normally opened within the room or booth for oil or plant material retrieval and frequent leakage in the closed system does not occur may be considered a Class I Division II Location.

**3903.2.3 Grounding and Bonding.** Precautions shall be taken within LPG extraction rooms to minimize the possibility of ignition by static electrical sparks through static bonding and grounding of extraction equipment, ducts, and piping etc. installed in accordance with NFPA 70.

**3903.3 Equipment.** Extraction process equipment utilizing hazardous materials shall be listed or approved.

**3903.4 Exhaust required.** Extraction and post oil processing, utilizing LPG or flammable liquids shall be provided with an exhaust system in accordance with Section 3903.4.1 or 3903.4.2. The exhaust system shall be in operation at all times when extractions or post oil processing is being performed and until LPG is off gassed from oil and/or plant material removed from LPG extraction equipment. Fans shall be of the type approved for use when flammable or explosive vapors are present in accordance with the International Mechanical Code 503.

**3903.4.1 Exhaust for LPG extraction processes.** A hazardous exhaust system engineered in accordance with the Denver Building and Fire Code shall be provided for LPG extraction processes including LPG degassing from processed plant material or oil removed from extraction equipment.

**3903.4.1.1 Exhausted Enclosure.** Where the extraction room is used as the exhausted enclosure, the exhaust system shall be designed to provide air movement across all portions of the floor to prevent the accumulation of vapors; the bottom of exhaust registers shall not be located more than 6" above the floor.

**3903.4.1.2 Electrical Interlocks.** The exhaust system shall be interlocked with the room power, such that when the exhaust system is not operating, power and lighting will be disabled.

**3903.4.2 Exhaust for Flammable Liquid Extraction processes.** A hazardous exhaust system in accordance with the Denver Building and Fire Code shall be provided for flammable liquid extraction processes.

**Exceptions:**

1. Distillation process with less than 5 gallons of flammable liquid performed under a chemical fume hood installed in accordance with the Denver Building and Fire Code unless a hazardous exhaust system is required by the Denver Building and Fire code.
2. Solvent distillation units in compliance with Section 5705.4.
3. Extractions performed in accordance with Denver Ordinance No. 629-14, § 1, 11-10-14

**3903.5 Gas Detection.** A continuous gas detection system shall be provided within rooms, booths, or hoods, containing CO<sub>2</sub> or LPG extraction processes. Actuation of the gas detection shall initiate a local alarm within the room. CO<sub>2</sub> gas detection systems shall alarm at 5000ppm. LPG gas detection systems shall alarm at 10% of the LFL. Portable LPG gas detection shall be utilized by the extraction system operator to verify local hydrocarbon levels, including system leaks.

**3903.6 CO<sub>2</sub> Extraction Equipment Process discharge.** CO<sub>2</sub> discharges shall be piped to the exterior.

**3903.7 Refrigeration and Cooling Equipment.** Refrigerators, freezers, and other cooling equipment used to store or process flammable liquids shall be in accordance with NFPA 45 and applicable provisions of the Denver Building and Fire Code.

**SECTION 3904**

**MARIJUANA GROWING OPERATIONS**

**3904.1 CO<sub>2</sub> Enrichment Systems:** CO<sub>2</sub> enrichment systems shall comply with Section 5310 or 5311.

## Annex B – Marijuana Facility 2015 IFC Code References

REQUIREMENT	CULTIVATION/ GROW	MIP/ MMIP	EXTRACTION	DISPENSARY	RETAIL/ RECREATIONAL	RESIDENTIAL/ CAREGIVER
<b>ADMINISTRATION &amp; DEFINITION</b>						
Definitions (MJ Industry)						
Change of Use or Occupancy	102.3, 102.4	102.3, 102.4	102.3, 102.4	102.3, 102.4	102.3	
Approved Materials & Equipment; Technical Assistance; Alternative Method or Material, Research Report and Tests	104.7.2, 104.9, 104.9.1	104.7.2, 104.9, 104.9.1	104.7.2, 104.9, 104.9.1	N/A	N/A	
Occupancy Classification Building Code	202	202	202	202	202	202
H Occupancy	202, Tables 5003.1.1.(1) - 5003.1.1.(4)	202, Tables 5003.1.1.(1) - 5003.1.1.(4)	202, Tables 5003.1.1.(1) - 5003.1.1.(4)	N/A	N/A	N/A
Operational Permits: Various Hazardous Materials, Carbon Dioxide Systems; Combustible Fibers, LP-gas; Fumigation & Insecticidal Fogging;	105.6.4; 105.6.9, 105.6.11, 105.6.21, 105.6.21; 105.6.8; 105.6.17; 105.6.20; 105.6.28	105.6.9, 105.6.11, 105.6.21, 105.6.21; 105.6.8; 105.6.17; 105.6.20; 105.6.28	105.6.9, 105.6.11, 105.6.21, 105.6.21; 1-5.6.8; 105.6.17; 105.6.20; 105.6.28			
Construction Permits: Various Hazardous Materials; Flammable & Combustible Liquids; LP-gas; Compressed Gas	105.7.10, 105.7.12, 105.7.3, 105.7.8; 1-5.6.8; 105.6.17; 105.6.20; 105.6.28	105.7.10, 105.7.12, 105.7.3, 105.7.8; 1-5.6.8; 105.6.17; 105.6.20; 105.6.28	105.7.10, 105.7.12, 105.7.3, 105.7.8; 105.6.8; 105.6.17; 105.6.20; 105.6.28			
<b>GENERAL SAFETY PROVISIONS</b>						
Hazard Communication	407	407	407	407	407	407
<b>BUILDING AND EQUIPMENT DESIGN FEATURES</b>						
Fire Protection	903.2.4, 903.2.5, 903.2.11	903.2.4, 903.2.5, 903.2.11,	903.2.4, 903.2.5, 903.2.11		903.2.7	
Interior Finishes						
Exits and exit signage; Egress						
Locks						

Key Box (Knox)	506.1, 503.6	506.1, 503.6	506.1, 503.6	506.1, 503.6	506.1, 503.6	
Aisles						
Control Areas						
Ventilation						
Portable Fire Extinguisher						
Electrical: wiring, extension cords, appliance, lighting, extraction equipment, kitchen						
Premise Identification						
Security						
Appliances: Extractors, Still, Vacuum Oven, Kitchen, CO2 Generator, Sulfur Evaporator						
Fire Dept. Access						
<b>SPECIAL OCCUPANCIES AND OPERATIONS</b>						
Combustible Fibers						
Fumigation and Insecticidal Fogging						
Rack Storage						
<b>HAZARDOUS MATERIALS</b>						
Hazardous Materials						
Compressed Gases						
Flammable Gases						
Pesticides/Fertilizers						
Gas Detection & Alarm						
Liquefied Petroleum Gases (LP-Gas): Indoor/Outdoor						
Highly Toxic and Toxic Materials (pesticide or agricultural products (storage))						
Flammable and Combustible Liquids						
Ventilation						

## **Annex C – Hemp and Cannibidoil (CBD Oil)**

Industrial Hemp (iHemp) is made up of varieties of “Cannabis Sativa” that contain less than 0.3% Tetrahydrocannabinol (THC). It is an annual broadleaf plant with a taproot and is capable of very rapid growth under ideal growing conditions. The female flowers and seeds are indeterminate, meaning that there are both ripe and immature seeds on the same plants at the time of harvest.

iHemp cultivation is similar to the marijuana cultivation activity. iHemp cultivation requires the same materials, supplies, equipment, and building design needs as the marijuana cultivation operation.

Cannibidiol (CBD) oil is extracted in oil form and is often found mixed in hemp oil extracts in varying concentrations. CBD is extracted and separated from specific varieties of cannabis, often known as hemp. Chemically, CBD is one of [85 chemical substances known as cannabinoids](#), which are all found in the cannabis plant. CBD is the second most abundant compound in hemp, typically representing up to 40% of its extracts. The most abundant constituent of cannabis is the cannabinoid known as THC, an intoxicating and illegal substance that is responsible for causing marijuana users to get “high.” While CBD is completely separated and isolated from THC, and CBD cannot get you “high,” there is still a lot of stigma as many people tend to mistake CBD for THC. A person cannot get “high” by smoking or ingesting CBD-high hemp (that has only traces of THC), as it is also impossible to get high by consuming CBD oil products (that contain no THC at all).

### **Hemp Seed Oil Vs. CBD Oil Extraction**

CBD oil is not exactly the same as hemp seed oil, and also because the extraction techniques used for producing the cannabinoid products are different from those used for obtaining oil from hemp seeds.

Hemp seed oil is produced by cold pressing the seeds and then extracting the oil. It requires no special equipment or solvent. The oil is obtained by simply pressing or grinding the seeds at a temperature that is lower than 120°F. The oil contains very small amounts of cannabinoids.

CBD oil is obtained from a plant’s seeds and stalks and the extraction methods are essentially the same as THC concentrate extraction (hash oil). Solvent based extraction utilizes solvents such as petroleum, naphtha, ethanol, or Super Critical Carbon Dioxide. Food based extraction can use olive oil for extracting the full range of cannabinoids and terpenes from the cannabis plant.