City of Adelanto

Department of Development Services
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Technical Information Sheet

Title: Cannabis Plant Processing and Extraction Facilities		
Code References: 2016 California Fire Code, Ch. 38 and Sec. 104.1		

Purpose:

The City of Adelanto has prepared this information sheet to provide guidance to Building Departments, contractors, engineers, consultants, applicants and the general public on local interpretations and practices that are considered to be in compliance with the 2016 California Building Code (CBC) and the 2016 California Fire Code (CFC). This sheet is intended to provide information on plant processing and extraction facilities. The requirements of this information sheet shall not be construed as altering any existing code, law or regulation which may require fire protection features not covered or alluded to in these requirements, nor shall they waive any requirements of any code, law or regulation. The reader is cautioned that the guidance detailed in this policy may or may not apply to their specific situation, and that the OFM retains final authority to determine compliance.

Scope:

This information covers the installation, maintenance, operation and permitting requirements as they pertain to Plant Processing and Extraction Facilities in new and existing facilities under the jurisdiction of the RCFD in accordance with CFC Chapter 38 and Section 104.1. This policy applies to the following:

- **The extraction process includes the act of extraction of the oils and fats by use of a solvent, desolventizing of the raw material and production of the miscella, distillation of the solvent from the miscella and solvent recovery. The use, storage transfilling, and handling of hazardous materials in these facilities shall comply with the 2016 [California Fire Code and Building Code requirements]**

Existing buildings or facilities where the processing or extraction of plants is introduced, changed, or where the medium of extraction or solvent is changed shall comply with CFC Chapter 38.

Design and installation shall comply with the applicable provisions of the California Construction Codes, as amended, and this policy. The most restrictive requirements shall govern.

Key Legend:

(Brackets — Bracketing in the paragraph or following a sentence/section are Riverside County Fire Department amendments and interpretations.

Codes and Standards:

This policy is based on the 2016 California Fire Code (CFC) and applicable sections of the California Codes and Regulations.

Bureau of Cannabis Control — Specific Requirements for Extractions: (CCR Title 17, Div 1, Ch 13, Article 2 Extractions)

540220. Permissible Extractions.

(a) Except as provided in subsection (b), cannabis extraction shall only be conducted using the following methods:

(1) Mechanical extraction;

(2 Chemical extraction using a nonvolatile solvent such as a nonhydrocarbon-based or other solvent such as water, vegetable glycerin, vegetable oils, animal fats, or glycerin. Nonhydrocarbon-based solvents shall be food grade;

(3 Chemical extraction using a professional closed loop C02 gas extraction system. C02 gas used for extraction shall be food grade;

(4 Chemical extraction using a volatile solvent, as defined in Section 401 OO (xx), using a professional closed loop extraction system; or

(5 Any other method authorized by the Building and Fire Departments pursuant to subsection (b).

(b) **To request authorization from the Building and Fire Departments to conduct cannabis extraction using a method other than those specified in paragraphs (1) through (4) of subsection (a), the applicant or licensee shall submit a detailed description of the extraction method, including any documentation that validates the method and any safety procedures to be utilized to mitigate any risk to public or worker health and safety.**

540222. **Volatile Solvent Extractions.**

Chemical extractions using volatile solvents shall be subject to the following requirements:

(a) Hydrocarbon-based solvents shall be at least 99 percent purity;

(b) All extractions shall be performed in a closed loop extraction system as described in Section 40225; and

(c) No volatile solvent extraction operations shall occur in an area zoned as residential.

540223. **Ethanol Extractions.**

(a) **Ethanol used for extractions or for post-extraction processing shall be food-grade.**

(b) **Ethanol extraction operations shall be approved by the local fire code official and shall be operated in accordance with applicable Division of Occupational Safety and Health (Cal/OSHA) regulations and any other state and local requirements.**

540225. **Closed-Loop Extraction System Requirements.**

(a) Chemical extractions using C02; a volatile solvent; or chlorofluorocarbon, hydrocarbon, or other fluorinated gas shall be conducted in a professional closed loop extraction system designed to recover the solvents. The system shall be commercially manufactured and bear a permanently affixed and visible serial number. The system shall be certified by a California-licensed Mechanical Engineer that the system was commercially manufactured, safe for use with the intended solvent, and built to codes of recognized and generally accepted good engineering practices, such as:

(1) The American Society of Mechanical Engineers (ASME);

(2 American National Standards Institute (ANSI);

(3 Underwriters Laboratories (UL); or

(4 The American Society for Testing and Materials (ASTM).

(b) Professional closed loop systems, other equipment used, the extraction operation, and facilities must be approved for use by the local Building and Fire code official and comply with any required fire, safety, and building code requirements related to the processing, handling, and storage of the applicable solvent or gas.

(c) The certification document required pursuant to subsection (a) shall contain the signature and stamp of a California-licensed professional Mechanical Engineer and the serial number of the extraction unit being certified.

(d) The licensee shall establish and implement written procedures to document that the closed loop extraction system is maintained in accordance with the equipment manufacturer specifications and to ensure routine verification that the system is operating in accordance with specifications and continues to comply with fire, safety, and building code requirements.

(e) A licensee shall develop standard operating procedures, good manufacturing practices, and a training plan prior to producing extracts. Any personnel using solvents or gases in a closed loop system to create extracts must be trained on how to use the system, have direct access to applicable safety data sheets, and handle and store solvents and gases safely.

(f) The extraction operation shall be operated in an environment with proper ventilation, controlling all sources of ignition where a flammable atmosphere is or may be present, and shall be operated in accordance with applicable Division of Occupational Safety and Health (Cal/OSHA) regulations and any other state and local requirements.

(g) No closed loop extraction system operation shall occur in an area zoned as residential.

California Fire Code Definitions:

[(Plant) EXTRACTION] The process in removing and collecting components of physical plant material (whole or part) utilizing a solvent and varying methods of pressure, vacuum, heating and chilling in a controlled environment. The result is typically a waxy or liquid material with marginal amounts of solvent remaining in the collection called "miscella"

DESOLVENTIZING - The act of removing a solvent from a material.

GAS DETECTION SYSTEM - A system or portion of a combination system that utilizes one or more stationary sensors to detect the presence of a specified gas [or vapor] at a specified concentration and initiate one or more responses required by the California Fire Code such as notifying a responsible person, activating an alarm system, or activating or deactivating equipment. A self-contained gas detection and alarm device is not classified as a gas detection system.

MISCELLA - A mixture, in any proportion, of the extracted oil or fat and the extracting solvent.

{A} REGISTERED DESIGN PROFESSIONAL - An architect or engineer, registered or licensed to practice professional architecture or engineering, as defined by the statutory requirements of the professional registration laws of the state in which the project is to be constructed.

[Adequate Ventilation] Adequate ventilation is provided in accordance with "ACGIH Industrial Ventilation: A Manual for Recommended Practice for Design (See Technical Policy #19-001)" or California Fire Code section 5705.3.5.7.1.

Bureau of Cannabis Control Definitions: (CCR Title 17, Div 1, Ch 13, Sec 40100)

Extraction means a process by which cannabinoids are separated from cannabis plant material through chemical or physical means.

Nonvolatile Solvent means any solvent used in the extraction process that is not a volatile solvent. For purposes of this chapter, "nonvolatile solvents" include carbon dioxide and ethanol [*Be advised that standards in chemistry and San Bernardino County Fire Department identify ethanol in common uses and at varying temperatures to be considered volatile]

Volatile Solvent means any solvent that is or produces a flammable gas or vapor that, when present in the air in sufficient quantities, will create explosive or ignitable mixtures. Examples of volatile solvent include, but are not limited to: butane, hexane and propane.

PERMITS REQUIRED

A. CONSTRUCTION PERMITS

Submittal Requirements

The City of Adelanto Building Official and the San Bernardino County Fire Department must review all plant extraction facility and system permit applications. Applicants shall comply with any additional permit applications and review requirements of the Building and Safety Department. Applicable plan review and permit fees shall apply. Construction permits shall be issued to licensed contractors unless otherwise approved by the Building Official.

1. New Structure or Tenant Improvement Construction Plans (Minimum 3 sets)

   A construction permit is required for installation of or modification to a room, building or space proposed for plant extraction system use. Maintenance performed in accordance with the 2016 CBC and 2016 CFC is not considered to be modification and may not not require a construction permit.

   Construction drawings and specifications shall bear the seal and signature of a licensed California professional engineer/architect who prepared the drawings/specifications and shall be complete and of sufficient clarity to indicate the entire work proposed and show in detail that the plant extraction system conforms to the provisions of this policy, the California Fire and Building Codes and relevant laws, ordinances, rules and regulations. Each set of drawings and specifications shall, at a minimum, contain the following information, architectural, structural, mechanical, electrical drawings, specifications and analysis:

   1. Exact address, legal description and location of the work performed.
   2. Name and address of the owner.
   3. Name and address of the person or firm responsible for the preparation of the drawings and specifications. The seal and signature of the California licensed architect and/or engineer responsible for the preparation of the drawings and specifications.
   4. Three complete sets of construction documents showing the construction of architectural, structural, mechanical, electrical and plumbing arrangements, existing and proposed.
   5. Three copies of specifications or notes that clearly describe the type, quality and finish of materials and the method of assembly, erection and installation of equipment to be installed with proper reference to accepted standards.
   6. Three plot plans showing the location of the proposed construction and the location of every adjacent existing building on the property, roads, walks, utilities and other site improvements, all property lines, streets, alleys, easements and other public areas.
   7. Bulk tank installations may require an engineered structural foundation with a separate tank installation permit. Contact the Building and Safety Department to determine requirements.
   8. Total aggregate quantity of hazardous materials (solvents, etc.) in storage, use open and use closed. Provide complete Hazardous Material Inventory Statement (HMIS).
   9. Location of the room where the plant extraction operation will be conducted. Identify whether the room is at grade or below grade.
   10. Location of containers relative to equipment, building openings and means of egress.
   11. Manufacturer's specifications and pressure rating, including cut sheets, of all piping and tubing to be used.
   12. A piping and instrumentation diagram that shows piping support and remote fill connections.
   13. Details of container venting, including but not limited to vent line size, material and termination location.

14. Alarm and detection system and equipment.
15. Seismic support for containers.
16. Engineering Analysis and Technical Report that identifies code requirements and explains how requirements are met regarding the facilities and process. This will address but is not limited to, construction type and separation, fire suppression and alarm systems, electrically classified areas, ventilation, spill isolation, and gas detection system that may be required by code.

17. Completion of the required Chemical Class form.

2. Gas detection systems. A separate/deferred construction permit is required for installation of or modification to gas detection systems where required based on the operational use hazards. Maintenance performed in accordance with the 2016 CBC and the 2016 CFC may not be considered a modification and shall not require a permit. (Minimum 3 sets)

   Construction drawings and specifications shall bear the seal and signature of a licensed California professional engineer/architect who prepared the drawings/specifications and shall be complete and of sufficient clarity to indicate the entire work proposed and show in detail the gas detection system.

   Each set of drawings and specifications shall, at a minimum, contain the following information:
   1. Make, model and listing information for each component.
   2. Device location details, including height of installation
   3. Wiring diagram, with details of relay and shunt-trip tie-ins.
   4. Sequence of Operations
   5. Manufacturer specification and cut sheets.

B. OPERATIONAL PERMITS

Operational permits for extraction equipment, regardless of the solvent used, shall be posted on site. To obtain required operational permit(s), the Business owner or Company Representative must submit for an Extraction Equipment Operational Permit.

Provide three sets of the following for each different make/model and solvent type of extraction equipment proposed for use within the single occupancy:

1. Extraction Equipment Manufacturer Specifications and Listing Information*
2. CA Mechanical Engineer — Technical Report/Peer Review in compliance with CFC 3804.3 *When extraction equipment process Listing is not available.
3. Copy of speculated or confirmed equipment purchase order of extraction equipment and ancillary equipment. *Pricing and cost details should be redacted.
4. Completed "Extraction Plan Submittal" form, "Application for Operational Permit" form

C. SITE INSPECTION

The Building and Safety Department shall inspect and witness acceptance testing of the installation. Contact the OFM and the Building and Safety Department to confirm type and frequency of inspections required. Compliance with all the 2016 California Building Code and the 2016 California Fire Code requirements shall be maintained at all times.

The following sections are being provided for reference as may be applicable for extraction operations. Not all sections of applicable codes and standards are being

provided in detail. Project Registered Design Professional should review these sections and other applicable codes/standards to confirm project compliance.

CALIFORNIA FIRE CODE (2016 - JULY 1. 2018 SUPPLEMENTAL) REQUIREMENTS CHAPTER 38 - PLANT PROCESSING AND EXTRACTION FACILITIES SECTION 3801 – GENERAL

3801.1 Scope. Plant processing or extraction facilities shall comply with this chapter and the 2016 California Building Code. The extraction process includes the act of extraction of the oils and fats by use of a solvent, desolventizing of the raw material and production of the miscella, distillation of the solvent from the miscella and solvent recovery. The use, storage, transfilling, and handling of hazardous materials in these facilities shall comply with this chapter, other applicable provisions of this code and the 2016 California Building Code.

3801.2 Existing buildings or facilities. Existing buildings or facilities used for the processing of plants or where the medium of extraction or solvent is changed shall comply with this chapter.

3801.3 Permits. Permits shall be required as set forth in Sections 105.6 and 105.7.

SECTION 3803 - PROCESSING AND EXTRACTION

3803.1 Construction. Processing shall be located in a building complying with the 2016 California Building Code.

3803.2 Prohibited occupancies. Extraction processes utilizing flammable gasses or flammable cryogenic fluids shall not be located in any building containing a Group A, E, I or R occupancy.

3803.3 Location. The extraction equipment and extraction process utilizing hydrocarbon solvents shall be located in a room or area dedicated to extraction.

3803.4 Post-process purification and winterization. Post-processing and winterization involving the heating or pressurizing of the miscella to other than normal pressure or temperature shall be approved and performed in an appliance listed for such use. Domestic or commercial cooking appliances shall not be used.

3803.5 Industrial ovens. The use of industrial ovens shall comply with 2016 CFC Chapter 30.

3803.6 Use of flammable and combustible liquids. The use of flammable and combustible liquids for liquid extraction processes where the liquid is boiled, distilled, or evaporated shall be located within a hazardous exhaust fume hood, rated for exhausting flammable vapors. Electrical equipment used within the hazardous exhaust fume hood shall be rated for use in flammable atmospheres. Heating of flammable or combustible liquids over an open flame is prohibited.

Exceptions:

1. The use of a heating element not rated for flammable atmospheres approved where documentation from the manufacture or approved testing laboratory indicates it is rated for heating of flammable liquids.
2. [Adequate ventilation is provided. — see provided definition for reference standard and formula]

3803.7 Liquefied Petroleum Gas. Liquefied-petroleum gases (LPG) shall not be released to the atmosphere.

Exception: LPG may be released to the atmosphere in accordance with NFPA 58 Section 7.3.

SECTION 3804 SYSTEMS AND EQUIPMENT

3804.1 General requirements. Systems and equipment used with the processing and extraction of oils and products from plants shall comply with this Technical Information CFC Section 5003.2, other applicable provisions of the 2016 CFC, the 2016 California Building Code, and the 2016 California Mechanical Code.

3804.2 Systems and equipment. Systems or equipment used for the extraction of oils from plant material shall be listed or approved for the specific use. If the system used for extraction of oils and products from plant material is not listed, then the system shall be reviewed by a Licensed California Mechanical Professional Engineer. The Licensed California Professional Mechanical Engineer shall review and consider any information provided by the system's designer or manufacturer. For systems and equipment not listed for the specific use, a technical report in accordance with the below requirements shall be prepared and submitted to the Building Official and the Fire Code Official for review and approval. The firm or individual preparing the technical report shall be approved by the Building Code Official and the Fire Code Official prior to performing the analysis.

3804.3 Technical report. The technical report which has been reviewed and approved by the Building Official and the Fire Code Official, as required by the section above is required prior to the equipment being located or installed at the facility. The report shall be prepared by a Licensed California Professional Mechanical Engineer or other professional approved by the Building Official and the Fire Code Official.

3804.3.1 Report Content. The technical report shall contain all of the following:

1. Manufacturer information.
2. Preparer of record on technical report.
3. Date of review and report revision history.
4. Signature page shall include all of the following:
   a. Author of the report
   b. Date of report
   c. Date and signature of the Registered Design Professional of record performing the design or peer review

Model number of the item evaluated. If the equipment is provided with a serial number, the serial number shall be included for verification at time of site inspection.

5. Methodology of the design or peer review process used to determine minimum safety requirements. Methodology shall consider the basis of design and shall include a code analysis and code path to demonstrate the reason as to why specific code or standards are applicable or not.

6. Equipment description. A list of every component and sub-assembly (fittings, hose, quick disconnects, gauges, site glass, gaskets, valves, pumps, vessels, containers, switches, etc.) of the system or equipment, indicating the manufacturer, model number, material, and solvent compatibility. Manufacturer's data sheets shall be provided.

7. A general flow schematic or general process flow diagram of the process. Post-processing or winterization shall be included in this diagram. All primary components of the process equipment shall be identified and match the equipment list required in Item 7. Operating temperatures, pressures, and solvent state of matter shall be identified in each primary step or component. A piping and instrumentation diagram (PID or PI&D) shall be provided.

8. Analysis of the vessel(s) if pressurized beyond standard atmospheric pressure. Analysis shall include purchased and fabricated components.

9. Structural analysis for the frame system supporting the equipment.
10. Process safety analysis of the extraction system, from the introduction of raw product to the end of the extraction process.
12. Comprehensive process hazard analysis considering failure modes and points of failure throughout the process. The process hazard analysis shall include a review of emergency procedure information provided by the manufacturer of the equipment or process and not that of the facility, building or room.
13. Review of the assembly instructions, operational and maintenance manuals provided by the manufacturer.
14. List of references used in the analysis.

3804.4 Site inspection. Prior to operation of the extraction equipment, the Licensed California Professional Mechanical Engineer of record or approved professional, as approved in Section 3804.2, shall inspect the site of the extraction process once equipment has been installed for compliance with the technical report and the building analysis. The Licensed California Professional Mechanical Engineer of record or approved professional shall provide a report of findings and observations of the site inspection to the Building Official prior to the approval of the extraction process. The field inspection report authored by the engineer of record shall include the serial number of the equipment used in the process and shall confirm the equipment installed is the same model and type of equipment identified in the technical report.

SECTION 3805 SAFETY SYSTEMS

3805.1 Gas detection system. For extraction processes utilizing flammable gases as solvents, a continuous gas detection shall be provided in compliance with this Section and Section 916. The gas detection threshold shall be no greater than 25 percent of the lower flammable limit (LFL).

3805.1.1 System design. The flammable gas detection system shall be listed or approved and shall be calibrated to the types of fuels or gases used for the extraction process. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL).

3805.1.2 Gas detection system components. Gas detection system control units shall be listed and labeled in accordance with UL 864 or UL 2017. Gas detectors shall be listed and labeled in accordance with UL 2075 for use with the gases and vapors being detected.

[Exception: Where there are no listed products available to comply with the provision in this section due to new and emerging technologies SBCFD may grant a modification in accordance with CFC Section 104.8. In addition, the provisions of CFC Section 104.7.2 may be required to demonstrate compliance with the intent and purpose of this technical policy and the CFC.]

3805.1.3 Operation. Activation of the gas detection system shall result in all the following:

1 . Initiation of distinct audible and visual alarm signals in the extraction room.
2. Deactivation of all heating systems [and non-classified electrically powered equipment] located in the extraction room.
3. Activation of the mechanical ventilation system, where the system is interlocked with gas detection.

3805.1.4 Failure of the gas detection system. Failure of the gas detection system shall result in the deactivation of the heating system, activation of the mechanical ventilation system where the system is interlocked with the gas detection system and cause a trouble signal to sound in an approved location.

3805.1.5 Interlocks. All electrical components within the extraction room shall be interlocked with the gas detection system. Activation of the gas detection system shall disable all light switches and electrical outlets.

3805.2 Emergency shutoff. Extraction processes utilizing gaseous hydro-carbon based solvents shall be provided with emergency shutoff systems in accordance with CFC Section 5803.1.3.

CHAPTER 9 - FIRE PROTECTION SYSTEMS

SECTION 911 EXPLOSION CONTROL

911.1 General. Explosion control shall be provided in the following locations [where both apply]:

1. Where a structure, room or space is occupied for purposes involving explosion hazards as identified in Table 911.1
2. Where quantities of hazardous materials specified in Table 911.1 exceed the maximum allowable quantities in Table 5003.1.1(1).

Such areas shall be provided with explosion (deflagration) venting, explosion (deflagration) prevention systems or barricades in accordance with this section and NFPA 69, or NFPA 495 as applicable. Deflagration venting shall not be utilized as a means to protect buildings from detonation hazards.

Table 911.1
EXPLOSION CONTROL REQUIREMENTS

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		BARRICADE CONST.	EXP. VENTING or EXP. PREVENTION SYSTEM
Flammable Gas	Gaseous	Not Required	Required
	Liquefied	Not Required	Required
Flammable Liquids	IA ft. b	Not Required	Required
	1B ft. c	Not Required	Required

b. Storage or use

c. In open use or dispensing

SECTION 916 GAS DETECTION SYSTEMS

916.1 Gas detection systems. Gas detection systems required by this code shall comply with Sections 916.2 through 916.11.

916.2 Permits. Permits shall be required as set forth in Section 105.7.19.

916.2.1. Construction documents. Documentation of the gas detection system design and equipment to be used that is adequate to demonstrate compliance with the requirements of this code shall be provided with the application for permit.

916.3 Equipment. Gas detection system equipment shall be designed for use with the gases being detected and shall be installed in accordance with manufacturers' instructions.

916.4 Power connections. Gas detection systems shall be permanently connected to the building electrical power supply or shall be permitted to be cord connected to an un-switched receptacle using an approved restraining means that secures the plug to the receptacle.

916.5 Emergency and standby power. Where standby power is not required elsewhere by this code, standby or emergency power shall be provided or the gas detection system shall initiate a trouble signal at an approved location if the power supply is interrupted.

916.6 Sensor locations. Where a specific location for sensors is not specified elsewhere by this code, sensors shall be installed in approved locations where leaking gases are expected to accumulate.

916.7 Gas sampling. Gas sampling shall be performed continuously. Sample analysis shall be processed immediately after sampling, except as follows:

1. For HPM gases, sample analysis shall be performed at intervals not exceeding 30 minutes.
2. For toxic gases that are not HPM, sample analysis shall be performed at intervals not exceeding 5 minutes, in accordance with CFC Section 6004.2.2.7.
3. Where a less frequent or delayed sampling interval is approved.

916.8 System activation. A gas detection alarm shall be initiated where any sensor detects a concentration of gas exceeding the following thresholds:

1. For flammable gases, a gas concentration exceeding 25 percent of the lower flammable limit (LFL).
2. For nonflammable gases, a gas concentration exceeding one half of the IDLH, unless a different threshold is specified by the section of this code requiring a gas detection system.

Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of this code requiring a gas detection system. Audible and visible alarm signals associated with a gas detection alarm shall be distinct from fire alarm and carbon monoxide alarm signals.

916.9 Signage. Signs shall be provided adjacent to gas detection system alarm signaling devices that advise occupants of the nature of the signals and actions to take in response to the signal.

916.10 Fire alarm system connections. Gas sensors and gas detection systems shall not be connected to fire alarm systems unless approved and connected in accordance with the fire alarm equipment manufacturers' instructions.

916.11 Inspection, testing and sensor calibration. Inspection and testing of gas detection systems shall be conducted not less than annually. Sensor calibration shall be confirmed at the time of sensor installation and calibration shall be performed at the frequency specified by the sensor manufacturer.

CHAPTER 50 - HAZARDOUS MATERIALS - GENERAL PROVISIONS

5003.1.3 Quantities not exceeding the maximum allowable quantity per control area. The storage use and handling of hazardous materials in quantities not exceeding the maximum allowable quantities per control are indicated in Tables 5003.1.1 (1) through 5003.1.1 (4) shall be in accordance with Sections 5001 and 5003.

5003.1.4 Quantities exceeding the maximum allowable quantity per control area. The storage and use of hazardous materials in quantities exceeding the maximum allowable quantity per control area indicated in Tables 5003.1.1(1) through 5003.1.1(4) shall be in accordance with this chapter.

5004.3 Ventilation. Indoor storage areas and storage buildings shall be provided with mechanical exhaust ventilation or natural ventilation where natural ventilation can be shown to be acceptable for the materials stored.

5004.3.1 System requirements. Exhaust ventilation systems shall comply with all of the following:

1 . Installation shall be in accordance with the California Mechanical Code.
2. Mechanical ventilation shall be at a rate of not less than 1 cubic foot per minute per square foot of floor area.
3. Systems shall operate continuously unless alternative designs are approved.
4. A manual shutoff control shall be provided outside of the room in a position adjacent to the access door to the room or in an approved location. The switch shall be a break-glass or other approved type and shall be labeled: VENTILATION SYSTEM EMERGENCY SHUTOFF. Exception: {For SFM} When exhaust systems containing explosive, corrosive, combustible, flammable or highly toxic dusts, mists, fumes, vapors, or gases are 100 percent exhausted to the outside, an emergency ventilation system shutoff is not required.
5. Exhaust ventilation shall be designed to consider the density of the potential fumes or vapors released. For fumes or vapors that are heavier than air, exhaust shall be taken from a point within 12 inches of the floor. For fumes or vapors that are lighter than air, exhaust shall be taken from a point within 12 inches of the highest point of the room.
6. The location of both the exhaust and inlet air openings shall be designed to provide air movement across all portions of the floor or room to prevent the accumulation of vapors.
7. Exhaust air shall not be recirculated to occupied areas if the materials stored are capable of emitting hazardous vapors and contaminants have not been removed. Air contaminated with explosive or flammable vapors, fumes or dusts; flammable, highly toxic or toxic gases; or radioactive materials shall not be recirculated.

CHAPTER 53 - COMPRESSED GASES

5301.1 Scope. Storage, use and handling of compressed gases in compressed gas containers, cylinders, tanks and systems shall comply with this chapter and NFPA 55, including those gases regulated elsewhere in this code. Partially full compressed gas containers, cylinders or tanks containing residual gases shall be considered as full for the purposes of the controls required.

Compressed gases classified as hazardous materials shall also comply with Chapter 50 for general requirements and chapters addressing specific hazards...

LP-gas shall also comply with Chapter 61 and the California Mechanical Code.

SECTION 5307 COMPRESSED GASES NOT OTHERWISE REGULATED

5307.5 Required protection. Where carbon dioxide storage tanks, cylinders, piping and equipment are located indoors [i.e. other than C02 enriched areas], rooms or areas containing carbon dioxide storage tanks, cylinders, piping and fittings and other areas where a leak of carbon dioxide can collect shall be provided with either ventilation in accordance with Section 5307.5.1 or a gas detection system in accordance with Section 5307.5.2.

5307.5.1 Ventilation. Indoor storage and use areas and storage buildings shall be provided with ventilation in accordance with the requirements of Section 5004.3. Where mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied.

5307.5.2 Gas detection system. A gas detection system complying with Section 916 shall be provided to monitor areas where carbon dioxide can accumulate. The system shall be designed to initiate a local

audible and visible alarm in the room or area in which the sensor is installed when the level of carbon dioxide exceeds 5,000 parts per million (9,000 mg/m).

CHAPTER 57 – FLAMMABEL AND COMBUSTIBLE LIQUIDS

SECTION 5703 GENERAL REQUIREMENTS

5703.1 Electrical. Electrical wiring and equipment shall be installed and maintained in accordance with CFC Section 605 and the CA Electrical Code.

5703.1.1 Classified locations for flammable liquids. Areas where flammable liquids are stored, handled, dispensed or mixed shall be in accordance with Table 5703.1.1. A classified area shall not extend beyond an unpierced floor, roof or other solid partition.

[EXCEPTION] The extent of the classified area is allowed to be reduce, or eliminated, where sufficient technical justification is provided to the fire code official that a concentration in the area in excess of 25 percent of the lower flammable limit (LFL) cannot be generated.

CFC TABLE 5703.1.1 - CLASS I ELECTRICAL EQUIPMENT LOCATION (AS CLASSIFIED IN THE CEC) - EXCERPT		
Location	Class I - Group D Division	Extent of Classified Area
Indoor equipment where flammable vapor air mixtures could exist under normal operations	1	Area within 5-feet of any edge of such equipment, extending in all directions
	2	Area between 5-feet to 8-feet of any edge of such equipment extending in all directions, and the area up to 3-feet above the floor or grade level within 5-feet to 25-feet horizontally from any edge of such equipment
c. The release of Class I liquids can generate vapors to the extent that the entire building, and possible a zone surrounding it are considered a Class I, Division 2 location.		

CHAPTER 58 - FLAMMABLE GASES AND FLAMMABLE CRYOGENIC FLUIDS

5803.1 Quantities not exceeding the maximum allowable quantity per control area. The storage and use of flammable gases in the amount not exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Sections 5001, 5003, 5801 and 5803.

5803.1.3 Emergency shutoff. Compressed gas systems conveying flammable gases shall be provided with approved manual or automatic emergency shutoff valves that can be activated at each point of use and at each source.

5803.1.3.1 Shutoff at source. A manual or automatic fail-safe emergency shutoff valve shall be installed on supply piping at the cylinder or bulk source. Manual or automatic cylinder valves are allowed to be used as the required emergency shutoff valve where the source of supply is limited to un-manifolded cylinder sources.

5803.1.3.2 Shutoff at point of use. A manual or automatic emergency shutoff valve shall be installed on the supply piping at the point of use or at a point where the equipment using the gas is connected to the supply system.

CHAPTER 61 LIQUEFIED PETROLEUM GASES

6101.1 Scope. Storage, handling and transportation of liquefied petroleum gas (LP-gas) and the installation of LP-gas equipment pertinent to systems for such uses shall comply with this chapter and NFPA 58. Properties of LP-gases shall be determined in accordance with Appendix B of NFPA 58.
(CCR Title 19, Div 1, 53.22(a) and (c) Liquefied Petroleum Gas)

(a) When liquefied petroleum gas is used, the storage and handling thereof shall conform to the appropriate provisions referenced in the California Code of Regulations, Title 19, Division 1, Sections 3.02 and 3.03

(c) California Code of Regulations, Title 8, Section 475 is hereby adopted as a part of Title 19, Division 1 regulations.

6103.2.1.3 Group F Occupancies. In Group F occupancies, portable LP-gas containers are allowed to be used to supply quantities necessary for processing, research or experimentation. Where manifolded, the aggregate water capacity of such containers shall not exceed 735 pounds per manifold, where multiple manifolds of such containers are present in the same room, each manifold shall be separated from other manifolds by a distance of not less than 20 feet.

6104.1 Location of LP-Gas Containers — General. The storage and handling of LP-gas and the installation and maintenance of related equipment shall comply with NFPA 58 and be subject to the approval of the fire code official, except as provided in this chapter.