

# TECHNICAL REPORT

NMG Ohio, LLC  
December 1, 2020

*This technical report was prepared pursuant to the State of Ohio Fire Code, Chapter 1301:7-7-39, Section 3904.*

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## **PROCESSOR OVERVIEW**

### **Technical Report**

NMG Ohio, LLC (“NMG”) applied for a Conditional Use Permit (“CUP”) for medical marijuana processing at 719 Sugar Ln., Elyria, Ohio 44035. Pursuant to the State of Ohio Administrative Code, Chapter 1301:7-7, Section 3904, NMG is submitting this Technical Report (the “Report”) to the State of Ohio in support of its CUP application and prior to locating and installing its extraction equipment at the facility.

### **Extraction Methods**

NMG will implement hydrocarbon, solvent-based extraction methods in a spark-free and ventilated environment using professional grade, closed-loop extraction equipment. The processing area will be isolated in a UL approved and certified fume-hood located in the extraction room. No open flame will be present in the processing area. All solvents used during the extraction process will be at least 99% pure and be properly stored consistent with OSHA regulations. All extraction equipment will be cleaned and maintained according to the manufacturer's recommendations.

NMG will extract oil from cannabis biomass to produce Butane Hash Oil (BTO) using an Ironfist Fabrication EX4-502 Extractor (“Extractor”) closed loop extraction system, which is supported by the Polyscience 6100T Chiller and Turbine and Kirkland EXT-420 Haskel Pumps. The Extractor will be positioned inside a Kewaunee Scientific Corporation V67 Floor Mounted Fume Hood (“Fume Hood”), which is a ducted device that draws air from the extraction space and ventilates it out through the hood.

### **Extraction Process**

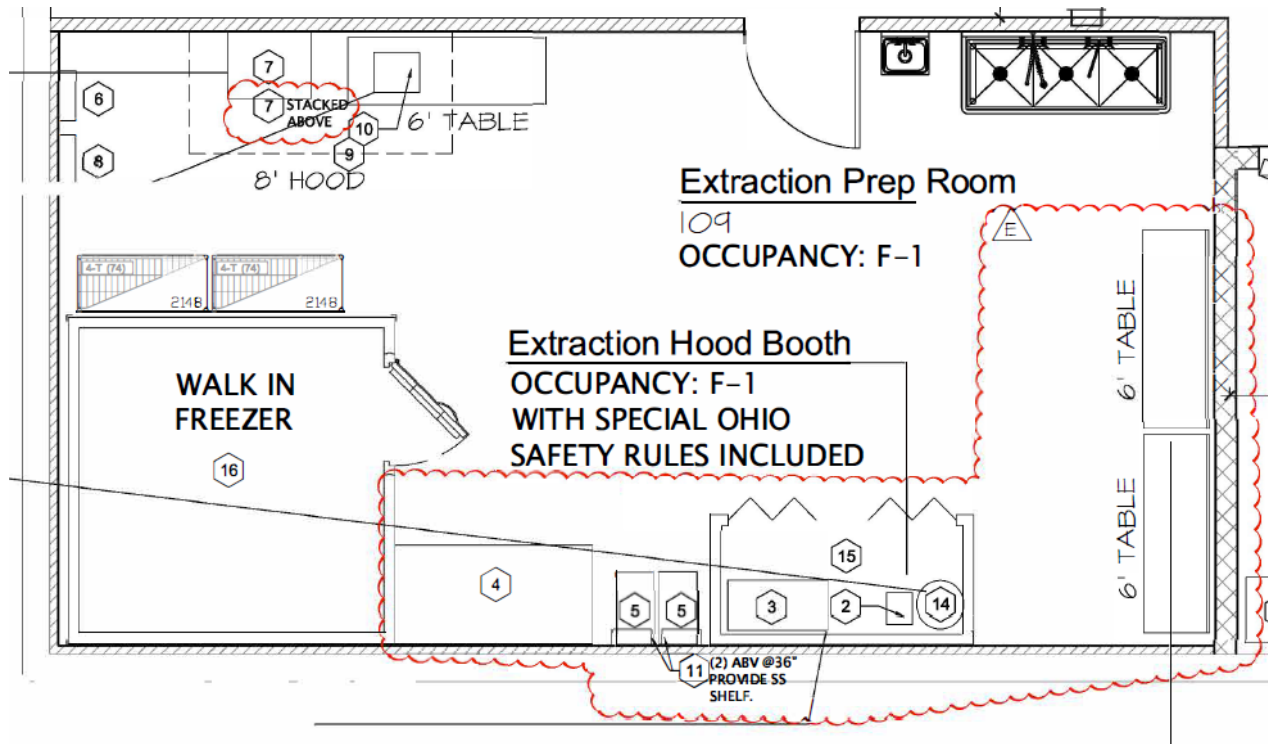
To begin the extraction process, cannabis material is placed in the Extractor and processed with cold butane. When the extraction process is finished, the crude oil is taken from the collection pot and transferred from inside the Extractor to an Across International, AT32e 3-zone Vacuum Oven (“Oven”) to purge the remaining solvents for 72-96 hours. The Oven is supported by Edward Rv8 and E2M30 Vacuum Pumps. To distill the oils, the BHO is warmed, mixed with ethanol, and filtered in an Across International SE13 Rotary Evaporator. Once the oil is distilled, terpenes are mixed in with the distilled oil on a Scilogex Magnetic Hotplate Stirrer, which is heated by a Benchmark H3760-H digital hotplate.

### **Reuse of Solvents**

To ensure no solvent is ever leaked or spilled before, during, or after an extraction process, technicians will perform a comprehensive check of the closed loops systems by performing a dry run of the Extractor. Only when the system gauges show that there are no leaks, technicians will release solvents to begin the extraction process. Additionally, once the crude oil has been processed, technicians recover the used solvent into a collection tank or flask, so solvent can be re-used safely. In instances when some solvent is part of the waste product, NMG will train technicians to follow the Resource Conservation and Recovery Act of 1976 (RCRA) Subtitle C, which establishes proper disposal of hazardous waste.

## Extraction Room and Equipment

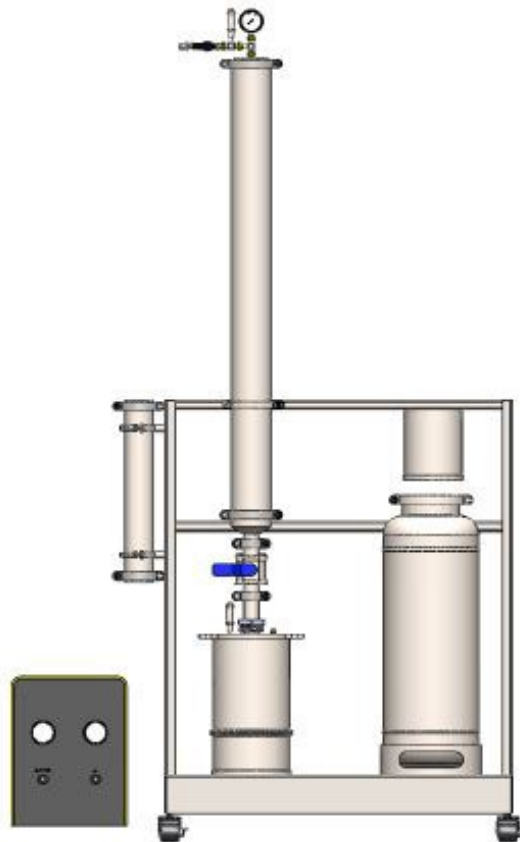
No.	NAME	MANUFACTURER	MODEL
2	Haskel Butane/Propane Extraction Pumps	Kirkland	EXT-420
3	IronFist Closed Loop Extraction System	IronFist Extractors	EX4-502
4	Solventvap 1.3 Gallon/5L Rotary Evaporator	Across Int.	SE13
5	IOC to 4.2L IHP Chiller with Turbine Pump	Polyscience	6100T
6	Edward E2M30 Vacuum Pump	Edwards	E2M30
7	AI 3.2 CU Ft. 3-Zone Vacuum Oven	Across Int.	AT32e
8	Edward RV8 Vacuum Pump	Edwards	RV8
9	Scilogex Bluespin Magnetic Hotplate Stirrer, LED Digital	Scilogex	SCIOGEX SCI280-Pro
10	H3760-H Digital Hotplate	Benchmark	H3760-H
11	1.6 CFM Dual-Stage Chemical-Resist Diaphragm Pump	Across Int.	ULVAC DTC-41



Extraction Room

## Closed-loop Extraction System

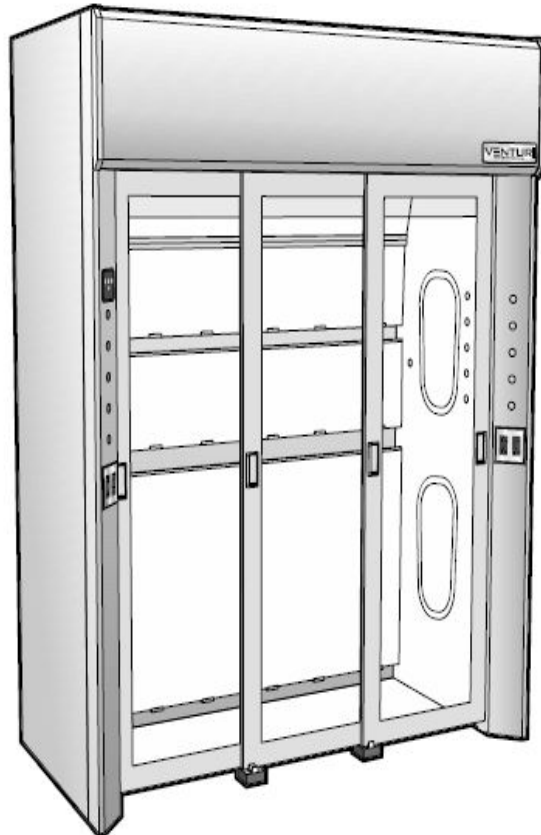
<b>Name:</b> EX4-502 Extractor	<b>Model No.:</b> EX4-502
<b>Manufacturer:</b> Ironfist Fabrication	<b>Type:</b> Extraction System



Ironfist Fabrication EX4-502 Extractor

## Floor Mounted Fume Hood

<b>Name:</b> Floor Mounted Fume Hood	<b>Model No.:</b> V67
<b>Manufacturer:</b> Kewaunee Scientific Corporation	<b>Type:</b> Fume-Hood



Kewaunee, Scientific Corporation, V67 Floor Mounted Fume Hood

## OHIO STATE CODE ANALYSIS

### 3796:3-2-01 Processor operations and quality assurance.

The Ohio Administrative Code outlines the operations and quality assurance standards for medical marijuana processors. NMG has completed review of Chapter 3796:3-2. Specifically, Chapter 3796:3-2-01 (C-E), which specifically outlines the requirements for equipment, materials, and processes:

#### Chapter 3796:3-2 Operations

##### 3796:3-2-01 Processor operations and quality assurance.

*(C) A processor may only use the methods, equipment, solvents, and gases set forth in this paragraph in the manufacture of medical marijuana products.*

*(1) A processor may use hydrocarbon solvent-based extraction methods in a spark-free and properly ventilated environment, isolated from any open flame or ignition source, and may use the following solvents, at a minimum of ninety-nine per cent purity, in a professional grade, closed-loop extraction system designed to recover the solvents:*

*(a) Propane;*

*(b) N-butane;*

*(c) Isobutane;*

*(d) Heptane; or*

*(e) Other solvents exhibiting minimal potential toxicity to humans with the approval of the department.*

*(2) A processor may use carbon dioxide-based extraction methods using food grade carbon dioxide at a minimum of ninety-nine per cent purity in a professional grade, closed-loop system in which each vessel is rated to a minimum pressure to accommodate the specific extraction protocol, including supercritical, liquid, and subcritical.*

*(3) A processor may use ethanol at a minimum of ninety-nine per cent purity to produce extracts for use in the manufacture of medical marijuana products.*

*(4) A processor may use food grade glycerin and propylene glycol in the manufacture of medical marijuana products.*

*(5) A processor may use non-solvent extraction methods involving the mechanical separation of cannabinoids from plant material to produce medical marijuana extracts for use in the manufacture of medical marijuana products.*

*(6) A processor may use non-marijuana ingredients in the manufacture of medical marijuana products that meet the following conditions:*

*(a) The non-marijuana ingredients must be obtained from licensed and regulated sources that comply with the requirements of federal and state laws and regulations;*

*(b) The non-marijuana ingredients are nontoxic and safe for human consumption; and*

*(c) The non-marijuana ingredients were not prepared or stored in a private residence.*

*(7) A processor shall comply with all applicable OSHA regulations as well as comply with and pass inspection for any applicable fire, safety, and building codes pertaining to the use and storage of the equipment and solvents used in the manufacture of medical marijuana products.*

*(D) A processor using hydrocarbon solvent-based or carbon dioxide extraction methods shall designate at least one individual to train and supervise employees in the use of extraction equipment and associated solvents who has earned, at minimum, a Bachelor's Degree in engineering or physical sciences from an accredited university, or who has at least three years of experience in the operation of the equipment being used in the facility or similar equipment.*

*(E) A processor shall submit, as part of the application process, and maintain an operations plan and quality control plan for the processing of medical marijuana in its facility. The purpose of these plans is to ensure a safe, consistent product supply and minimize the deviation in quality of the production lots of medical marijuana products*

As permitted under rule 3796:3-2-01 (C), NMG will implement hydrocarbon solvent-based extraction methods using a professional-grade closed-loop extraction system in a spark-free environment. NMG will use ninety-nine percent (99%) pure propane/butane mix and ethanol as solvents to process the plant material. No other solvents will be used. The processing area will be isolated in a nationally certified fume-hood located in the extraction room. All extraction equipment will be cleaned and maintained according to the manufacturer's recommendations, and all solvents used during the extraction process will be properly stored consistent with OSHA regulations.

NMG has created Standard Operating Procedures (SOPs) that cover production, cleaning and sanitation, storage, inventory, transportation of plant material, medical marijuana extract, and medical marijuana products, and outline the best practices for safe, secure, and proper processing of medical marijuana. NMG will designate at least one individual to train and supervise employees working in the extraction room. The designated individual will have, at a minimum, a bachelor's degree in engineering or physical sciences from an accredited university and three years of experience in the operation of equipment being used in the facility.



## OHIO STATE FIRE CODE ANALYSIS

### Liquid Definition and Flash Points

The Ohio Fire Code provides a very thorough definition of liquids and gases. As such, the definitions below show that the propane and butane are clearly not defined as liquids because of the Flash points listed below. Furthermore, the section specifically excludes compressed gasses.

*Ohio Code 1301:7-7-02 Definitions.*

**"Combustible liquid."** A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:

**"Class II."** Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).

**"Class IIIA."** Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).

**"Class IIIB."** Liquids having closed cup flash points at or above 200°F (93°C).

**"Flammable liquid."** A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:

**"Class IA."** Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).

**"Class IB."** Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).

**"Class IC."** Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).

The category of flammable liquids does not include compressed gases or cryogenic fluids.

### Flammable Liquid Definition

By definition in section 1301:7-7-02, compressed gasses are not categorized as flammable liquids, therefore they are not categorized as a liquid per the Ohio Code.

Flash point of Propane: -155.2 degrees F

Flash Point of Butane: listed as "not applicable for gases and gas mixtures"

- This clearly identifies that these are gases, not liquids. Therefore, the section on "15 psi liquids" does not apply.

### 15 PSI Rule

According to Ohio Fire Code, the 15 PSI rule applies to liquids only, not gases. Per the Ohio Code Definitions 1301:7-7-02, NMG's Propane Butane Mix is clearly a gas, not a liquid. Use group H-2 is not mandated by this section.

**"High-hazard Group H-2."** Buildings and structures containing materials that pose a deflagration hazard or a hazard from accelerated burning shall be classified as Group H-2. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or combustible liquids that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch ( 103.4 kPa) gauge

Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with section 414.1.3 of the building code as listed in rule 1301:7-7-80 of the Administrative Code.

## H-occupancy

Both the Ohio Building code Table 307.1 and the Ohio Fire Code specify that gasses under 150 pounds do not require an H-occupancy. The highlighted table below from the Ohio Fire Code clearly states this:

**Table 5003.1.1(1)**

Maximum allowable quantity per control area of hazardous materials posing a physical hazard:

Material	Class	Group when the maximum allowable quantity is exceeded	Storage <sup>b</sup>		Use-closed systems <sup>b</sup>			Use-open systems <sup>b</sup>		
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (feet)	Liquid gallons (pounds)
Flammable gas	Gaseous Liquefied	H-2	NA	NA (150) <sup>d,e</sup>	1,000 <sup>d</sup> , e NA	NA	NA (150) <sup>d,e</sup> (Pounds)	1,000 <sup>d,c</sup> NA	NA	NA
Flammable liquid <sup>f</sup>	IA IB and IC	H-2 or H-3	NA	30 <sup>d,e</sup> 120 <sup>d,e</sup>	NA	NA	30 <sup>d</sup> 120 <sup>d</sup> (Gallons)	NA	NA	10 <sup>d</sup> 30 <sup>d</sup>
Flammable liquid,	NA	H-2 or	NA	120 <sup>d,e,h</sup>	NA	NA	120 <sup>d,h</sup>	NA	NA	30 <sup>d,h</sup>

Flammable gas allowable per area is 150 pounds. NMG's gas is far below 150 pounds.

Below is a list of hazardous materials in the building:

Item	Location	Category	Max Allowed	Actual Amount
Propane and butane mix	Stored outside of the extraction room and used in the extraction chamber.	Flammable gas	150 lbs.	100 lb. tank
Ethanol	Extraction room	Flammable liquid	30 gallons for open system	3 gallons used to remove fatty liquids
Isopropyl (alcohol 99%)	Extraction room	Flammable liquid	30 gallons for open system	3 gallons used for cleaning

### Explosion Control Requirements

This section below states that only hazardous materials more than the maximum allowable quantities per control area listed in Section 307.1 of the code mandate compliance with the 414 provisions. Since NMG is not considered a Hazard use group and does not exceed the maximum hazardous materials quantity, this section does not apply.

***[F] 415.1 Scope***

*The provisions of Sections 415.1 through 415.11 shall apply to the storage and use of hazardous materials in excess of the maximum allowable quantities per control area listed in Section 307.1. Buildings and structures with an occupancy in Group H shall also comply with the applicable provisions of Section 414 and the Fire Code.*

## Plant Processing and Extraction Facilities

While NMG has proven that it is not an H occupancy, the State Fire Marshall pointed out that compliance with the Cannabis Plan Processing and Extraction Facilities code must be met. The code includes a section on Safety System that mandate safeguards for the extraction booth. The building plans include these items. See responses in red below:

**1301:7-7-39 Plant processing and extraction facilities**

**(E) Section 3905 Safety systems**

**(1) 3905.1 Gas detection.** For extraction processes utilizing flammable gases as solvents, a continuous gas detection system shall be provided. The gas detection threshold shall be not greater than 25 percent of the lower explosive limits/lower flammable limit (LEL/LFL) limit of the materials.

Adding a gas detection unit in the extraction booth to meet this requirement.

**(a) 3905.1.1 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 LFL.

Gas Detection System will comply.

**(b) 3905.1.2 Gas detection system components.** Gas detection system control units shall be listed and labeled in accordance with UL 864 or UL 2017 as listed in rule 1301:7-7-80 of the Administrative Code. Gas detectors shall be listed and labeled in accordance with UL 2075 as listed in rule 1301:7-7-80 of the Administrative Code for use with the gases and vapors being detected.

Gas Detection System will comply.

**(c) 3905.1.3 Operation.** Activation of the gas detection system shall result in all of the following:

(i) Initiation of distinct audible and visual alarm signals in the extraction room.

Gas Detection System will comply.

(ii) Deactivation of all heating systems located in the extraction room.

Gas Detection System will interlock to HVAC system and shut down when activated.

(iii) Activation of the mechanical ventilation system, where the system is interlocked with gas detection.

Gas Detection System will interlock to HVAC system and shut down when activated.

*(d) 3905.1.4 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 initiation of a trouble signal to sound in an approved location.

Gas Detection System will be interlocked to the fume hood which will extract all gases from booth when activated.

*(e) 3905.1.5 Interlocks.* 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. Circuits will be interlocked with gas detection system to shut down when activated.

*(2) 3905.2 Emergency shutoff.* Extraction processes utilizing gaseous hydrocarbon based solvents shall be provided with emergency shutoff systems in accordance with paragraph (C)(1)(c)(5803.1.3) of rule 1301:7-7-58 of the Administrative Code.

Emergency shutoff valves will be accessible at the tank so that gasses may be shut off.

## Chapters 57 and 58 of Ohio State Code

The Fire Marshall also indicated that NMG must complete a review of Chapters 57 and 58 of the Ohio Fire Code. As such, NMG determined that chapter 57 provisions for Flammable Liquids is not applicable since there will not be any flammable liquids in the extraction chamber. See responses in red below:

### *1301:7-7-58 Flammable gases and flammable cryogenic fluids.*

*(1) 5803.1 Quantities not exceeding the maximum allowable quantity per control area.* The storage and use of flammable gases in amounts not exceeding the maximum allowable quantity per control area indicated in paragraph (C)(1)( 5003.1 ) of rule 1301:7-7-50 of the Administrative Code shall be in accordance with paragraphs (A)(5001) and (C)(5003) of rule 1301:7-7-50 of the Administrative Code, and paragraphs (A)(5801) and (C)(5803) of this rule.

*(a) 5803.1.1 Special limitations for indoor storage and use.* Flammable gases shall not be stored or used in Group A, E, I or R occupancies or in offices in Group B occupancies.

#### *Exceptions:*

1. Cylinders of nonliquefied compressed gases not exceeding a capacity of 250 cubic feet ( 7.08 m<sup>3</sup>) or liquefied gases not exceeding a capacity of 40 pounds (18 kg) each at normal temperature and pressure (NTP) used for maintenance purposes, patient care or operation of equipment.

2. Food service operations in accordance with paragraph (C)(2)(a)(vii) (6103.2.1.7) of rule 1301:7-7-61 of the Administrative Code.

3. Hydrogen gas systems located in a hydrogen fuel gas room constructed in accordance with section 421 of the building code as listed in rule 1301:7-7-80 of the Administrative Code.

*(i) 5803.1.1.1 Medical gases.* Medical gas system supply cylinders shall be located in medical gas storage rooms or gas cabinets as set forth in paragraph (F)(5306) of rule 1301:7-7-53 of the Administrative Code.

**(b) 5803.1.2 Storage containers.** Cylinders and pressure vessels for flammable gases shall be designed, constructed, installed, tested and maintained in accordance with rule 1301:7-7-53 of the Administrative Code.

NMG will use approved storage containers.

**(c) 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.

All tanks will have shutoff valves that comply with this rule.

**(i) 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 unmanifolded cylinder sources.

**(ii) 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.

**(d) 5803.1.4 Ignition source control.** Ignition sources in areas containing flammable gases in storage or in use shall be controlled in accordance with paragraph (C)(7)( 5003.7 ) of rule 1301:7-7-50 of the Administrative Code.

Lights in the booth are all explosion resistant.

Exception: Fuel gas systems connected to building service utilities in accordance with the International Fuel Gas Code as listed in rule 1301:7-7-80 of the Administrative Code.

**(i) 5803.1.4.1 Static producing equipment.** Static-producing equipment located in flammable gas storage areas shall be grounded.

All equipment within booth is grounded.

**(ii) 5803.1.4.2 Signs.** "No Smoking" signs shall be posted at entrances to rooms and in areas containing flammable gases in accordance with paragraph (C)(7)(a)(5003.7.1) of rule 1301:7-7-50 of the Administrative Code.

No smoking signs will be provided.

**(e) 5803.1.5 Electrical.** Electrical wiring and equipment shall be installed and maintained in accordance with paragraph (E)(605) of rule 1301:7-7-06 of the Administrative Code and NFPA 70 as listed in rule 1301:7-7-80 of the Administrative Code.

All electrical equipment in exhaust booth is explosion resistant and vapor tight.

**(i) 5803.1.5.1 Bonding of electrically conductive materials and equipment.** Exposed noncurrent-carrying metal parts, including metal gas piping systems, that are part of flammable gas supply systems located in a hazardous (electrically classified) location shall be bonded to a grounded conductor in accordance with the provisions of NFPA 70 as listed in rule 1301:7-7-80 of the Administrative Code.

Entire booth is grounded and bonded.

**(ii) 5803.1.5.2 Static-producing equipment.** Static-producing equipment located in flammable gas storage or use areas shall be grounded.

All equipment shall be grounded.

*(f) 5803.1.6 Liquefied flammable gases and flammable gases in solution. Containers of liquefied flammable gases and flammable gases in solution shall be positioned in the upright position or positioned so that the pressure relief valve is in direct contact with the vapor space of the container.*

Will Comply

Exceptions:

1. Containers of flammable gases in solution with a capacity of 1.3 gallons (5 L) or less.
2. Containers of flammable liquefied gases, with a capacity not exceeding 1.3 gallons (5 L), designed to preclude the discharge of liquid from safety relief devices.

## CODE PATH

In support of this Report, all proposed extraction equipment, processes, and procedures have been reviewed and evaluated based on the following rules, regulations, and standards.

### Ohio State Administrative Code

3796:3 Processors.

3796:3-2-01 Processor operations and quality assurance.

### Ohio State Fire Code

1301:7-7-39 Plant processing and extraction facilities

1301:7-7-57. Flammable and combustible liquids

1301:7-7-58. Flammable gases and flammable cryogenic fluids

1301:7-7-80. Reference Standards

### National Fire Protection Association Codes and Standards

#### NFPA 58-2014

**4.1.1** Systems or Components assembled to make up systems shall be approved. Cylinders less than 120 gallons. Container Valves, connection manifold valve assemblies, regulators, and pressure relief valves.

**4.2.2** Odorization is not required as the R600/a is delivered from the manufacturer or distributor. The addition of Odorization damages the processed materials and shall increase the risk of the process by requiring persons untrained in odorization to perform this task. Odorization is not required and is not to be performed by processors for the purpose of oil extraction by a Professional Grade Closed Loop Extractor. A gas monitoring system is used to detect and monitor levels of the LP-Gas used.

**5.2.3.1** DOT and ASME Designed containers are used for the storage of Solvents. No other containers are used for this process. The Extraction equipment is designed to the rules of ASME BPVC VIII Division 1, and the Butane tank (container) is a DOT approved container with a 20 lb quantity of Butane (R600/a).

#### NFPA 58-2014

**5.2.4.2** The Maximum Allowable Working Pressure (MAWP) has been calculated to the current ASME Boiler and Pressure Vessel. Code VIII Division 1. The MAWP has been identified and listed within this report. The process pressure never exceeds the MAWP.

**5.2.8.1 (A)** The Solvent vessel is marked according to the section, "Flammable" and "Butane"

**5.2.8.4** Warning Labels that contain unodorized LP-Gas products shall be marked "NOT ODORIZED", Letter height 3/8", Border Width 1/16". The equipment and the room have the appropriate warning labels affixed.



**5.7.1 Materials.** All processing equipment such as the recovery pump, valves, fittings, seals and extracting piping meet the compatibility requirements for this process and solvent.

**5.7.2 Pressure Relief Devices.** Pressure relief valves have been installed at each vessel that can be closed. There are three (3) pressure relief valves installed.

**5.7.3 Overfilling Prevention Devices.** The DOT certified container is never filled beyond its original supplied capacity. Butane is recycled to its original container and weighed to determine the amount of Butane recovered.

**5.7.6 Pressure Gauges.** Compatible pressure gauges are installed.

**5.7.7 Other Container Connections.** The process requires bi-directional ball valves.

**5.9.3 Pipe and Tubing.** All piping and tubing have been sized and selected to meet the pressure requirements and compatibility requirements of this process and the chemical.

**5.9.4 Fittings for Metallic Pipe and Tubing**

**6.7.2 Installation of Pressure Relief Devices (See 5.7.2, page 41 of code)**

**6.18.3 Compressor Installation (Refrigerant Recovery Pump)**

**6.20.3 Installation Requirements for Cylinders, Equipment, Piping and appliances in Buildings, Building Roofs, and Exterior Balconies**

**6.20.6 Buildings Housing Industrial Occupancies**

**7.3 Venting LP-Gas to Atmosphere** has been evaluated. Only emergency venting would occur.

### **NFPA 497 2012**

This standard has been evaluated.

### **International Fire Code**

#### **IFC 2015**

**5003.9 General Safety Precautions.** General precautions for the safe storage, handling or care of hazardous materials shall be in accordance with Sections 5003.9.1 through 5003.9.10.

**5003.9.1 Personnel training and written procedures.** Persons responsible for the operation of areas in which hazardous materials are stored, dispensed, handled or used shall be familiar with the chemical nature of the materials and the appropriate mitigating actions necessary in the event of fire, leak or spill.

**5003.9.1.1** Fire department liaison. Responsible persons shall be designated and trained to be liaison personnel to the fire department. These persons shall aid the fire department in preplanning emergency responses and identifying the locations where hazardous materials are located, and shall have access to Material Safety Data Sheets and be knowledgeable in the site's emergency response procedures.

**5003.9.4** Electrical wiring and equipment. Electrical wiring and equipment shall be installed and maintained in accordance with NFPA 70.

**5003.9.5** Static accumulation. When processes or conditions exist where a flammable mixture could be ignited by static electricity, means shall be provided to prevent the accumulation of a static charge. Floors are Anti-Static. Operators wear lab coats and gloves. The floor is a non-static floor. Process does not involve repeated motion of hoses which reduce risk of static accumulation.

**5005.2.2** Closed systems. Use of hazardous materials in closed containers or systems shall be in accordance with Sections 5005.2.2.1 through 5005.2.2.4.

**5005.2.2.1** Ventilation. Where closed systems are designed to be opened as part of normal operations, ventilation shall be provided in accordance with Section 5005.2.1.1.

## **National Electrical Code**

### **NFPA 70**

**Article 500** Hazardous (Classified) Locations, Classes I, II, and III, Divisions 1 and 2

**Article 500.5(2)(1)** Class I, Division 2 location –Protection Technique K is to be used to allow for normal wiring and remove requirement for Explosion Proof Devices.

**Article 500.7(K)** Combustible Gas Detection System Protection method utilized in processing room.

## CERTIFICATE OF COMPLIANCE

The Ironfist Fabrication EX4-502 Extractor and Kewaunee, Scientific Corporation, V67 Floor Mounted Fume Hood, and accompanying literature have been reviewed by Hengst Streff Bajko Architects and Engineers and meets all the requirements established by Ohio Administrative Code 3796:3 and Ohio State Fire Codes.

The following codes, standards, and rules have been evaluated:

- Ohio State Administrative Codes
- Ohio State Fire Codes
- National Fire Protection Association Codes and Standards
- International Fire Code
- National Electrical Code

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12/1/20

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Expiration: Dec. 31, 2021

## LIST OF ATTACHMENTS

1. IronFist Closed Loop Extraction System
  - Technical data
  - Peer review
2. Haskel Butane/Propane Extraction Pump
  - Technical data
3. Kewaunee V67 Floor Mounted Fume Hood
  - Technical data
  - Manual
4. AI 3.2 CU Ft. 3-Zone Vacuum Oven
  - Technical data
5. Solventvap 1.3 Gallon5L Rotary Evaporator
  - Technical data
6. Edward E2M30 Vacuum Pump
  - Technical data
  - Manual
7. Edward RV8 Vacuum Pump
  - Technical data
  - Manual
8. IOC to 4.2L IHP Chiller with Turbine Pump
  - Technical data
9. 1.6 CFM Dual-Stage Chemical-Resist Diaphragm Pump
  - Technical data
10. H3760-H Digital Hotplate
  - Technical data
11. Scilogex Bluespin Magnetic Hotplate Stirrer, LED Digital
  - Technical data
12. QCC Quad Controller Gas Detection
  - Technical data