

Plant Oil Extraction Safety

ARKANSAS CANNABIS INDUSTRY ASSOCIATION



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What's a Safety Guy Like You Doing in a Place Like This?

Certified Industrial Hygienist - American Board of Industrial Hygiene

Late 2013 State of Colorado Extraction Regulations Developed

Required CIH's to Sign Off on Extraction Facilities



COLORADO
Marijuana

2013 – STATE OF THE ART – OPEN BLASTING

Quasi-Legalization

Butane Hash Oil – Product of Choice

Explosions Common

Dispensaries Blasting in Parking Lot, Closed Rooms



OPEN BLASTING

LIQUID BUTANE
CAN

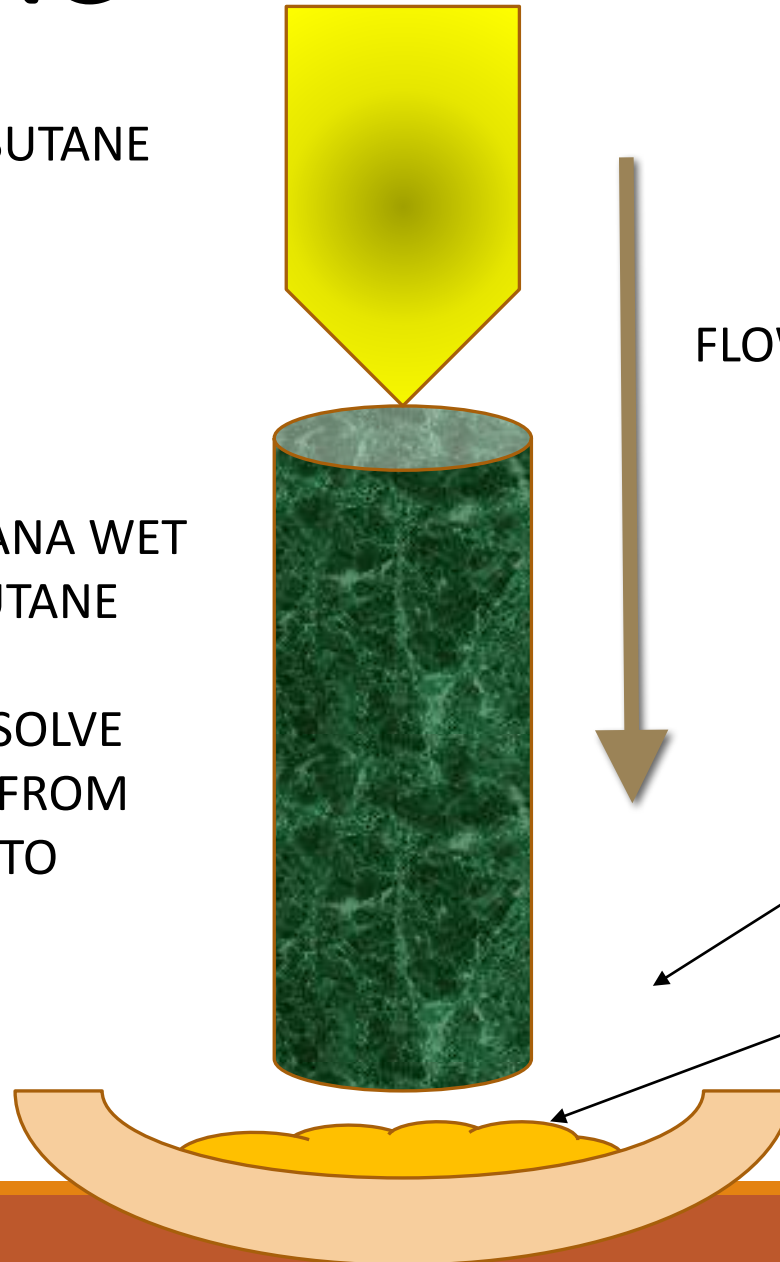
SOLID
MARIJUANA WET
WITH BUTANE

OILS DISSOLVE
(LEACH) FROM
SOLID INTO
LIQUID

FLOW

BUTANE VAPORIZING

EXTRACT-RICH LIQUID OR
LOADED SOLUTION



BUTANE HASH OIL: OPEN BLASTING



Arkansas RR 12.5 Manufacturing and Processing of Cannabinoid Concentrates and Extracts

- Hydrocarbon solvent (Butane and/or Propane)
- Non-Hydrocarbon solvent (Ethanol)
- Environment with:
 - Proper Ventilation
 - Control Sources of Ignition
- No Open Blasting
- Fully Enclosed Room

COLORADO REGULATIONS R/M 605

Marijuana Products Manufacturing Facility

- Butane, propane, CO2, ethanol, isopropanol, acetone, heptane
- “Fully enclosed room”
- Standard Operating Procedures
- Industrial Hygienist or Professional Engineer
 - Quantities, electrical, ventilation, gas monitoring, fire suppression at discretion of IH or PE

“CLOSED-LOOP EXTRACTION SYSTEM”

“capable of recovering the solvent “

- (I.E. – Don’t open blast)
- Regulatory definition

Solvent-Based (butane, propane, CO2)

“If people use closed-loops systems they will be safe”



HOUSTON CAM

(713) **Live Leak**

New Mexico Environment Department



Don't Be That Guy (or His Boss)

Go home safe.



BELT AND SUSPENDERS

1. Training
2. Appropriate Facilities for Extraction
3. Limit Quantity of Solvent
4. Recovery of Flammable Solvent
5. Avoid Release of Solvent
6. Ventilation to Keep Concentrations Below Lower Explosive Limit (LEL)
7. Once-Through Ventilation – Exhaust Outside
9. Sensors to Warn of High Concentrations
10. Warning Alarms and Horns
11. Controls
12. No Ignition Sources
13. EXP Equipment to Avoid Ignition
14. Protective Clothing
15. Fire Extinguishers
16. Fire Sprinklers



Arkansas RR 12.5 Manufacturing and Processing of Cannabinoid Concentrates and Extracts

- Professional Grade Closed Loop Extraction System
- Extraction Machine Meets codes and engineering standards
- Extraction Machine Licensed Engineer Certified
- Carbon Dioxide Systems 600 psi
- Approval by Fire Code Official

BUILDING AND FIRE CODES

- MAXIMUM ALLOWABLE QUANTITIES

MAQs of Butane/Propane for Class F Occupancy (Industrial)

- NFPA 58 Table 8.3.1 LPG Gas 300 pounds butane and/or propane
- 2013 CA Fire Code Table 5003.1.(1) 150 pounds butane and/or propane
 - (Can be doubled with sprinklers and/or ventilated enclosures)
- Fire & Building Codes 120 pounds Ethanol & Isopropyl Alcohol
 - (Can be doubled with sprinklers and/or ventilated enclosures)

Class H Occupancy (Hazardous)

- Required if MAQ's exceeded

Ventilation Minimum 1 cubic foot per minute per square foot of floor area

- 29 CFR 1920.106(e)(3)(v)(a)

WHAT IS “EXPLOSION-PROOF” or EXP

Better referred to as “SPARK-PROOF”

Electrical components must be able to contain an ignition without spread of flame.

- (Switches, lights, boxes, sensors, outlets)

CLASS I, DIVISION 1 LOCATIONS

This is a location where the explosion hazard exists under normal operating conditions . The area may be hazardous all or most of the time, or it may only be hazardous some of the time.

CLASS I, DIVISION 2 LOCATIONS

This is a location where the explosion hazard has a potential to exist when something goes wrong or under abnormal conditions.



EXP EQUIPMENT



CONTAINS IGNITED FLAME FRONT WITHIN THE
CONFINES OF THE FIXTURE IF IGNITION HAPPENS

AUTOMATIC FIRE SUPPRESSION SYSTEMS

Required for
production space
working with
flammable liquids &
gases

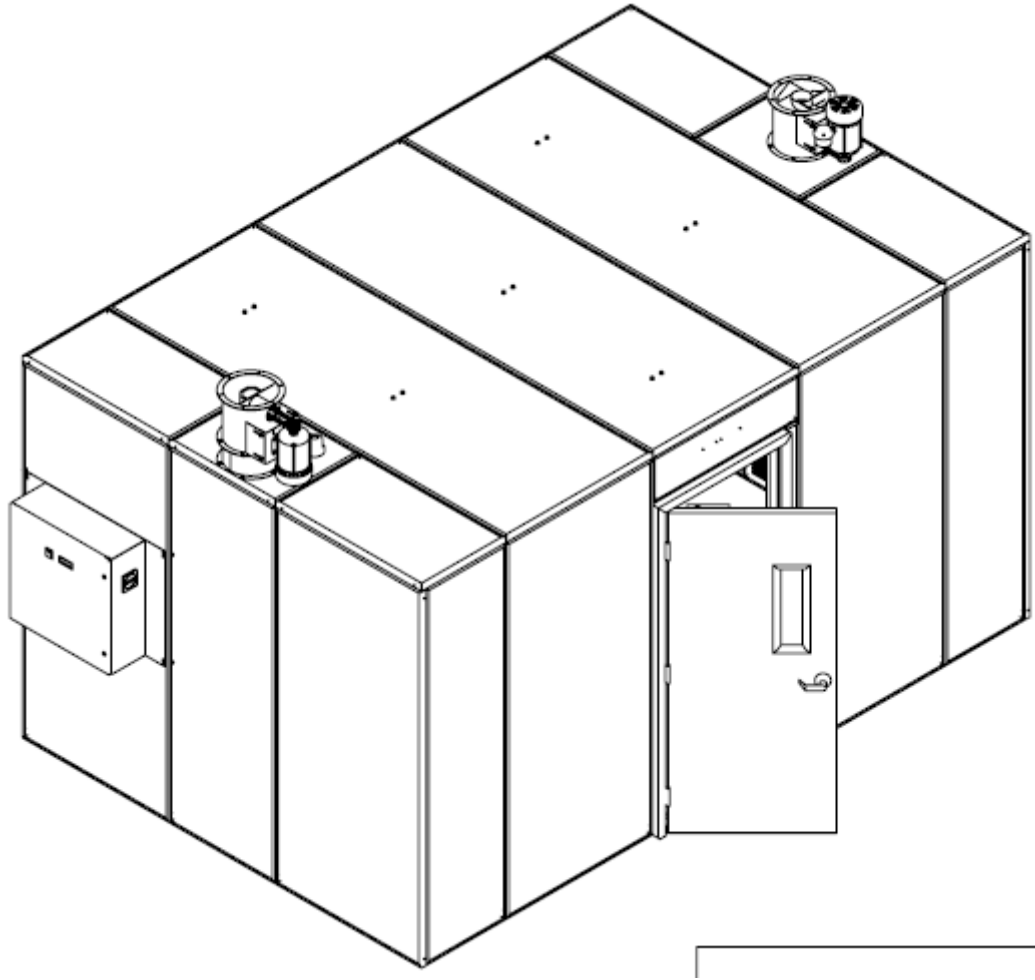


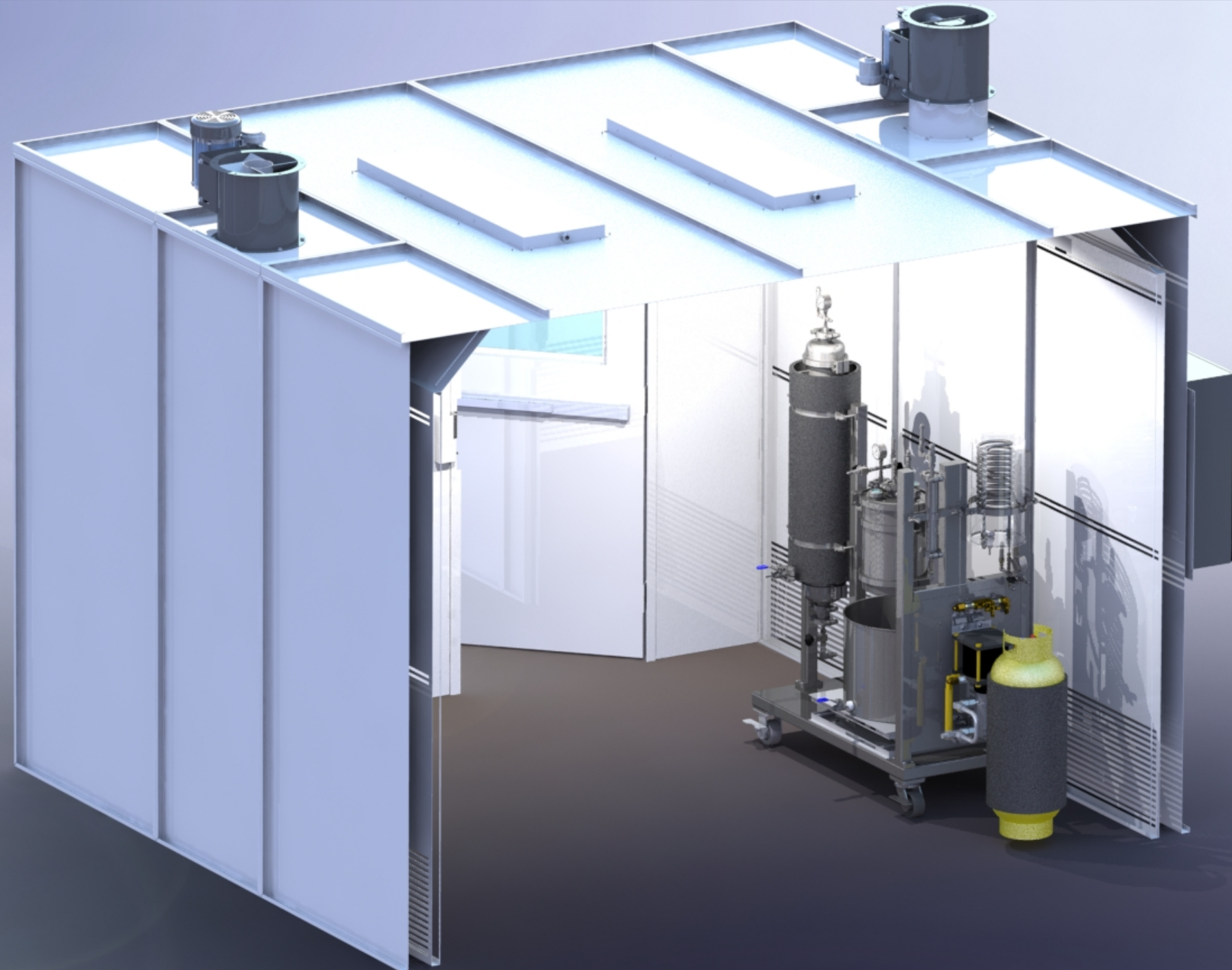
BUILDING A FACILITY IS EXPENSIVE

- Architect
- Engineer
- License Application - Time
- Local Code Review - Time
- Fire Department Review - Time
- Specialized Equipment
- Specialized Construction



HAL EXTRACTION





HAL
EXTRACTION

PROTOTYPE MODEL



SUPPLY & EXHAUST PLENUM PANELS



EXPLOSION PRESSURE RELIEF PANEL



CONTROL PANEL

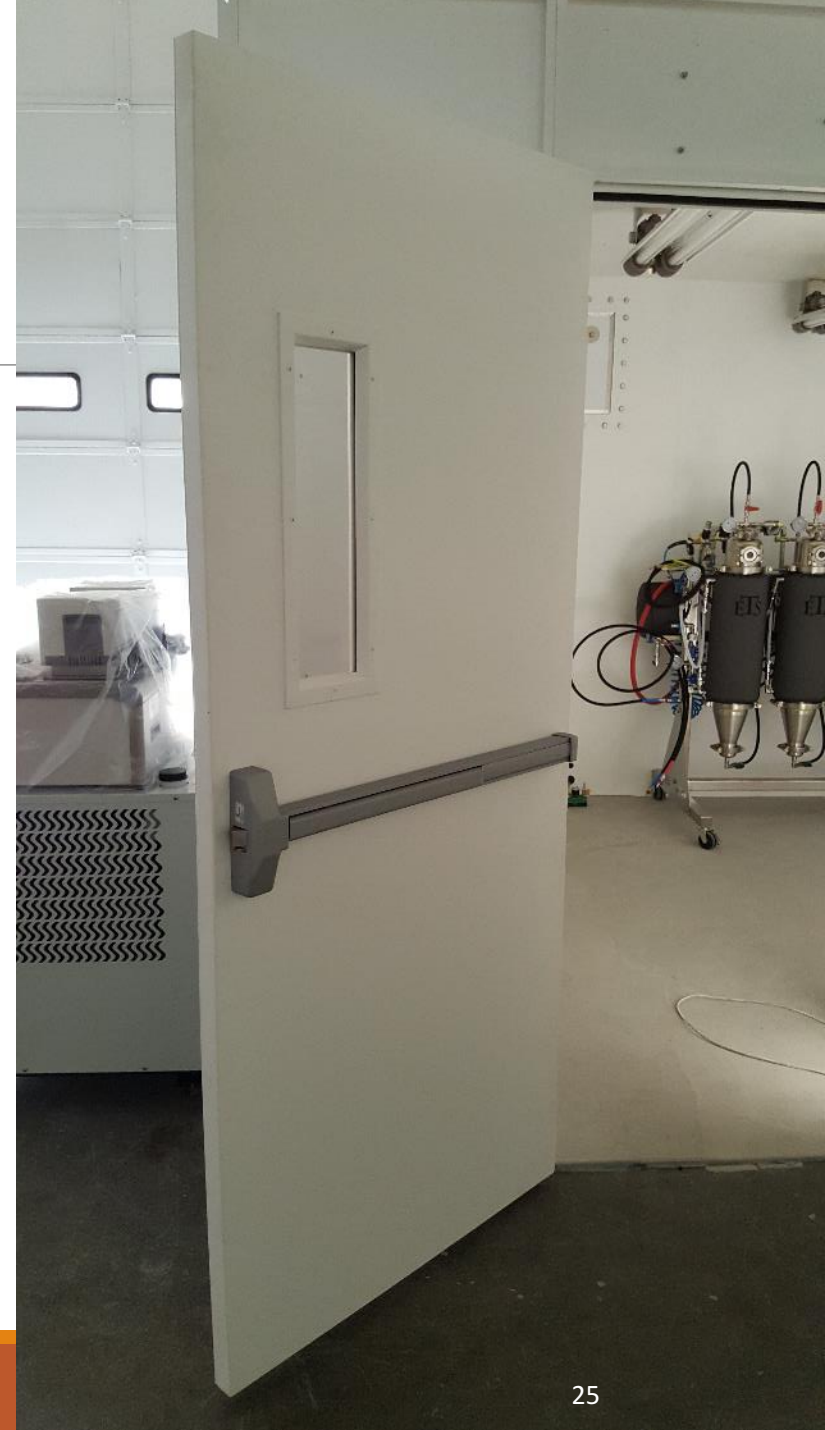


MANUFACTURER CONTROLS ENGINEERING
& SERVICES
UL FILE NO. E750178
MARK SUPPLY
VOLTAGE 500V
FRAME 900
TRANSIENT BEHZ
FULL LOAD AMP 5.5A
LAMP/LOAD 5.5A
MARK DISCONNECT
PARTIC 50A
SECT ALA
OVERLAMP PROTECTIVE
ELECTRICAL SCHEMATIC
EDMATION, PPL, SOLER AND
ENCLOSURE
TYPE 0
SERIAL NUMBER
N1000

WARNING HORN AND LIGHT



EXIT WITH PANIC BAR



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