EXTRACTION LAB FIRE PROTECTION
A PREVENTATIVE STRATEGY TO RELIABLY PROTECT PEOPLE, PROPERTY AND PRODUCT

THE PROBLEM
One of the most popular THC-extraction methods involves the use of liquefied petroleum gases (LPGs), such as butane, propane and many other flammable materials. While LPG extraction is cost-effective, it’s also incredibly dangerous if left unprotected.

“THC is often extracted utilizing flammable processes with volatile chemicals by start-up level businesses,” said Chris Vanderstokker, president of ETG Fire, a fire protection supplier in Denver. “Experimentation, mixed with a lack of consensus among local authorities who are still working to determine proper code requirements, has resulted in many major incidents across several states in the last five years.”

And regulatory organizations are taking action. For example, in 2018 Cal/OSHA issued a $50,470 fine against a California-based extraction lab after a propane leak caused an explosion that injured a worker. During that same year, NFPA 1 was updated to include “Chapter 38 – Marijuana Growing, Processing, or Extraction Facilities,” which is being adopted by AHJs across the country and requiring many extraction labs to rethink their protection strategies.

"THC is often extracted utilizing flammable processes with volatile chemicals by start-up level businesses"
THE SOLUTION

Extraction lab fires and explosions are unique because there are few warning signs of the impending hazard visible to the human eye. If a gas leak goes undetected and levels are high enough to support ignition, very little can be done to protect workers and equipment from an LPG-based explosion.

That’s why for extraction lab owners who want to reliably protect their employees, equipment and product from fires, satisfy AHJ and insurance requirements, and meet NFPA regulations, Fike recommends the following strategy which prioritizes the mitigation of LPG hazards.

### GAS DETECTION

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<thead>
<tr>
<th>FIKE'S RECOMMENDATION: VESDA BY XTRALIS</th>
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<tr>
<td>Provides early-warning fire and gas detection through aspirating air sampling technology.</td>
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VESDA meets NFPA gas detection requirements by continuously sampling the air in the extraction lab and detecting LPG gas at a threshold no greater than 25 percent of the Lower Explosive Limit (LEL) or Lower Flammability Limit (LFL). When gas is detected, VESDA may communicate to a connected fire alarm control panel to alert staff and activate suppression systems.

### INERT GAS

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<tr>
<th>FIKE'S RECOMMENDATION: PROINERT®</th>
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<td>Consists of a 50/50 argon/nitrogen mix that floods hoods, ductwork and the rest of the enclosure when VESDA detects dangerous levels of LPGs.</td>
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Upon discharge, PROINERT displaces potentially flammable gases and inerts the environment by safely reducing oxygen levels to a point where combustion can’t be sustained. The inert gas will not contaminate any product in the room during an event. Fike does not recommend — as a first line of defense — the other primary protection strategies, including sprinkler systems and dry chemical systems, suggested in NFPA Chapter 38.6.2.5.

### EMERGENCY POWER SHUTDOWN

<table>
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<tr>
<th>FIKE'S RECOMMENDATION: FIKE'S EMERGENCY POWER SHUTDOWN MANAGEMENT SYSTEM</th>
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<td>De-energizes equipment, closes fire dampers and turns off ventilation and cooling equipment to contain fire and maintain proper concentration of inert gas or fire suppressant.</td>
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NFPA 138.6.2.4.1
An approved continuous gas detection system shall be provided.

NFPA 138.6.2.5
An automatic suppression system shall be provided within hoods or enclosures, including ductwork...

NFPA 138.6.2.3.5
An automatic emergency power system shall be provided for the following items, when installed: extraction room lighting, extraction room ventilation system, solvent gas detection system.
Why are sprinkler systems and/or dry chemical systems the predominant fire protection method used in extraction labs?

“Fire protection typically isn’t a top-of-mind concern for someone building an extraction facility, so when they do have to think about it, it’s natural to gravitate to the lowest-cost option. When these types of systems are used, it is usually due to lack of knowledge about the availability of a better option like inert gas. However, with a little education, the owner will realize that sprinklers are slow-acting, and both sprinklers and dry chem systems stand to contaminate the lab and require extensive cleanup.”

As a fire protection professional, why do you recommend inert gas systems over sprinklers or other options?

“If an explosion occurs, all bets are off. No system exists that can reliably protect what’s in the lab at that point. But with an inert gas fire suppression system combined with gas detection, we have the potential to stop a fire or explosion before it occurs. These systems can detect the presence of a flammable gas at the earliest possible stage, sound the alarm, give people a chance to evacuate, purge the flammable gas and inert the environment – practically all at once. Contrast that with a sprinkler head that won’t even begin flowing water until the heat of the fire opens it. This provides no advanced protection against a potentially explosive environment. It is a reactive measure rather than a proactive measure. Proactive fire suppression is a must for an environment like an extraction lab.”

What should extraction lab owners expect from the clean-up process after the discharge of one of these systems?

“We all know the kind of damage water can do in a lab environment where we have electronics and valuable product. A single sprinkler head that is releasing 25 gallons per minute of dirty sprinkler water can take days to clean up. Dry chemical discharges potentially leave residue in every crack and crevice in a lab, and that includes the interiors of electronic devices and lab equipment. Conversely, an inert gas system discharges a 50/50 mix of nitrogen and argon into the lab. These are non-reactive, non-conducting gases that occur naturally in the air we breathe. After an inert gas discharge there is absolutely no residue left behind, which means there is virtually no cleanup required.”
GROW HOUSES AND FIRE PROTECTION

Due to their explosive potential, extraction labs are often prioritized when it comes to fire protection. However, marijuana grow houses are not without their own fire hazards, including:

- 1,000-watt high-pressure sodium lamps
- Flammable fertilizers, pesticides, herbicides, fungicides
- Pressurized cylinders of CO₂, LPGs, etc.
- Exposed electrical wiring

Effective fire protection without the use of dirty sprinkler water or chemicals is more cost-effective than one might think. Fike recommends the following system to reliably protect a grow house from fire:

OPTICAL FLAME DETECTION

Optical flame detectors protect grow houses by identifying a flame in as few as 5 milliseconds and from as far away as 100 ft.

IR3-HD or UV-IR-HD
Flame detectors which include an HD camera, capable of recording one minute pre-event and three minutes post-event. Also, may be used to satisfy security needs with the ability to identify people in the grow house. LEARN MORE >

Fike Video Analytics
May be added to optical flame detectors to provide early-warning detection capabilities such as the ability to identify smoke. LEARN MORE >

WATER MIST

Unlike sprinkler systems, fast-acting water mist systems can quickly suppress a fire with uncontaminated, ultra-fine water droplets. Water mist is considered a three-dimensional agent because of its ability to penetrate concealed spaces that are typically unreachable by traditional sprinkler systems.

DuraQuench®
Uses water from the facility’s water main or other local water source, and lower operating pressures (175 psi vs. 2,000 psi used by high-pressure systems) allow for lower cost pipe and fittings. LEARN MORE >

Micromist®
Offers the same benefits as DuraQuench but in a self-contained, pre-engineered system—ideal for remote locations or when it’s not practical to tap into a continuous, piped water supply. LEARN MORE >

PROBLEM? SOLVED.

Do you have further questions about protecting an extraction lab from fire?

Call 1-800-YES-FIKE today or visit FIKE.COM for more information.