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A close-up photograph of a hand holding a glass vial containing a yellowish-green cannabis extract. A glass dropper is positioned above the vial, with a single drop of the extract falling into it. The background shows green cannabis leaves.

Cannabis Extraction Methods

**WHAT INSURANCE
BROKERS NEED
TO KNOW WHEN
PLACING COVERAGE**

WHITE PAPER



Cannabis Extraction Methods: What Insurance Brokers Need to Know When Placing Coverage

The cannabis industry is growing. As more insurance carriers expand coverage offerings to these types of enterprises, brokers are presented with new opportunities to put more business on the books. But the commercial cannabis industry is complex. As more brokers market to cannabis operations, there are critical areas of concern that should be addressed when considering coverage – one being extraction methods.

Given this emerging market, brokers may not have all the facts when it comes to the method of extraction a business operation is using. Moreover, extraction terminology in the cannabis industry isn't consistent, and that can lead to issues for brokers when placing coverage and in claim situations.

In this white paper, we'll take a closer look at cannabis extraction methods to better educate brokers when placing coverage in this rapidly expanding industry.

Matching the Product to the Risk

A key issue of concern in placing coverage in the cannabis industry is that the terminology from market to market – and even intermarket between carriers – is confusing and lacks consistency. The challenge for brokers is that many are placing risks based on the names of the products that clients indicate they are producing, rather than their true operating exposure.

For example, the client may state that they are producing shatter – an amber-colored concentrate. Originally, shatter was produced exclusively by way of butane extraction methods. Today, the term shatter is being used more broadly to describe any hard, amber-colored cannabis concentrate. Traditionally, when shatter is listed as the product on the insurance application, the broker may



automatically assume that butane is the extraction method, when in fact, a nonbutane method such as carbon dioxide is being used.

A better way to approach a client is to ask not only about the product being produced, but also about what solvents are used in the operation. For example, with CO2 extraction, it's not uncommon for operations to do a secondary processing with ethanol. This can create underwriting and carrier selection issues if the application lists CO2 as the primary extraction method with no reference made to ethanol, resulting in a possible cancellation of coverage if the policy isn't placed with the correct carrier. This makes identifying critical exposures important to ensure the proper marketing to available carriers.

"When considering coverage for a cannabis operation, it's important to shift the conversation from what the client calls the products that are the result of the extraction process, and focus more on the specific method of extraction and the solvents being used. Doing so will allow brokers to better understand the risks, ask the right questions and offer the most appropriate coverage." – **Norman Ives**, Cannabis Practice Leader at Worldwide Facilities, LLC

Understanding Cannabis Extraction Processes and Risks

When it comes to identifying and mitigating the hazardous conditions of cannabis extraction, brokers need to first understand the processes of a cannabis facility. If left unchecked, hazardous operations can result in serious injury to people and property when contents ignite, causing a fire or explosion.

Three Main Cannabis Extraction Methods

Once the cannabis plant is harvested, it is either used in its raw form or refined through an extraction process into cannabis oils, concentrates and extracts. The



objective of these processes is to collect the most desirable compounds from the plant and discard unusable byproducts; however, the methods by which each product is extracted can differ greatly. In general, there are three main types of extraction methods used to achieve the extraction/concentration: solvent-based, solvent-less and infusion.

✔ Solvent-Based Extraction Methods

Solvent-based extractions typically produce concentrates that are known as oil. The use of solvents to remove cannabinoid and other components from the plant material can be done under pressure, such as with butane and CO₂, but that may not always be the case with ethanol extraction methods.

Cannabis concentrates are divided into two main categories: solvent-based and solvent-free extractions, and can include butane, CO₂, ethanol, or a blend of each.

Butane

Butane is sometimes blended with other gases such as hexane and propane in a process referred to as light hydrocarbon extractions. These solvents have low boiling points that allow extractors to capture the essence of a cannabis plant by first dissolving resins, and then pulling the cannabinoids and terpenes from the plant matter without the use of extreme pressures or temperatures. It is the low boiling point of butane (30.2 F) that allows the extraction to remove unwanted plant matter without evaporating heat-sensitive cannabinoids or terpenes.

CANNABIS EXTRACTION AND BUTANE

Butane is a gaseous hydrocarbon that when sparked can trigger an explosion that is significantly more powerful than carbon dioxide.

As butane is pressurized and heated, it transforms from a liquid to a vapor, making it easier to extract the cannabis product. It's also a common method of creating shatter.



Solvents such as butane are considered either flammable or combustible. In general, flammable liquids release ignitable vapors at normal temperatures, while combustible liquids release ignitable vapors once heated.

Take note! Cannabis operations in which extraction processing equipment is not properly installed and maintained can allow flammable gases to escape, putting employees and property at risk. Where butane is used, many states require that the extraction room or facility be rated as sparkproof (i.e., void of refrigerators, cooking appliances, electrical panels, computers, cell phones, etc.), with equipment and wiring rated as explosion-proof and in a Class 1, Division 1 location. In addition, some carriers may require backup generators and verification of sparkproof equipment.

CO₂

CO₂ behaves like a gas at normal temperatures and pressure. When it is cooled and pressurized, it reaches an in-between phase referred to as a supercritical state. In this state, CO₂ can be passed through plant matter as a gas.

The use of supercritical CO₂ for cannabis extraction is becoming more common in hemp oil and hash oil production. It works by extracting large amounts of wax and chlorophyll in a post-extraction process called

FLAMMABLE AND COMBUSTIBLE: WHAT'S THE DIFFERENCE?

The level of risk that a material poses and how easily it can cause a fire is based on whether it's flammable or combustible.

Flammables ignite at lower temperatures than combustibles when exposed to an ignition source. This specific temperature, or flashpoint, is what separates flammables and combustibles.

- A material is considered flammable if it has a flashpoint of less than 100 F.
- A material is considered combustible if it has a flashpoint greater than 100 F and less than 199.94 F.



winterization. Winterization uses a solvent – typically ethanol, methanol or isopropanol – to aid in the removal of unwanted waxes and byproducts to obtain usable extracts. Many companies using CO₂ extractions perform winterization and then remove the solvents through a process called distillation, which is typically performed at very high heat. Supercritical CO₂ extractions are essentially a set of two extraction runs – CO₂ followed by an ethanol extraction.

Take note! CO₂ can change from a liquid state to a supercritical state without exceeding temperatures of 90 F, making it safer than the petroleum-based hydrocarbons such as butane or propane in terms of toxicity. Companies that produce pharmaceutical-grade products generally prefer CO₂ extraction methods to help reduce the risk of any remaining trace elements of solvents. This process generally includes enlisting the services of a third-party testing provider to ensure product quality, safety and composition.

Ethanol

In ethanol extraction, food-grade ethanol is passed through the cannabis plant material. As the cannabis mixes with the ethanol, it produces a vapor that contains beneficial compounds. The ethanol can be recirculated through the plant matter multiple times, allowing for maximum extraction. After processing, the ethanol is evaporated, leaving the cannabis oil as a residue. Heat and vacuum are then applied to remove residual ethanol.

Unlike most other solvents, ethanol doesn't separate the plant material, allowing it to capture the original chemical ratios contained in the plant, such as terpenes and phytochemicals that other extraction methods remove.

UNDERSTANDING ETHANOL'S VARIOUS FLASHPOINTS IN CANNABIS EXTRACTION

100% ethanol can ignite at 61.88 F.

90% ethanol can ignite at 63 F.

60% ethanol can ignite at 72 F.

10% ethanol can ignite at 120 F.



Moreover, ethanol easily evaporates, leaving little or no trace of solvent in the finished product.

Take note! Ethanol is a dangerous chemical that is highly flammable. Due to its numerous flashpoints, it is also extremely volatile. Pure ethanol has a low flashpoint of just 61.88 F (typically less than the average room temperature) that increases as the ethanol solution is diluted.¹ Ethanol should be stored in a cool, dry area with adequate ventilation in the event of a vapor leak.

✔ **Solvent-Less Extraction Methods**

The solvent-less extraction method involves refining and distilling cannabis to extract cannabinoids to infuse into concentrates and cartridges with the primary objective of preserving potency and ensuring purity of the product. Types of solvent-less products include kief (also known as dry sieve hash), rosin and ice water hash.

Take note! Amid the rapidly growing popularity of concentrates there are patients and recreational users who are seeking solvent-less concentrates. The extraction methods used in creating solvent-less cannabis concentrates use a mechanical extraction process, such as heat or pressure.

✔ **Infusion Extraction**

Fatty agents such as oils and butters can extract oil from cannabis by attaching to the plant's lipid structure. Cannabinoids, specifically THC and CBD, exist in acidic and activated forms. When heated, these acidic forms undergo a chemical reaction called decarboxylation that results in tetrahydrocannabinolic acid converting to THC, CBDA and CBD. The fats used in these products are odorless and become solid at room temperature. Common oils/agents used in infusion extraction include coconut oil, olive oil, butter and ghee.

COMMON CANNABIS EXTRACTS

- Kief
- Hash
- Butane hash oil
- Supercritical CO2 oil
- Rosin



Take note! Companies that manufacture cannabis-infused products must have proper testing and controls in place to ensure that consumers receive the precise amount of THC or other cannabinoids in each measured amount.

Flammable and Combustible Hazards Fast Facts

Flammable and combustible liquids are classified as either flammable or combustible by their flashpoints.² Most flammable liquids will ignite and burn easily at normal working temperatures. Combustible liquids have the ability to burn at temperatures that are usually above typical working temperatures.

- Flammable liquids can give off enough vapor to form burnable mixtures with air – even at room temperatures. Flammable liquid fires burn very fast, giving off a lot of heat and clouds of thick, toxic smoke.
- Combustible liquids that are at temperatures above their flashpoint will release enough vapor to form burnable mixtures with air, and hot combustible liquids can be as serious a fire hazard as flammable liquids.
- Wood, cloth and cardboard can become sponges, easily absorbing flammable and combustible liquids.
- Fumes from flammable and combustible liquids are invisible and can be hard to detect.
- Many flammable and combustible liquids ignite easily and burn with extreme rapidity. Even a small spill can quickly engulf floors and work areas.
- Even after a spill has been cleaned up, dangerous amounts of liquid can remain in the processing area, giving off hazardous vapors.
- Burning liquids can spread fire widely – moving down stairways, under closed doors and to adjacent buildings.
- The rate at which a liquid produces flammable vapors depends upon its vapor pressure.
- Because vaporization rate increases as the temperature increases, flammable and combustible liquids are more hazardous at elevated temperatures than at room temperature.
- Class 1 flammable liquids must be bonded and grounded when transferring liquids.

Product Liability

considering coverage for product liability, carriers will inquire as to the testing of products. Today, it has become standard practice for operations extracting cannabis oils to contract with a third-party testing lab to certify that their product contains no residual butane, propane or other solvents – an area of particular importance for consumers whose health may be compromised and are using cannabis products for medical purposes.

Another product liability issue centers on clients who are not growing the product they plan to extract, but buying their raw plant materials from another source. Brokers should inquire whether the plants being used for extraction have been tested to ensure they are free from pesticides and to determine specific THC and cannabinoid levels. In cases where businesses are buying products from others, brokers should expect carriers to inquire as to whether the insured is indemnified by the producer growing the plant materials planned for extraction.

Questions to ask when considering coverage for extraction facilities, equipment and processes

The extraction of cannabis concentrates is a complex and potentially dangerous process. In addition to noting standard safety concerns, brokers should carefully examine the location of the extraction facility, the type of operational risk, the amount and quantity of hazardous contents, and all operational procedures employed.

THE INDUSTRY VALUE CHAIN

is an intertwined web of the various market actors and participants working together as a system to deliver a valuable product or service to a customer. In the cannabis industry, this includes:

Primary: Raw material providers (i.e., seed providers, cultivators)

Secondary: Manufacturers transforming raw materials (i.e., product manufacturers)

Tertiary: Ancillary service providers (i.e., retailers and supporting service organizations) and products companies



When approaching a cannabis business for coverage, consider the following questions:

- In addition to identifying the extraction method, are there any other solvents being used in the extraction, or in secondary extraction processes such as winterization?
- Do all systems in the facility receive regularly scheduled preventative maintenance, and are they serviced by highly trained professionals?
- Are the extraction rooms equipped with a fume extractor with the appropriate flow and filtering capacity? What about the installation of alarms to alert workers to a CO2 leak, as well as a backup generator in the event of a power outage?
- Depending on their flashpoints, are there certain materials that will require stricter controls compared with others in preventing fire risks? For example, some materials may require operating at a specific temperature to limit vapors.
- Are there sprinkler systems that meet the requirements of the most hazardous contents in storage?
- Does the extraction room comply with Class 1, Division 2 electrical requirements?
- Does the liquid storage room comply with applicable codes, and is it separated from the rest of the facility by an hourly fire-rated wall?
- Does the operation have a set of approved standards of operation guidelines for conducting the extraction process?
- How are flammable and combustible liquids stored? Are they kept in closed containers to reduce the risk of accidental spills?
- Are liquid storage rooms equipped with containment or drainage safeguards that are separate from local waterways in the event of a spill?
- Are material safety data sheets (on each hazardous substance stored at the facility and available for easy reference when determining the appropriate size and type of containers being used?
- Are incompatible hazardous materials and substances stored separately and in amounts below the maximum capacity of a facility? Various codes govern the maximum allowable amounts of hazardous materials stored or used in control areas, so it's critical to regulate the amount of hazardous materials on site according to the code.



- Is all hydrocarbon extraction equipment suitable and certified for the desired solvent application, for safety of the operator and the benefit of the end consumer?

“A first step for brokers prior to placing coverage is to work closely with their clients to complete a comprehensive cannabis extraction and manufacturing application, addressing key questions to better underwrite the business. A partnership with a wholesaler that has a thorough understanding of the industry, deep underwriting expertise and strong carrier relationships can be a valuable resource to help brokers put more cannabis operations on the books.”

– **Norman Ives**, Cannabis Practice Leader at Worldwide Facilities, LLC

At-a-Glance Glossary of Common Cannabis Extraction Terms

Cannabis Extraction. The process of separating cannabinoids from raw plant material and concentrating them into a cannabis extract or oil.

CO2 Extraction. Involves using carbon dioxide that is subjected to extremely high pressure in metal tanks until it becomes a supercritical fluid. Next, the fluid takes out the necessary compounds from the plant, separates the materials, and leaves behind a concentrate such as wax and shatter.

Ethanol Extraction. Involves soaking raw plant material in the solvent to pull the trichomes into the ethanol. The cannabis is removed, the liquid is filtered, and the alcohol is purged from the material that has been extracted.

Flashpoint. The minimum temperature at which the vapors of a material can create an ignitable mixture in the air near the material’s surface. A low flashpoint means a material is easy to ignite. Flammable liquids have a flashpoint of less than 100 F. Liquids with lower flash points ignite easier. Combustible liquids have a flashpoint at or above 100 F.

Solvent-Free Extraction. Extracts oil from raw plant materials using a hydrocarbon such as CO2 or butane. Prior to being sold, all the solvents are removed.



Solventless Extraction. Extracts oils from raw plant materials without using any solvents.

Supercritical CO2 Extraction: Supercritical CO2 is a nonpolar solvent that uses the temperature and pressure of CO2 to target and extract specific cannabinoids.

Winterization: A process used to dissolve the sludge from the supercritical CO2 equipment into ethanol, chilling and filtering off the mass of unusable waxes, etc., and then evaporating off the remaining ethanol.

Conclusion

Cannabis extraction methods are complex. It is critical for brokers to be informed regarding the various processes, materials used, and the risks they pose in order to ask the right questions prior to placing coverage.

At NutraRisk, we have a deep understanding of the cannabis industry and the exposures cannabis companies face. More than just providing coverage, we help our retail brokers better understand key trends and changes in the industry that could affect their clients.

For more information, please contact Norman Ives, Broker and Cannabis Practice Leader, at nives@wwfi.com or 206-538-5290.

Notes

1 Nicole Richter, "[Ethanol Extraction for Marijuana: Is it Safe?](#)" Marijuana Break, July 16, 2019.

2 UC San Diego, "[Flammable and Combustible Liquids Overview](#)" March 2, 2016.

Additional Sources:

1. [Leafly](#).
 2. [Eden Labs, LLC](#).
 3. [High Speed Training](#).
 4. Escet, [Cannabis Extraction Methods: The Good, The Bad & The Ugly](#).
 5. Cannabiz Journal, [The Perfect Solvent for Cannabis Extrication](#).
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