# Position Statement on Defining and Distinguishing Flavor Compounds and Terpenes

We write to: (i) emphasize our concerns about the potential new rules regarding marijuana products in the State of Washington, promulgated by the WSLCB and the Washington Health Board which mix inaccurate assumptions about marijuana with new fears about vaping; (ii) provide scientific data confirming that the new proposed rules impose arbitrary requirements on product manufacturers that do not protect public safety; and (iii) propose science-backed regulatory language that appropriately accommodates and responds to known dangers surrounding vapor products. We believe that the current policy, as written, could confuse the public and cause officials to misdirect resources and fail to expose the truth by giving a false sense of security about specific products, while simultaneously driving regulated, licensed companies out of business almost overnight.

Even with the tight regulatory structure provided by the WSLCB for Washington State Cannabis Products, there is certainly room to strengthen policy, especially when it comes to public health and safety. However, our most grave concerns with the proposed action of banning licensed marijuana retailers from "selling any cannabinoid (marijuana and hemp) products containing any flavor, including non-marijuana terpenes" is that it wrongfully assumes that flavoring has caused Vaping Associated Pulmonary Injury (VAPI) when the true cause of Vaping Associated Pulmonary Injury (VAPI) has yet to be demonstrated. It further wrongfully assumes that marijuana-derived terpenes and flavoring are safer than those that derive from other natural sources, which has also *not* been demonstrated. And it creates an unjustified sense of consumer safety for products that remain for sale in Washington.

As described in greater detail herein, when tested for contaminants, the notion that any increased risk of injury comes from the use of a non-marijuana derived source as opposed to a marijuana-derived source is plainly false and unsupported by a single available scientific study. While we agree that the WSLCB and Washington Health Board should establish regulations to protect public health, we submit that science should drive public policy. Terpenes and terpenoids that are derived directly and solely from the marijuana plant are no different on a molecular level than non-marijuana derived terpenes from hops, oranges, or other natural sources. No global regulatory body uses the source of an ingredient as a discriminating factor in deciding whether an ingredient is permitted or prohibited, and neither should the WSLCB or Washington Health Board. Global regulatory bodies recognize a distinction about the source of a substance only in the context of labeling. In this connection, the WSLCB should expand upon existing packaging and labeling rules to accommodate these public health concerns.

We support a full and transparent discourse on every policy concern that brings us closer to resolving this threat to public health and safety. Our shared interest is in having a safe, fully regulated marijuana market that is responsive to, and appropriately accommodates science-backed health and safety concerns.

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## Understanding SDS

In preparing the proposed emergency rules, it is our understanding that the WSLCB and/or the Health Board may have relied upon certain Safety Data Sheets (SDS) taken from various prominent non-marijuana terpene and flavor suppliers. These documents are being used by some as supposed “evidence” that non-marijuana terpenes are dangerous and more harmful than marijuana-derived identical compounds. This belief is inaccurate and unsupported, relying on data taken out of context.

Safety Data Sheets for non-marijuana terpenes and flavorings are for professional use and provide information for people who are working with the products in manufacturing, not using them as a consumer. Safety Data Sheets communicate the hazards of a product ‘as is’, in this case, undiluted. We understand that reading a Safety Data Sheet can be alarming to the untrained eye and want to explain that terpenes, regardless of their source, are volatile compounds known as hydrocarbons and thus require safety instructions for handling. The risks associated with using non-marijuana terpenes as additives in marijuana products are not accurately communicated via SDS, because the undiluted product (depicted on the SDS) will be reduced before consumption, up to 1000x by volume, to a concentration level that is substantially lower than the concentration level found in marijuana-derived terpene products. (those containing terpenes derived solely from marijuana) (referenced on page 7)

We ask that you review the following SDS for examples of hazards we encounter when handling marijuana and hemp-derived terpenes, distilled THC, and the oxygen we all breathe.

**Hemp/Marijuana Essential Oil** - https://www.neoils.com/wp-content/uploads/Hemp-SDS.pdf

**Pure Delta-9 THC** - https://www.sigmaaldrich.com/MSDS/MSDS/DisplayMSDSPage.do?country=US&language=en&productNumber=1651621&brand=USP&PageToGoToURL=https%3A%2F%2Fwww.sigmaaldrich.com%2Fcatalog%2Fproduct%2Fusp%2F1651621%3Flang%3Den

**Oxygen** - https://www.airgas.com/msds/001043.pdf

## Proposed Regulatory Language

As the State of Washington seeks to take action to protect its citizens, we believe the best solution to address the vaping crisis would be to issue a ruling similar to that made by the State of Colorado, which instead of prohibiting “characterizing flavors,” has moved to ban dangerous additives which are being exposed as likely causes. This moves to address the items that have been identified as dangers by the CDC, and which Washington’s current ban does nothing to address, using this language:

“Additive means any non-marijuana derived substance added to Regulated Marijuana to achieve a specific technical and/or functional purpose during processing, storage, or packaging. Additives may be direct or indirect. Direct additives are used to impart specific technological or functional qualities. Indirect additives are not intentionally added but may be present in trace amounts as a result of processing, packaging, shipping, or storage

Ingredient means any non-marijuana derived substance that is added to Regulated Marijuana to achieve a desired effect. The term Ingredient includes all Additives.

A Medical Marijuana Products Manufacturer or Retail Marijuana Products Manufacturer shall not include any Additive that is toxic within a Regulated Marijuana Product; nor include any Additive for the purposes of making the product more addictive, appealing to children,or misleading to patients or consumers.

Prohibited Ingredients. A Medical Marijuana Products Manufacturer or Retail Marijuana Products Manufacturer shall not use the following Ingredients in the production of Regulated Marijuana Concentrate and Regulated Marijuana Product for which the inhaled product is the intended use in accordance with Rule 3-1015:

1.Polyethylene glycol (PEG);
2.Vitamin E Acetate; and
3.Medium Chain Triglycerides (MCT Oil).

DMSO. The use of Dimethylsulfoxide (DMSO) in the production of Regulated Marijuana Product shall be prohibited and possession of DMSO upon the Licensed Premises is prohibited.” (1)

However, under the current WSLCB language, below, there is not clarity..

> "Characterizing flavor" means a distinguishable taste or aroma, or both, other than the taste or aroma of tobacco or marijuana or a taste or aroma derived from compounds or derivatives such as terpenes or terpenoids derived directly and solely from marijuana, as defined in RCW 69.50.101, or hemp plants that have been grown and tested as required by state law, imparted by a vapor product. Characterizing

> flavors include, but are not limited to, tastes or aromas relating to any fruit, chocolate, vanilla, honey, candy, cocoa, dessert, alcoholic beverage, menthol, mint, wintergreen, herb, or spice. A vapor product does not have a characterizing flavor solely because of the use of additives or flavorings. (2)

This language would appear to allow tobacco flavor or marijuana flavor or terpenes/terpenoids from marijuana or terpenes/terpenoids from hemp in any vapor product as they are defined as outside of the meaning of characterizing flavor. However, somehow the WSLCB saying that botanically-derived terpenes are not allowed, even if they may be used in such a way as to mimic the chemical composition and flavor of the marijuana plant exactly.(3) Using an example this interpretation is equivalent to saying **a** or **b** or **c** or **d** are allowed and then having that ruled to say only **c or d** are allowed. Also the board seems to have admitted that the flavors aren't directly linked to the health concerns, and as such how are cannabis flavors allowed to be regulated under an emergency ban?

Further would botanical terpenes utilized not for flavor, but rather to create a desired effect for a consumer such as uplifting or sociable be something that would be prohibited under this? What about the use of terpenes to alter the viscosity of cannabinoids for use in carts?

We would further seek to clarify that "taste or aroma of marijuana" be categorized separately from "taste or aroma derived from marijuana or hemp derived compounds only," as follows:

> "Characterizing flavor" means a distinguishable taste or aroma, or both, other than the taste or aroma of tobacco or marijuana, **regardless of the source of the compounds used to create the taste or aroma of tobacco or marijuana**, or a taste or aroma derived from compounds or derivatives such as terpenes or terpenoids derived directly and solely from marijuana, or hemp plants that have been grown and tested as required by state law, imparted by a vapor product. Characterizing flavors include, but are not limited to, tastes or aromas relating to any fruit, chocolate, vanilla, honey, candy, cocoa, dessert, alcoholic beverage, menthol, mint, wintergreen, herb, or spice. A vapor product does not have a characterizing flavor solely because of the use of additives or flavorings.

The WA ruling, made clear by our proposed insertion, would allow marijuana products to be modified with marijuana flavors, regardless of source and allows for any flavor that is extracted from legally compliant marijuana or hemp, while prohibiting any non-marijuana derived flavors which are perceived as "fruit, chocolate, vanilla, honey, candy, cocoa, dessert, alcoholic beverages, menthol, mint, wintergreen, herb, or spice."

As a point of clarification, "terpenes" and "terpenoids" are only a subset of the flavor and aroma compounds found in marijuana. Despite industry convention to use the term "terpenes" to refer to all marijuana flavor compounds, other molecules, such as esters, aldehydes, sulfur-compounds, etc. are also naturally present in marijuana plants, and contribute to their flavor and aroma. Regardless of their source (marijuana-derived or non-marijuana-derived), these naturally present flavor compounds should be allowed as additives in manufactured

products when: (i) contributing to a marijuana or tobacco flavor; and (ii) properly disclosed to the consumer via heightened labeling requirements.

## Synthetic and Natural Compounds

Non-Marijuana and marijuana-derived terpenes are identical substances when compared as apples to apples. Limonene, Myrcene, Beta-Caryophyllene, and any of the 100+ terpene and terpenoid compounds naturally found in marijuana are extracted using the same methods from other plant sources, such as oranges, hops, and black pepper. As such, the idea that non-marijuana derived terpenes are less safe than marijuana-derived is plainly false and contrary to science.

Marijuana is not a plant set apart, but another botanical source from which terpenes can be extracted and purified. As confirmed in the studies provided below, terpenes are found in marijuana, lavender and nearly every other aromatic plant on earth. (4)(5)

Current testing requirements mandated by the WSLCB cannot differentiate limonene derived from marijuana from limonene derived from oranges. It also cannot differentiate synthetic or artificial limonene from its natural counterpart. Synthetic and artificial terpenes are considered the same, with the only distinction being the use of "natural" or "artificial" ingredients on the product label, just as the state of Washington has done with its labeling requirements.

By prohibiting non-marijuana derived terpenes, the WSLCB and the Washington Health Board have inadvertently created a situation that stifles lawful business activities, while others look for new loopholes and means of exploiting these regulations. For example, there are no testing requirements on hemp-derived terpenes which are allowed.

Furthermore, as evidenced in other manufacturing based industries, the enforcement of compliant business practices and standards such as ISO 9001:2015, and FSSC22000, and manufacturing following cGMP, does more to protect consumers from harmful products than prohibitive regulation without realistic oversight. Because non-marijuana terpenes cannot be identified with current practices, deciding upon a standard for the inclusion of these products and creating a system for communicating product contents to the consumer is the best way forward.

## Use of Non-Marijuana Terpenes

Non-Marijuana derived terpenes are used in a variety of applications, including vaping, to replicate the natural flavor of marijuana. Marijuana shares aromas with wet earth, wood, flowers, pine, tea, fuel, cheese, pepper, tobacco, and sage, among others.

Non-marijuana terpenes are not responsible for the flavors of fruit, chocolate, vanilla, honey, candy, cocoa, dessert, alcoholic beverages, mint, or wintergreen; these flavors are formulated using mixtures, which include esters, aldehydes, ketones, lactones, and other molecules.

When products are formulated using non-marijana terpenes, responsible manufacturers seek to replicate the ratios naturally found in the marijuana plant. From analysis, it is found that, on average, marijuana is comprised of terpenes in a range between 1-5% by dry weight, with some exceptional samples exceeding 5%.

**A Typical Use Case Example:**
Licensed product manufacturer "Canna. Co." uses THC distillate in the manufacturing of its products. After testing its THC at an accredited lab for contaminants and purity, it warms the THC distillate to a temperature at which it becomes fluid (around 100 degrees fahrenheit) and then adds non-marijuana terpenes to the warmed THC (usually about 5% by weight). This solution is then mixed thoroughly to a point that it is homogenous, and is then used as an ingredient in the manufacturing of a variety of THC infused products.

These final products will be tested again by an accredited lab for contamination before being cleared for sale to wholesale distributors or retail shops. The accredited lab is unable to determine if the terpenes it detected in the infused products are non-marijuana derived or marijuana derived. That final product, at a maximum of 5% total terpenes by weight, is not likely to be the highest concentration terpene product on the retail shelf or in the typical wholesaler's portfolio.

**A New Focus:**
Because non-marijuana and marijuana-derived terpenes are chemically identical, their source should not be the focus of conversation, but their concentration should be.

There are currently marijuana products for sale in Washington in the form of 'dabs' or 'cartridges,' which contain upwards of 20% marijuana-derived terpenes by volume. These terpene-rich products are commonly known as 'sauce', 'diamonds,' or 'live resin' and they carry the exact same hazards as non-marijuana derived terpenes. Thus, they should not be permitted to stand as a safer alternative than products with non-marijuana terpenes. Given the foregoing, we propose that a concentration limit for all terpenes, including marijuana and hemp derived, and other additives be enacted.

## Composition of Marijuana Extract Products

Marijuana extracts have a different chemical composition when compared to the source material (marijuana flower) that they were extracted from. A great example of this may be found in a study performed by Dr. Michelle Sexton, below. (6)

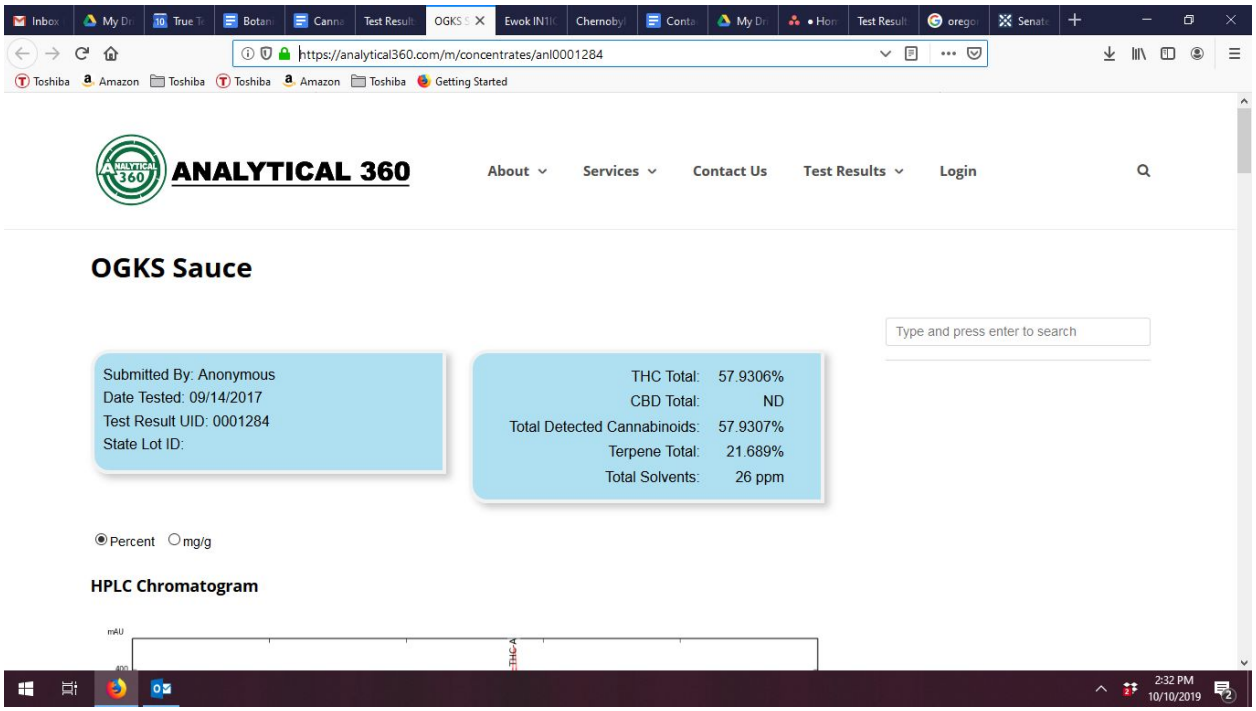
The following table illustrates the average ratio of cannabinoids to terpenes in flower, CO2 extract, butane extract, and THC distillate with non-marijuana terpenes at an added range of 1 to 10% by volume. What you'll notice first is that marijuana extracts have a higher terpene volume than marijuana flower. Further, when used at rates of 1-10% per gram non-marijuana terpenes have a much lower exposure rate than other marijuana extracts per serving. These distillate products typically exceed 90% total cannabinoids, and when used in combination with non-marijuana terpenes, creates a final product with less waxes, fats and other compounds to be inhaled than butane extracts or marijuana flower.

| **Averages** | **Marijuana Flower** | **CO2 Extract** | **Butane Extract** | **THC Distillate with non-marijuana Terpenes** |
|---|---|---|---|---|
| Cannabinoid to Terpene Ratio | 3:1 to 12:1 | 14:1 | 3:1 to 20:1 | 9:1 to 45:1 |
| Terpene % or product weight & MG / ML or G | Average 1-5% or 10-50 mg/g | Averages 5-15% or 50-150 mg/g | Averages 5-22% or 50-220 mg/g | Averages 1-10% or 10-100 mg/g |
| Terpene MG / Dose Assuming 150 draws on a cartridge or 20 servings in a gram dab | 0.067 mg-0.33 mg of terpenes/ vape draw<br><br>0.5 mg-2.5 mg of terpenes/inhalation/ dab | 0.33 mg-1 mg of terpenes/vape draw<br><br>2.5 mg-7.5 mg of terpenes/dab | 0.33 mg-1.46 mg of terpenes/ vape draw<br><br>2.5 mg-11 mg of terpenes/dab | 0.067 mg-0.67 mg of terpenes/vape draw<br><br>0.5 mg-5 mg of terpenes/dab |

## COAs of Marijuana Extracts and Flower

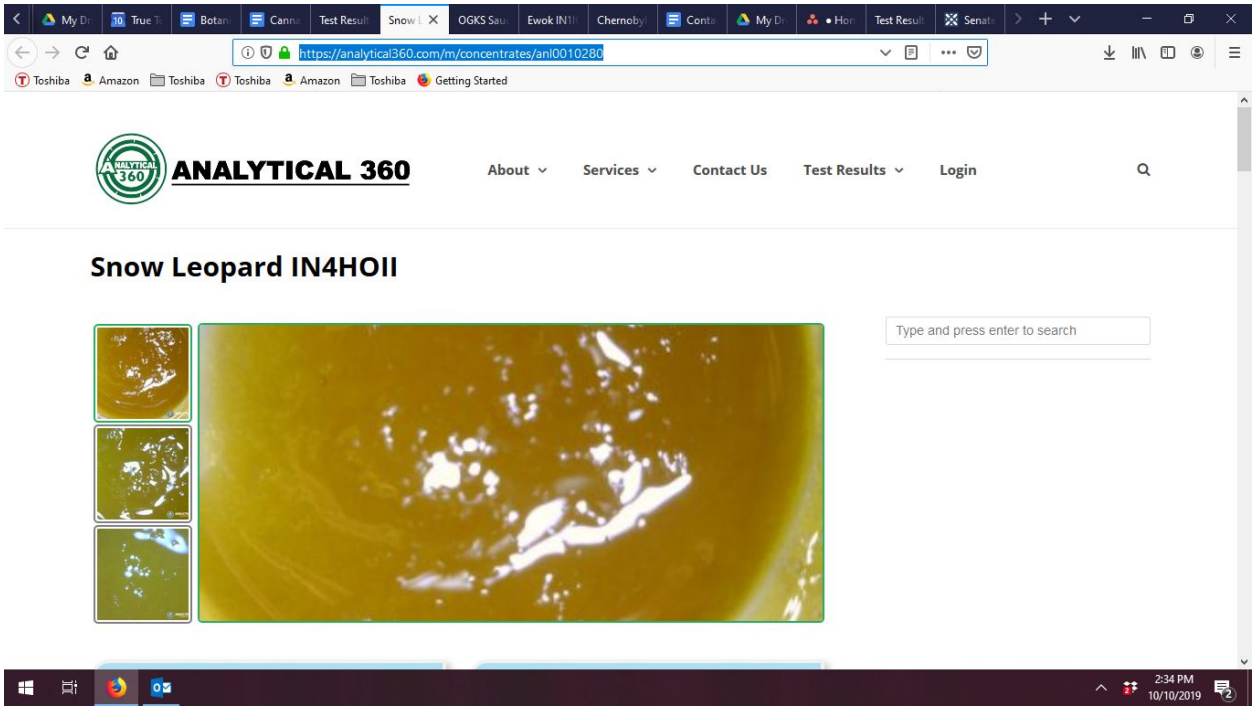
OGKS Sauce - 57.9% cannabinoids and 21.69% terpenes for a 2.67:1 ratio

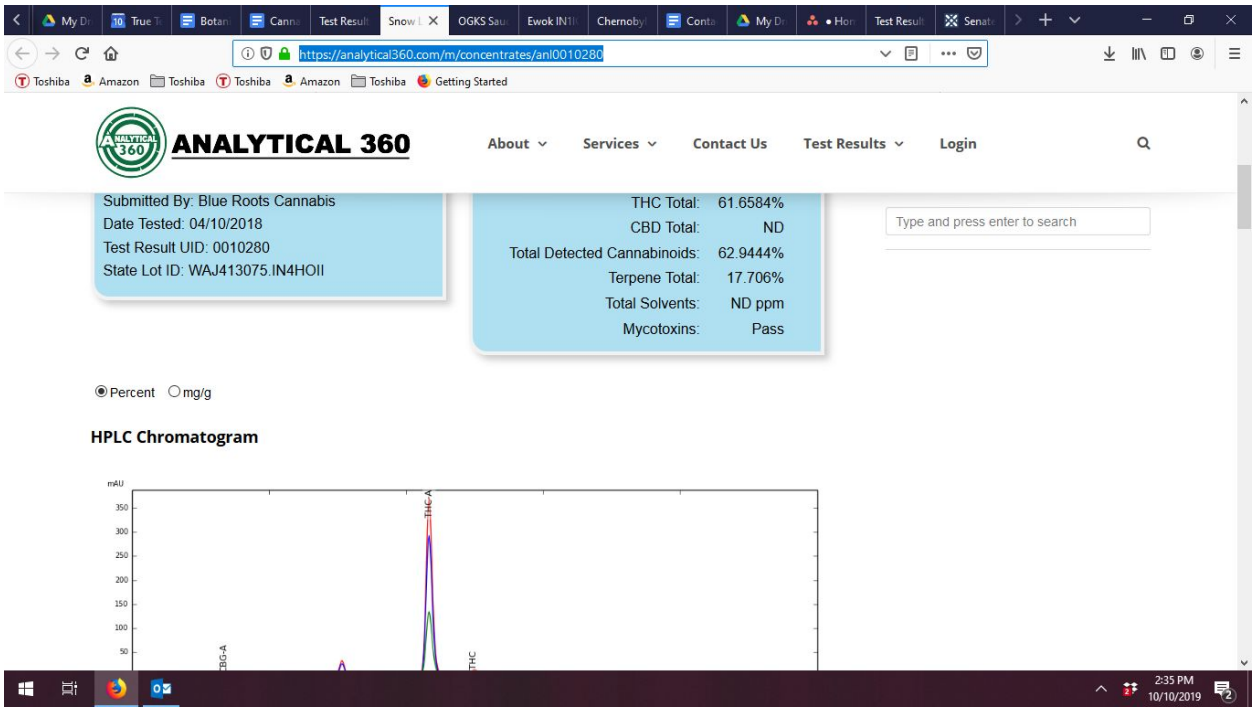
https://analytical360.com/m/concentrates/anl0001284



Snow Leopard Extract - 62.94% cannabinoids and 17.7% terpenes for a 3.55:1 ratio

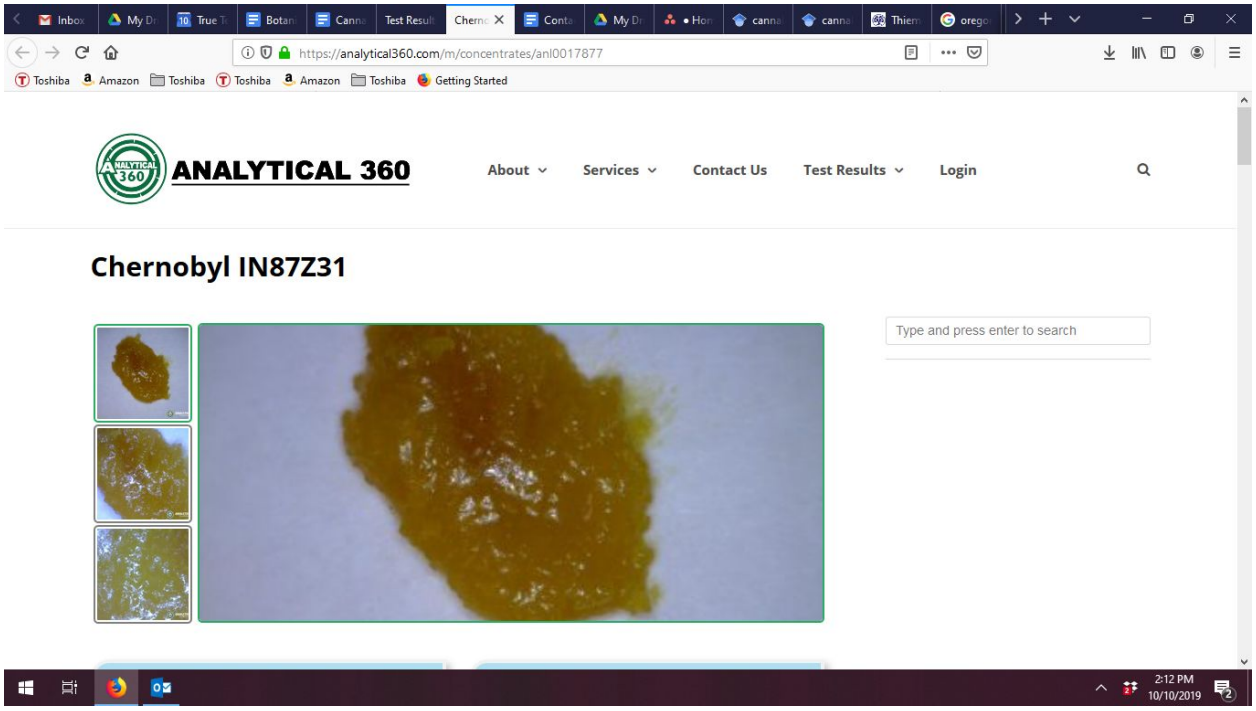
https://analytical360.com/m/314855

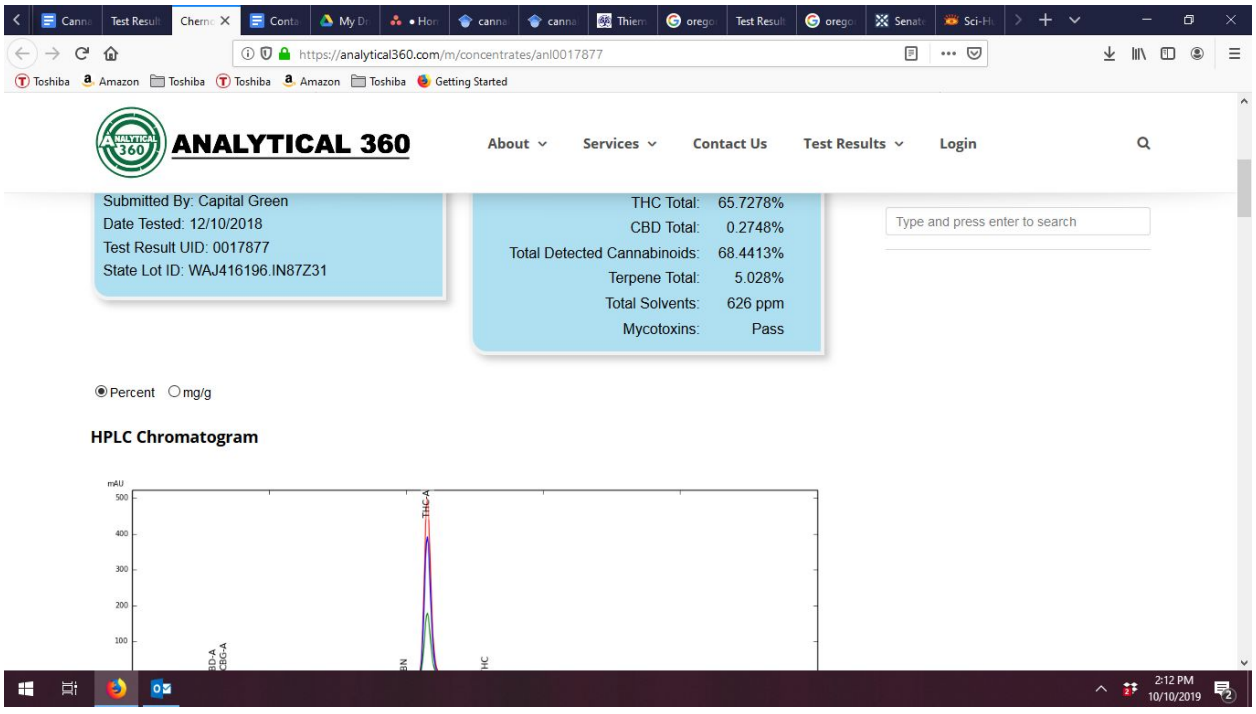


Chernobyl Butane Extract testing - 68.44% cannabinoids and 5% terpenes for a 13:1 ratio

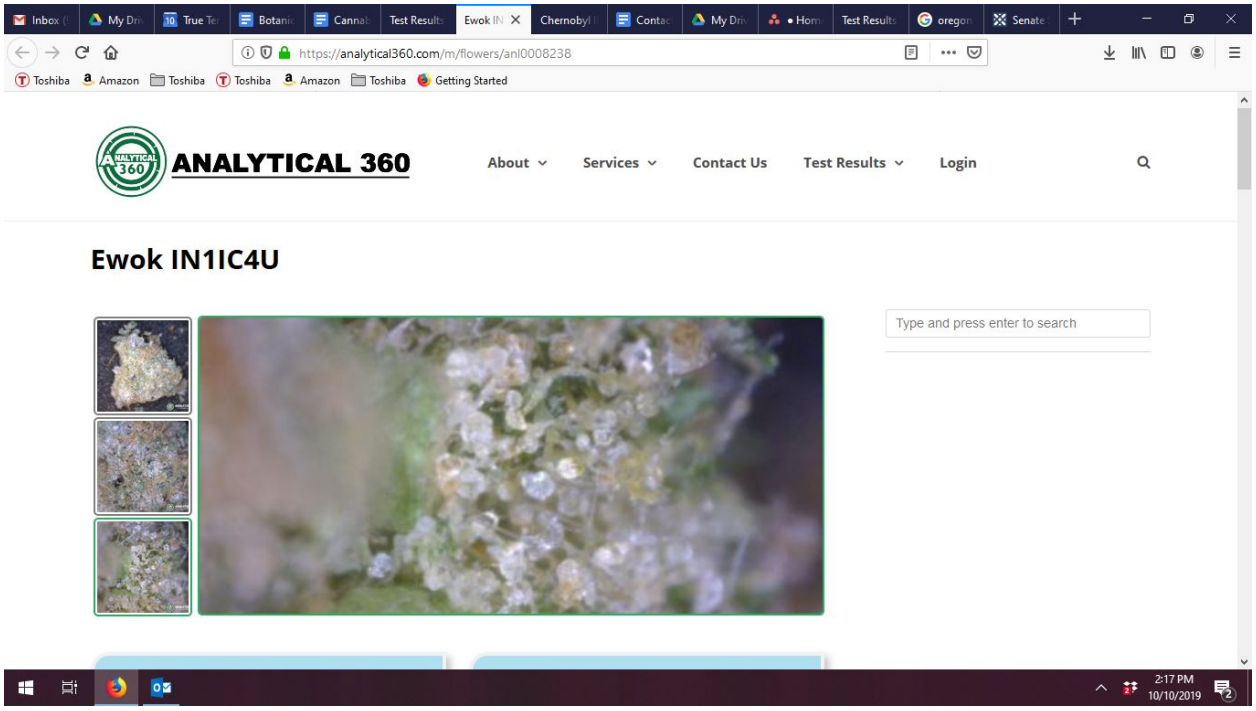
https://analytical360.com/m/concentrates/anl0017877

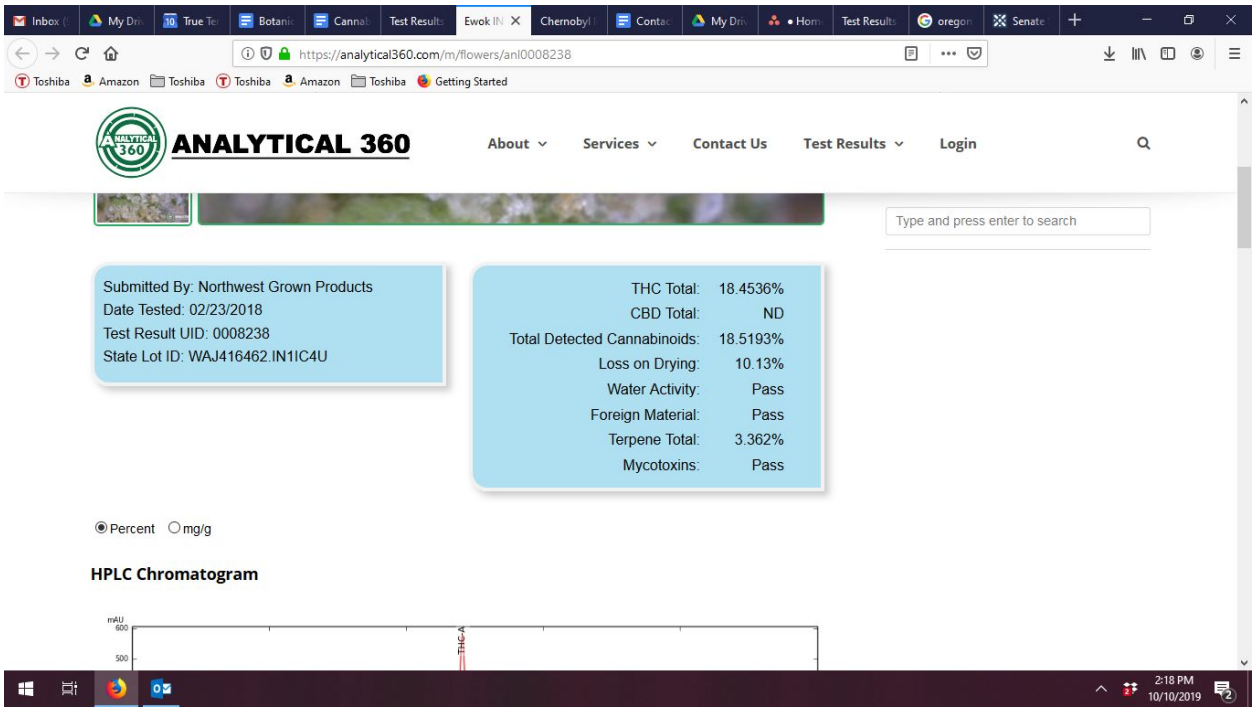


Ewok Flower testing: 18.5% cannabinoids and 3.36% terpenes for a ratio of 6:1

https://analytical360.com/m/flowers/anl0008238



## Other factors to consider for VAPI

1. The CDC states that, of the products containing tetrahydrocannabinol (THC) that resulted in illness, “89% were primarily acquired from informal sources (e.g., friends, family members, illicit dealers, or off the street).” (7)

    a. Meaning nearly 90% of cases were caused by products not originating from regulated businesses.

    b. We are extremely concerned that banning regulated products will drive consumers to the unsafe, unregulated illicit market, where flavored products will flourish, thus creating a greater risk to public safety than the increased regulation proposed herein.

2. This week a new contaminate theory involving heavy metals became a major concern when Colorado laboratory ‘Colorado Green Lab’ identified cadmium poisoning or “Metal Fume Fever” as a possible cause for the nationwide variable health crisis.(8)

    a. Limiting what additives are allowed in marijuana products will do nothing to address this issue which affects all products which contain both marijuana and non-marijuana ingredients.

## Evidence of Terpene Safety - A history of cannabis and it's extracts -

Humankind has a long history with the cannabis plant that dates back thousands of years. While there have been hemp cloth remnants found from 8,000 BC, it was only this year that archaeologists discovered what is believed to be the oldest evidence of THC and terpene inhalation and smoking. Archaeologists discovered braziers and wooden remnants with cannabis and THC residue at a site in China that was dated to 500 BC, from over 2,500 years ago. (9)

Following prohibition the modern era of cannabis extracts dates to 1973 and and has just passed its 35 aniversary. Since its origin the potency of cannabinoids and essential oils in cannabis extracts has steadily increased, becoming more and more concentrated and pure over the years.

Because all terpenes are equal, the combined traditional and recent 35 year history should serve as evidence enough that cannabis extracts with an average amount of terpenes present is relatively safe to inhale. There is nothing to fear from the addition of botanical terpenes which have been shown to be free from contaminants.

Further a recent paper compared the hazard index and cancer risk of smoking cannabis flower to vaporization of THC with added terpenes and found a 10 to 100-fold decrease in the hazard and cancer risks from the vaporized THC and terpene product compared to smoking. (10)

FDA guidance and the system surrounding food and supplements is the standard by which these types of product regulations are made. However if you review the The Dietary Supplement Health and Education Act of 1994 or Food, Drug and Cosmetic Act you'll notice that there are in both and related legislature repeated exemptions for grandfathering in commonly used compounds prior to the enactment as they're deemed likely to be safe.

While many new additives such as vitamin e acetate and items like pesticides or heavy metals are likely a danger, terpenes either from the cannabis plant, or botanical sources have been used in Washington's medical cannabis system and now recreational since its inception. If these botanically-derived terpenes were causing the variety of health complications that are being seen in the US then we would have seen an epidemic 5 to 10 years ago, not now.

Should the state not choose to govern these two products (botanical and cannabis-derived terpenes) equally it will have unfairly handed down a judgement that it should levey on all chocolate, MCT, Flour, and other additives which originate outside of the WSLCB closed loop system and are found in regulated cannabis products

For the History of Extracts visit Citation #11

**Solution**

**Our solution is that exempted terpene suppliers must:**

Be 3rd party certified with the ODA as a food manufacturer, FDA registered, GMP, ISO 9001:2015, FSSC2200

Test products for Solvents, Pesticides, and Heavy Metals in an accredited lab. Must be able to demonstrate that this lab is ISO accredited and that all contaminants are below action limits.

Offer trade secret formulas to the State for reference

Label products distinctly with “Natural and Artificial Flavor” for non-marijuana terpenes.

Limit concentration of all additives to less than 10%.

All vaporizer products should have an inhalation warning stating that vaporizing is not proven to be better for your health than smoking.

Should not supply licensed manufacturers with flavors defined as “Characterizing Flavors”

## Conclusion

There are enormous repercussions to hasty regulatory action and when it comes to regulating marijuana products, science should be the driver of public policy.

As the evidence provided shows, terpenes and terpenoids that are derived directly and solely from the marijuana plant are no different on a molecular level than non-marijuana derived terpenes from hops, oranges, or other natural sources; it is arbitrary and irrational to take action against one and not the other.

Short of suggesting that all vape products be banned (a determination that would be premature in light of the lack of available information), we submit that the State of Washington still lacks a basis to ban marijuana flavoring based upon the factual information presented by the CDC, FDA, academic authorities, private organizations, and various state governments.

Banning “flavored vapor products” when none have been identified as the cause of illness has the very real potential of instilling a false sense of safety about other products and manufacturing processes. Until the exact causes of the recent vape illnesses have been determined, we urge Washington State lawmakers to consider the evidence herein before making blanket policy changes that stand to disrupt one of the most thoughtful and organized cannabis regulatory schemes in the country.

Given the apparent demand for vapor products, to do otherwise would fuel the illicit market while side-stepping the undetermined cause(s) of illness. We suggest that a more prudent response would be to strengthen the regulation of marijuana vapor products, and require suppliers of additives and hardware to be 3rd party certified for cGMP (Good Manufacturing Practices), ISO 9001:2015 (Quality Control Management System), and FSSC22000 (Food Safety Management System). Such heightened manufacturing requirements, together with the proposed labeling requirements set forth above,will effectively ensure that the ingredients in, and devices used, for vapor products are safer than those produced under the proposed regulations, regardless as to whether the contents are marijuana or non-marijuana derived.

Thank you for your time and consideration, we understand and appreciate the importance of smart, thoughtful regulation and the role each reader of this document will play in protecting the safety of Washington’s marijuana consumers.

Respectfully Submitted,

David Heldreth
Chief Science Officer
True Terpenes
(888)954-8550

## Citations

(1) https://ewscripps.brightspotcdn.com/47/ce/8be5b8854b19a7741f1f061916f5/191007-master-marijuana-rules-212-3-for-public-release-1.pdf

(2) https://sboh.wa.gov/Portals/7/Doc/Tab08h-EmergencyRuleVaporFlavors-Final_.pdf

(3) https://lcb.wa.gov/vape/vapor-and-public-health

(4) https://pubs.acs.org/doi/abs/10.1021/jf00054a045

(5) https://www.longdom.org/open-access/cannabinoids-and-terpenes-as-chemotaxonomic-markers-in-cannabis-2329-6836-1000181.pdf

(6) https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0043-119361 - Michelle Sexton, Evaluation of Cannabinoid and Terpenoid Content: Cannabis Flower Compared to Supercritical $CO_2$ Concentrate - covers cannabinoids/terps/ketones/ethers etc

(7) https://www.cdc.gov/mmwr/volumes/68/wr/pdfs/mm6839-H.pdf

(8)https://www.wweek.com/news/state/2019/10/07/colorado-lab-results-point-to-new-culprit-in-vaping-cases-a-specific-chemical-used-in-cheap-vape-pens/

(9)https://www.nationalgeographic.com/culture/2019/06/earliest-evidence-cannabis-marijuana-smoking-china-tombs/

(10)https://pubs.acs.org/doi/abs/10.1021/acsomega.9b02301

(11)https://www.leafly.com/news/cannabis-101/where-did-cannabis-dabs-come-from

**Definitions**:

Terpene: An aromatic compound derived from any botanical source, including Hemp or cannabis with the chemical formula $C_{10}H_{16}$ Or $C_{15}H_{24}$..

Monoterpene: $C_{10}H_{16}$

Sesquiterpene: $C_{15}H_{24}$

Characterizing flavor: means a distinguishable taste or aroma, or both, other than the taste or aroma of tobacco or marijuana, regardless of the source of the compounds used to create the taste or aroma of tobacco or marijuana, or a taste or aroma derived from compounds or derivatives such as terpenes or terpenoids derived directly and solely from marijuana, or hemp plants that have been grown and tested as required by state law, imparted by a vapor product. Characterizing flavors include, but are not limited to, tastes or aromas relating to any fruit, chocolate, vanilla, honey, candy, cocoa, dessert, alcoholic beverage, menthol, mint, wintergreen, herb, or spice. A vapor product does not have a characterizing flavor solely because of the use of additives or flavorings.

## Hemp Essential oil (Terpenes) SDS



# SAFETY DATA SHEET

In accordance with REACH Regulation EC No.1907/2006

**Product:** Hemp Oil HP

**Version:** 5

## Section 1. Identification of the substance or the mixture and of the supplier

### 1.1 Product Identifier

**Product identifier:** Cannabis sativa; CAS: 89958-21-4
**Other identifiers:** Hemp Essential Oil

### 1.2 Relevant identified uses of the substance of mixture and uses advised against

**Product uses:** Fragrances

### 1.3 Details of the supplier of the safety data sheet

**Company name:** Norfolk Essential Oils
**Company address:** Pates Farm
Wisbech Road
Tipsend
Welney
Wisbech
PE14 9SQ
**Contact:** Regulatory Affairs
**E-Mail address:** info@neoils.com
**Company phone:** 01354 638065

### 1.4 Emergency telephone number

**Emergency phone:** 01354 638065

## Section 2. Hazards identification

### 2.1 Classification of the substance or mixture

**Classification under Regulation (EC) No 1272/2008**

**Class and category of danger:**
Flammable Liquid, Hazard Category 3
Skin Corrosion / Irritation Category 2
Eye Damage / Irritation Category 2
Sensitization - Skin Category 1
Aspiration Hazard Category 1
Hazardous to the Aquatic Environment - Long-term Hazard Category 2
H226, Flammable liquid and vapour.
H304, May be fatal if swallowed and enters airways.
H315, Causes skin irritation.
H317, May cause an allergic skin reaction.
H319, Causes serious eye irritation.
H411, Toxic to aquatic life with long lasting effects.
H412, Harmful to aquatic life with long lasting effects.

**THC SDS**

# SIGMA-ALDRICH

sigma-aldrich.com

## SAFETY DATA SHEET

Version 5.2
Revision Date 03/12/2018
Print Date 10/11/2019

### 1. PRODUCT AND COMPANY IDENTIFICATION

**1.1 Product identifiers**

Product name : DELTA-9-TETRAHYDROCANNABINOL, UNITED STATES PHARMACOPEIA (USP) REFERENCE STANDARD

Product Number : 1651621
Brand : USP

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Identified uses : Laboratory chemicals, Synthesis of substances

**1.3 Details of the supplier of the safety data sheet**

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

**1.4 Emergency telephone number**

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

### 2. HAZARDS IDENTIFICATION

**2.1 Classification of the substance or mixture**

**GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**
Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - single exposure (Category 1), Eyes, H370

For the full text of the H-Statements mentioned in this Section, see Section 16.

**2.2 GHS Label elements, including precautionary statements**

Pictogram

Signal word Danger

Hazard statement(s)

| | |
|---|---|
| H225 | Highly flammable liquid and vapour. |
| H301 + H311 + H331 | Toxic if swallowed, in contact with skin or if inhaled. |
| H361 | Suspected of damaging fertility or the unborn child. |
| H370 | Causes damage to organs (Eyes). |

Precautionary statement(s)

| | |
|---|---|
| P201 | Obtain special instructions before use. |
| P202 | Do not handle until all safety precautions have been read and |

**Oxygen SDS**

*Oxygen*

## Section 3. Composition/information on ingredients

**Substance/mixture** : Substance

**Chemical name** : oxygen

**Other means of identification** : Molecular oxygen; Oxygen molecule; Pure oxygen; O2; UN 1072; Dioxygen; Oxygen USP, Aviator's Breathing Oxygen (ABO)

**Product code** : 001043

**CAS number/other identifiers**

**CAS number** : 7782-44-7

| Ingredient name | % | CAS number |
|---|---|---|
| oxygen | 100 | 7782-44-7 |

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

**There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.**

**Occupational exposure limits, if available, are listed in Section 8.**

## Section 4. First aid measures

**Description of necessary first aid measures**

**Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

**Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

**Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

**Ingestion** : As this product is a gas, refer to the inhalation section.

**Most important symptoms/effects, acute and delayed**

**Potential acute health effects**

**Eye contact** : Contact with rapidly expanding gas may cause burns or frostbite.

**Inhalation** : No known significant effects or critical hazards.

**Skin contact** : Contact with rapidly expanding gas may cause burns or frostbite.

**Frostbite** : Try to warm up the frozen tissues and seek medical attention.

**Ingestion** : As this product is a gas, refer to the inhalation section.

**Over-exposure signs/symptoms**

**Eye contact** : No specific data.

**Inhalation** : No specific data.

**Skin contact** : No specific data.

**Ingestion** : No specific data.

**Indication of immediate medical attention and special treatment needed, if necessary**

**Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

**Specific treatments** : No specific treatment.