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Standard Guide for Cannabis/Hemp Extract Vaporizers[1]

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1. Scope

1.1 This guide is intended to define characteristics, functions, and technologies commonly present in cannabis/hemp extract vaporizers.

1.2 This guide shall apply to vaporizers used to incorporate the extracts of a cannabis plant regardless of the type of cannabis plant from which they where derived. For the sake of brevity, the term "cannabis" shall be used from now on to refer to any type of cannabis plant (cannabis/hemp).

1.3 This guide will provide clarity to the industry, government, consumers, and the public as way to understand what different features and technologies are present in cannabis extract vaporizers.

1.4 This guide shall be used in conjunction with Classification D8376.

1.5 For the purposes of this guide, the terms *concentrate* and *extract* are interchangeable in the context of source material being consumed. Concentrate and extract are two different products consumed in the same way.

1.6 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D8270 Terminology Relating to Cannabis

D8376 Classification for Cannabis/Hemp Extract Vaporizers

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this classification, refer to Terminology D8270 and the terms developed by Subcommittee D37.91 on Terminology.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *atomizer, n*—any device that transforms a substance by means of heating into vapour.

3.2.1.1 *Discussion*—The term *atomizer* in the vaping world is the component of the device responsible for heating up the substance to vapour. The word *atomizer* is also commonly used to reference the heating coils of any cartridge, the part that is responsible for vaporizing liquid.

3.2.2 *carb cap, n*—a term used to define a cover that is placed over the heated extract to enhance the vapour production.

3.2.3 *cartridge, n*—a container or receptacle used for storage of cannabis extracts, that typically contains an atomizer within and is intended to be single use or replaceable.

3.2.4 *chamber, n*—any vessel/receptacle where the user loads material directly into/onto the vaporization mechanism prior to inhalation.

3.2.5 *container, n*—a receptacle for holding product.

3.2.6 *dab, n*—a small amount of cannabis extract material.

3.2.6.1 *Discussion*—The dab volume used in the dab rig is non precise and is user dependent.

3.2.7 *dab nail, n*—a specifically designed chamber for cannabis extracts used in refillable vaporizers.

3.2.7.1 *Discussion*—Dab nails are commonly used in dab rigs.

[1] This guide is under the jurisdiction of ASTM Committee D37 on Cannabis and is the direct responsibility of Subcommittee D37.08 on Cannabis Devices and Appliances.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.2.8 *dab rig, n*—a common term for a refillable cannabis extract vaporizer.

3.2.9 *dab tool, n*—a tool used to place a dab into a refillable cannabis extract vaporizer.

3.2.10 *dose insert, n*—a precise amount of cannabis extract that is contained within a holder.

3.2.10.1 *Discussion*—A holder may be manufactured from various substrates such as glass, quartz, flexible materials, or organic compounds.

3.2.11 *threaded cartridge, n*—a type of cartridge whose connection method to a battery is by means of a threaded system.

3.2.11.1 *Discussion*—Threaded cartridges may come in various threaded pitches. Some examples are 510, 512 and 710. The number refers to "X" threads at "Y" millimetres per thread type threading that is used to screw the bottom of the cartridge to an appropriate threaded vape battery.

3.2.11.2 *Discussion*—510 threaded cartridge is the most common type of vaporizer cartridge and has been adopted and commonly called "universal." Following convention, 510 refers to 10 threads at 0.5 mm per thread.

3.2.11.3 *Discussion*—Adapters exist to allow threaded cartridge types to work with magnetic batteries and vice versa.

3.2.12 *pod, n*—a type of container style, explicitly designed for use with liquids of varying viscosities, typically proprietary, that attaches by means of magnetic connection to an appropriate magnetic vape battery.

3.2.13 *power source, n*—an internal or external source that powers onboard systems.

3.2.13.1 *Discussion*—The power source can be activated directly through an internal source, for example, rechargeable battery or an external source, for example, AC power plug directly connected to a wall outlet.

3.3 *Abbreviated Terms — Acronyms and Initialisms:*

3.3.1 *AC*—alternating current or voltage

3.3.2 *XLR*—external line return

4. Significance and Use

4.1 This guide is intended to educate new and experienced users of cannabis extract vaporizers on the various characteristics that can be available in cannabis extract vaporizers.

4.2 This guide will outline characteristics of cannabis extract vaporizers, which includes individual components, design elements, and basic universal functions.

4.3 This guide will categorize common characteristics using categories based on different technologies and describe in simple terms the details attributable to each category, but is not intended to be all inclusive.

4.4 This standard will serve to provide clarity to industry, government, and the public on terminology and universal functions of cannabis extract vaporizers.

4.5 Reference to a type characteristic in this guide is not intended in any manner to denote endorsement or approval of said type by ASTM International.

5. Characteristics

5.1 The various characteristics of cannabis extract vaporizers appear in Table 1.

5.2 *Characteristic — I Configuration:*

5.2.1 *a. Handheld*—Handheld cannabis extract vaporizers are used for the personal consumption of cannabis extract by inhalation. This configuration can include an onboard precharged or rechargeable battery cell to power the device. For a rechargeable cell, an external plug in power source is used to charge the onboard battery. Additionally, these devices include an air intake path channel from the external atmosphere, leading to the chamber or cartridge that includes a heating coil or atomizer. The atomizer heats the extract material to vapour. The vapour then flows to a mouthpiece and is inhaled into the lungs.

5.2.2 *b. Desktop*—Desktop cannabis extract vaporizers are typically designed to rest on a stable horizontal surface while in use for the personal or social consumption of cannabis extract by inhalation. This configuration can include various devices such as a vapour tap, integrated self-contained dab rigs, or the traditional e-nail arrangement. Integrated dab rigs contain a rechargeable battery cell for onboard heating the dab nail and constant and controlled temperature adjustment. The traditional e-nail typically includes a series of separate components, namely a controller box with temperature settings and an AC power plug which requires an alternate source of energy to power the device. Additionally, this device includes a cable with a heating coil on one end and XLR[3] connector on the other end. The heating coil is then attached to the dab nail and the XLR connector is attached to the controller box. The dab nail is then attached to a dab rig (a waterpipe). In both

[3] Wikipedia. 2021. "XLR connector." Last modified February 1, 2021. https://en.wikipedia.org/wiki/XLR_connector.

TABLE 1 Characteristics of Cannabis Extract Vaporizers

Characteristics	Categories				
I. Configuration	a. Handheld	b. Desktop	c. Universal		
II. Extract Container	a. Prefilled Container	b. Refillable Container			
III. Temperature/Wattage Settings	a. Precise Control	b. Rough Control	c. Hybrid Control	d. Without Temperature/ Wattage Control	
IV. Information Readout	a. Digital Readout	b. Analogue Readout	c. Haptics	d. No Information Readout	
V. Design Intent	a. Built for Purpose	b. Adaptive			
VI. Heating Contact Material	a. Single Material	b. Combination of Materials			
VII. Activation Method	a. Manual	b. Digital	c. Sequence	d. Inhalation	
VIII. Heating Type	a. Conduction	b. Convection	c. Induction	d. Radiant	e. Combination

instances, cannabis extract is placed in the dab nail chamber with a dab tool and covered with a carb cap. The carb cap contains a small air orifice from the external atmosphere that allows air to flow over the cannabis extract. Cannabis extract is heated, and vapour is produced, air is drawn through the dab rig mouthpiece by user and the dab rig draw hole allows the vapour produced to flow into a dab rig holding chamber. This vapour is then consumed through the user's mouth into the lungs through inhalation.

5.2.3 *c. Universal*—These devices are typically designed to be used for the personal consumption of cannabis extract by inhalation. These may be cartridges or pods that include a heating coil or atomizer. A power source is required to activate the atomizer to heat the extract material to vapour. The vapour then flows to a mouthpiece and is inhaled into the lungs.

5.3 *Characteristic — II Extract Container:*

5.3.1 *a. Prefilled Container*—A container that is designed to house a specific amount cannabis extract meant for inhalation. The container typically houses an atomizer and mouthpiece. These containers are commonly known as cartridges or pods. These cartridges or pods are prefilled by a manufacturer with cannabis extract. The cartridges or pods are used in conjunction with a rechargeable battery cell and an activation method. Together these components create a complete vaporizer. Once the cannabis extract is fully consumed the cartridge or pod is discarded.

5.3.2 *b. Refillable Container*—A container that allows the user to consistently replenish the contents in the integrated chamber or a refillable container. These configurations are typically used in conjunction with a power source and an activation method. Together these components create a complete vaporizer.

5.4 *Characteristic — III Temperature/Wattage Settings:*

5.4.1 *a. Precise Control*—A vaporizer with exact control of the temperature or wattage of the device. Typically, the device allows the user to set the temperature to the degree Celsius or Fahrenheit and the wattage to the Watt.

5.4.2 *b. Rough Control*—A vaporizer with selectable factory set temperature or wattage settings. Typically, the device allows the user to select a single setting from three or more options.

5.4.3 *c. Hybrid Control*—A vaporizer that may possess both precise control and rough control. Such vaporizer may provide precise control through external application connectivity, but also have rough control with pre-set wattages/temperatures by means of manual activation method.

5.4.4 *d. Without Temperature/Wattage Control*—A vaporizer without any temperature or wattage setting options. The device turns on to the one factory set temperature or wattage.

5.5 *Characteristic — IV Information Readout:*

5.5.1 *a. Digital Readout*—A vaporizer with an electronic display that provides the user with control or visual cues to temperature or device-specific options, or both. This includes vaporizers controlled through wireless communications, such as Bluetooth[4] through a smart device application.

5.5.2 *b. Analog Readout*—A vaporizer with a visual identifier indicating a setting. This could include numbers inscribed on a panel, a flashing coloured light, or any type of analog identifier.

5.5.3 *c. Haptics*—A vaporizer with response identifiers that provide the user with cues to temperature or device-specific options, or both. This response is possible through tactile or motion sensor technology. Haptic identifiers can result in vibrations, or other motion feedback responses to the user.

5.5.4 *d. No Information Readout*—A vaporizer without any visual display of settings.

5.6 *Characteristic — V Design Intent:*

5.6.1 *a. Built for Purpose*—A vaporizer solely designed, manufactured, and intended for use with a single type of input. In this instance, the input is cannabis extract or concentrate meant for inhalation.

5.6.2 *b. Adaptive*—A vaporizer designed, manufactured, and intended for use with multiple types of inputs. In this instance, inputs could include both cannabis extract meant for inhalation or other type of cannabis meant for inhalation, such as a rosin.

5.7 *Characteristic — VI Heating Contact Material:*

5.7.1 *a. Single Material*—A heating contact material made from a single material. Examples commonly used are cotton wick, ceramic cell, quartz, glass, stainless steel, titanium, or aluminium

5.7.2 *b. Combination of Materials*—A heating contact made from a combination of materials, such as ceramic-coated steel.

5.8 *Characteristic — VII Activation Method:*

5.8.1 *a. Manual*—A vaporizer that activates from the physical engagement of a feature on the device. An example of a manual activation method is a button on the device which actives when pressed.

5.8.2 *b. Digital*—A vaporizer that activates by means of an electronic signal from another device or an onboard signal. Examples of digital activation methods are: activation by means of cellular phone over Bluetooth or Near-Field Communication (NFC), biometric print reader onboard, or facial recognition over another device, for example, a laptop computer.

5.8.3 *c. Sequence*—A vaporizer that requires multiple or a combination of actions to activate or turn on the device. Examples of sequence activation methods are: a user pressing two buttons simultaneously, or holding a button while inhaling.

5.8.4 *d. Inhalation*—A vaporizer that activates or turns on by means of air sensor detection when the user draws vapour through the mouthpiece.

5.9 *Characteristic — VIII Heating Type:*

5.9.1 *a. Conduction*—A vaporizer that heats the cannabis extract through direct contact with a heat source. Typically, these devices consist of an electronic heating element that is in direct contact with the cannabis extract meant for vaporization and inhalation. The heating element permits decarboxylation of cannabinoids, generating a vapour that is pulled by means of a mouthpiece. The user draws on the mouthpiece allowing the vapour to flow to the user's lungs.

5.9.2 *b. Convection*—A vaporizer that heats the cannabis extract with hot air. Typically, this configuration utilizes

[4] A trademark of Bluetooth SIG, Inc., in Kirkland, WA.