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Standard Guide for Personal Cannabis/Hemp Plant Growing Appliances[1]

This standard is issued under the fixed designation D8374; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide is intended to define characteristics, functions and technologies commonly present in personal cannabis/hemp plant growing appliances

1.2 This guide will provide clarity and understanding to the industry, government, consumers and the general public on different features and technologies that may be present and/or are used in the design and manufacture of personal cannabis/hemp plant growing appliances.

1.3 This guide shall be used in conjunction with Classification D8390.

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

1.5 *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.*

1.6 *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]

D8390 Classification for Domestic Cannabis/Hemp Plant Indoor Growing Appliances

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *array pattern, n*—a group of LEDs arranged in rows and columns that form a complete unit.

3.1.2 *bubbler, n*—an irrigation system component that resides at the end of a micro delivery line from which small low-pressure water stream bubbles upward in a similar manner to a drinking fountain stream that wets the cannabis plants root zone.

3.1.3 *closed cell foam, n*—a type of foam material that is commonly used where liquid resistance is desirable.

3.1.4 *drip emitter, n*—an irrigation system delivery component that resides at the end of a micro delivery line used to deliver drips of water directly to the cannabis plants roots in a slow and steady manner.

3.1.5 *fertilizer, n*—a term used for chemical substances that contain nutrients that aid in plant growth.

3.1.5.1 *Discussion*—Fertilizers are typically applied to soil medium to supplement or enhance elements found naturally in soil and to help in the replacement of these elements that have been consumed by plants.

3.1.5.2 *Discussion*—Fertilizers are composed of primary (macro nutrients), secondary (micro nutrients), and tertiary (minor nutrients). The most prominent macro nutrients for cannabis growth are Nitrogen (N), Phosphorus (P), and Potassium (K) commonly referred to as NPK. In addition, micro nutrients such as Calcium (Ca), Magnesium (Mg), and Sulfur(S) are used to supplement cannabis plant growth, as well as other minor nutrients such as Manganese (Mn), Boron (B), Iron (Fe), Copper (Cu), Nickel (Ni), Zinc (Zn), Molybdenum (Mo), and Chlorine (Cl).

3.1.6 *main delivery line, n*—a larger diameter supply line that is directly connected to a main water supply which may/may not be pressure regulated and timer controlled.

3.1.6.1 *Discussion*—the main delivery line will have multiple micro delivery lines inserted to which drip emitters, stream emitters, bubblers, micro sprayers or combinations are attached for controlled water delivery.

3.1.7 *medium, n*—a means to carry nutrients to help in plant growth and development.

3.1.8 *micro sprayer, n*—a low pressure irrigation system component that resides at the end of a micro delivery line with/without an elevated stake, used to deliver water directly to

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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.

plants in an umbrella like spray pattern. Spray patterns may cover various angles such as 90°, 180° and 360°.

3.1.9 *nutrient, n*—any substance that provides nourishment for plants growth and development during its growth cycle.

3.1.9.1 *Discussion*—Nutrients can be organic materials, such as animal biproducts or inorganic materials, such as chemical fertilizers.

3.1.10 *stream emitter, n*—an irrigation system component that resides at the end of a micro delivery line used to deliver an adjustable stream of water directly to the cannabis plants roots.

3.1.11 *tank, n*—a large receptacle for holding or storing liquids

3.1.11.1 *Discussion*—the term tank in irrigation is a reservoir that may hold water, a solution of nutrient-rich oxygenated water or other liquid solution that is used or delivered to the cannabis plants root system during plant growth.

3.2 *Abbreviated Terms — Acronyms and Initialisms:*

3.2.1 *LED*—light emitting diode

3.2.2 *HID*—high intensity discharge

3.2.3 *HPS*—high pressure sodium

3.2.4 *MH*—metal halide

3.2.5 *NPK*—nitrogen, phosphorous, potassium

3.2.6 *EC*—electrical conductivity

3.2.7 *TDS*—total dissolved solids

3.2.8 *CO2*—carbon dioxide

3.2.9 *pH*—potential of hydrogen ion

4. Significance and Use

4.1 This guide is intended to educate new and experienced users of personal cannabis/hemp plant growing appliances on the various characteristics that can be available in personal cannabis/hemp plant growing appliances.

4.2 This guide will outline characteristics of personal cannabis/hemp plant growing appliances, 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 guide will serve to provide clarity to industry, government, and the public on terminology, and universal functions of personal cannabis/hemp plant growing appliances.

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 personal cannabis/hemp plant growing appliances appear in Table 1.

5.2 *Characteristic I: Grow Medium:*

5.2.1 *a. Soil*—A grow medium of organic matter for seed germination with sufficient nutrients and good water and oxygen retention properties that allows the cannabis plant to grow.

5.2.2 *b. Soilless*—A grow medium composed of non-soil ingredients. Examples of these medium are perlite, peat moss, coco coir, rockwool, and vermiculite to name a few. Typically, no nutrients are present. Nutrients are instead added to water, which is used to feed the cannabis plant.

5.2.3 *c. Combination*—A grow medium comprising of a mixture of organic and inorganic ingredients.

5.3 *Characteristic II: Lighting System:*

5.3.1 *a. Light Emitting Diode (LED*—A lighting system commonly used in the aid of growing cannabis plants in a controlled environment. This type of lighting system consists of a series of small semiconductor components that are laid out in an array pattern. When an electric charge or current is applied through the array, each individual LED emits visible light. The visible light produced by the LED's is part of the light spectrum (**1**).[3] These lighting systems can also have optional electronic controls used to vary wavelengths and

[3] The boldface numbers in parentheses refer to a list of references at the end of this standard.

TABLE 1 Characteristics of Personal Cannabis/Hemp Plant Growing Appliances

Characteristics	Categories					
I. Grow Medium	a. Soil	b. Soilless	c. Combination			
II. Lighting System	a. Light Emitting Diode (LED)	b. High Pressure Sodium (HPS)	c. Metal Halide (MH)	d. Fluorescents	e. Inter-Changeable	
III. Irrigation	a. Hydroponics	b. Aquaponics	c. Aeroponics	d. Manual	e. Sprinkler System	f. Combination
IV. Water Supply and Drainage	a. Hard Plumbing	b. Manual Fill Reservoir	c. Manual Watering	d. Combination		
V. Atmospheric Sensors and Controls	a. Atmospheric Control System	b. Atmospheric Monitoring or Sensoring System	c. No Control System or Sensors			
VI. Growing Aid	a. Nutrient Liquid	b. Nutrient Solid	c. None (Organic)			
VII. Plant Contact Material	a. Coated	b. Plastic	c. Glass	d. Combination		
VIII. Grow Chamber Size	a. Single Plant	b. Multiple Plants				
IX. Automation	a. Fully Automated	b. Semi-Automated				
X. Information Readout	a. Application Readout	a. Digital Readout	c. Analog Readout	d. No Information Readout		