



Designation: D8450 – 22

# Standard Specification for Environmental Conditions While Packaging Cannabis/Hemp Flower<sup>1</sup>

This standard is issued under the fixed designation D8450; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## INTRODUCTION

The cannabis/hemp industry, from seed to consumption, is undergoing a transition and modernization. Thus, standards for ensuring safety, quality, and weight stabilization during key steps of the cannabis/hemp flowers sojourn are in order. This specification is needed to ensure safety, quality, and weight stabilization of cannabis/hemp flower and will be used by purveyors who move the cured crop to packaging used for distribution to another licensed operator or the end user.

### 1. Scope

1.1 This standard specifies the environmental conditions, such as temperature, humidity, and lighting, under which cannabis/hemp flowers intended for human use are to be packaged to ensure the safety, quality, and weight stabilization of the packaged flower. This specification does not apply to frozen cannabis/hemp nor to cannabis/hemp intended for extraction.

1.2 This specification applies only to controlling an indoor environment (heat, cooling, humidity control) surrounding packaging operations. Outdoor operations are outside the scope of this specification and are not addressed.

1.3 This specification is to be followed by licensed operators in the cannabis/hemp space who move the cured crop(s) into consumer or non-consumer packaging used for distribution.

1.4 Security of the cannabis/hemp flower during the packaging process is not within the scope of this specification.

1.5 This specification is intended to remain valid until the packaged cannabis/hemp flower is placed in storage or transit.

1.6 *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.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standard-*

*ization 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:*<sup>2</sup>

[D8197 Specification for Maintaining Acceptable Water Activity \( \$a\_w\$ \) Range \(0.55 to 0.65\) for Dry Cannabis Flower Intended for Human/Animal Use](#)

[D8270 Terminology Relating to Cannabis](#)

### 3. Terminology

3.1 *Definitions:*

3.1.1 *General*—Definitions are in accordance with Terminology [D8270](#), unless otherwise indicated.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *environmental conditions, n*—the atmosphere immediately surrounding the cannabis/hemp flower as it is transferred from drying/curing to packaging, whether controlled within the immediate vicinity in which the flower is contained, or in the larger space surrounding the packaging operation of the flower.

3.2.2 *mean kinetic temperature, n*—a simplified way of expressing the overall effect of temperature fluctuations during storage or transit of perishable goods.

3.2.2.1 *Discussion*—The MKT is widely used in the pharmaceutical industry. The mean kinetic temperature can be expressed as **(1)**:<sup>3</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D37 on Cannabis and is the direct responsibility of Subcommittee D37.04 on Processing and Handling.

Current edition approved May 1, 2022. Published July 2022. DOI: 10.1520/D8450-22.

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

<sup>3</sup> The boldface numbers in parentheses refer to the list of references at the end of this standard.

$$T_K = \Delta H/R / -\ln[t_1 e^{(\Delta H/RT_1)} + t_2 e^{(\Delta H/RT_2)} + \dots + t_n e^{(\Delta H/RT_n)} / t_1 + t_2 + \dots + t_n] \quad (1)$$

where:

- $T_K$  = mean kinetic temperature in kelvins (K),
- $\Delta H$  = activation energy (in kJ mol<sup>-1</sup>),
- $R$  = gas constant (in J mol<sup>-1</sup> K<sup>-1</sup>),
- $T_1$  to  $T_n$  = temperatures at each of the sample points in kelvins, and
- $t_1$  to  $t_n$  = time intervals at each of the sample points.

3.2.3 *relative humidity, n*—the relative humidity (RH) of an air-water mixture is defined as the ratio of the partial pressure of water vapor (pH<sub>2</sub>O) in the mixture to the equilibrium vapor pressure of water (p·H<sub>2</sub>O) over a flat surface of pure water at a given temperature.

$$RH = pH_2O/p \cdot H_2O \quad (2)$$

#### 4. Significance and Use

4.1 The cannabis/hemp industry, from seed to consumption, is undergoing a transition and modernization. Thus, standards for ensuring safety, quality, and weight stabilization during key steps of the cannabis/hemp flowers sojourn are in order.

4.2 This specification is intended to ensure safety, quality, and weight stabilization of cannabis/hemp flower during indoor packaging operations.

4.3 This specification is intended to be used by purveyors who move the cured crop to consumer or non-consumer packaging used for distribution.

#### 5. Apparatus

##### 5.1 Monitoring Equipment:

5.1.1 *Temperature*—Device or devices capable of measuring temperature to ensure specifications of this standard are met. Monitoring and tracking may be automated or manual.

5.1.2 *Relative Humidity*—Device or devices capable of measuring relative humidity to ensure specifications of this standard are met. Monitoring and tracking may be automated or manual.

#### 6. Record Keeping

6.1 Records shall be maintained to ensure that the specifications of this standard are met. Record keeping can be automated or manual.

#### 7. Specification for Environmental Conditions While Packaging Cannabis/Hemp Flower

7.1 The temperature of the area in which the packaging operations of cannabis/hemp flower are conducted shall be maintained between 1 °C and 30 °C.

7.2 The relative humidity of the environment surrounding the packaging operations of cannabis/hemp flower shall be adjusted according to **Table 1**:

NOTE 1—These environmental conditions while packaging ensure that the cannabis/hemp in the finished package will not have an  $a_w$  exceeding 0.65 if moved to a higher temperature within the ranges above. If lower than the specified relative humidities are maintained during packaging, the  $a_w$  of the cannabis/hemp may not rise into the 0.55 to 0.65 range specified in Specification **D8197**. Placement of an effective humidity control device within the finished package is an alternative to further ensure the proper water activity to meet the Specification **D8197** standard.

7.3 Light exposure (visible and ultraviolet (UV)) of the cannabis/hemp flower shall be limited to the minimum necessary for safe and effective packaging operations.

7.3.1 When possible, UV filters should be used with fluorescent light fixtures. LED light fixtures are preferred as these do not produce UV radiation.

#### 8. Special Considerations

8.1 Adherence to this specification can be verified by the means defined in **5.1** situated near the locations of the cannabis/hemp flower as it is being packaged.

#### 9. Keywords

9.1  $a_w$ ; cannabis; cannabis flower; degradation; environmental conditions; hemp; hemp flower; humidity; industrial hemp; mold; physical damage; preservation; quality; safety; temperature; water activity; water content; weight stabilization

**TABLE 1 Temperature and Relative Humidity of Packaging Operations Environment**

NOTE 1—Derived from data in references (2-5) and internal testing.

Temperature of Packaging Environment, °C	Relative Humidity of Packaging Environment, % RH
26 to 30	60 ± 5
21 to 25	58 ± 5
16 to 20	56 ± 5
11 to 15	54 ± 5
6 to 10	52 ± 5
1 to 5	50 ± 5