



ASTM INTERNATIONAL  
Helping our world work better

## **ASTM International and Cannabis Industry Standards Development through Committee D37**

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Committee D37 on Cannabis

# Objectives



Introduce ASTM  
International



Committee D37



# Who is ASTM International?

## Operating Globally

- One of the world's largest Standards Developing Organizations
- Established in 1898
- 30,000 members over 150 countries
- 148 technical committees



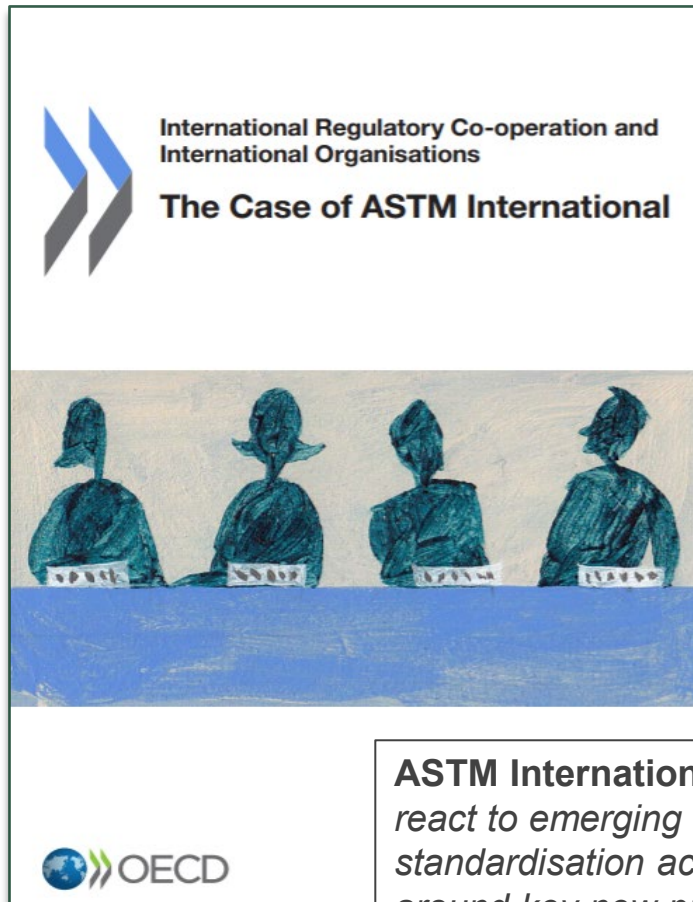
8,700+ citations of ASTM Standards in 75 nations

12,800+ ASTM standards operate globally

# ASTM International Recognition



## 2021 OECD Report



**ASTM International is** *“Quick to react to emerging areas in need of standardisation action, notably around key new production technologies.” — OECD*



WORLD TRADE ORGANIZATION

### WTO/TBT Principles

Transparency

Openness

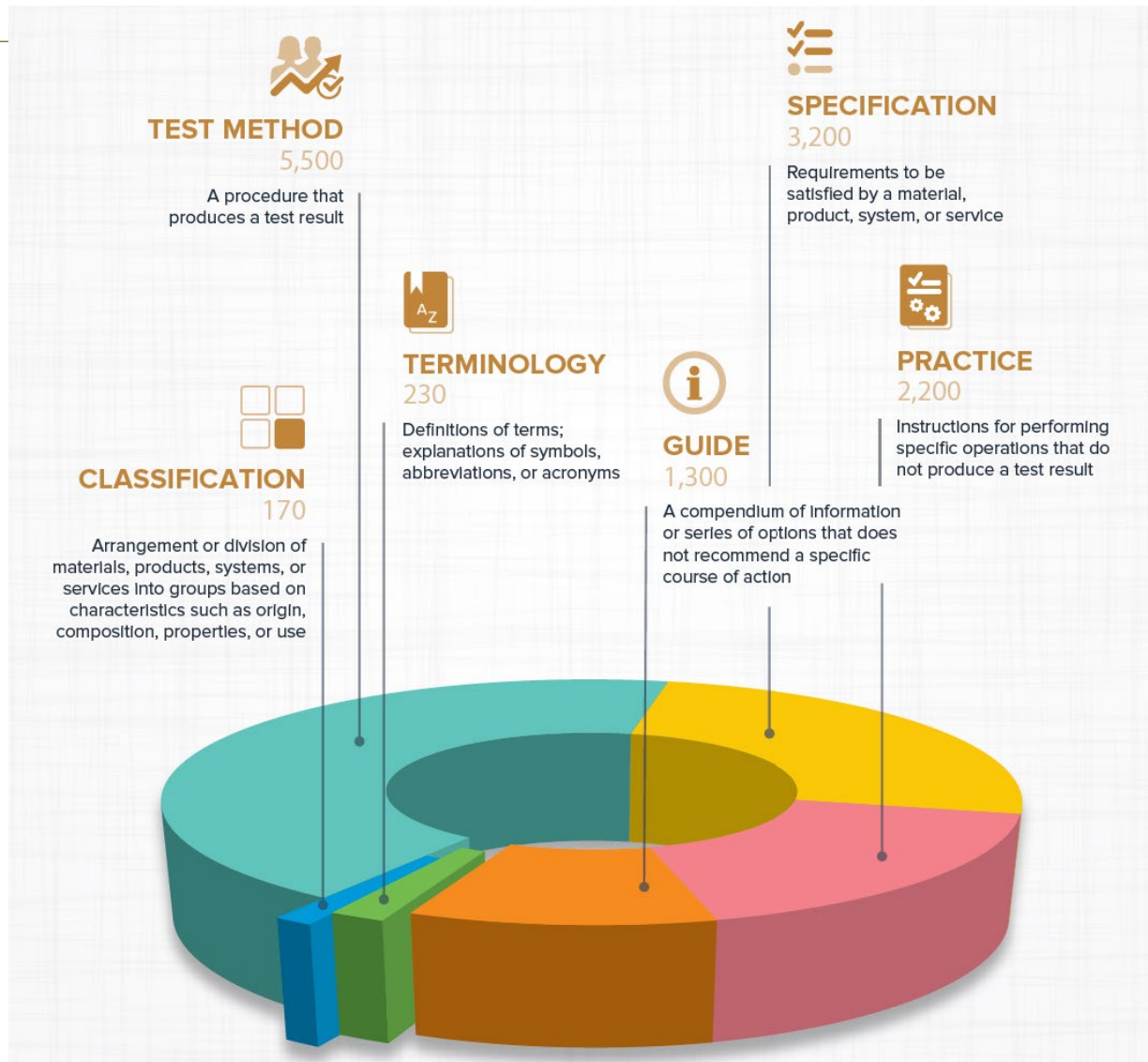
Impartiality and Consensus

Effectiveness and Relevance

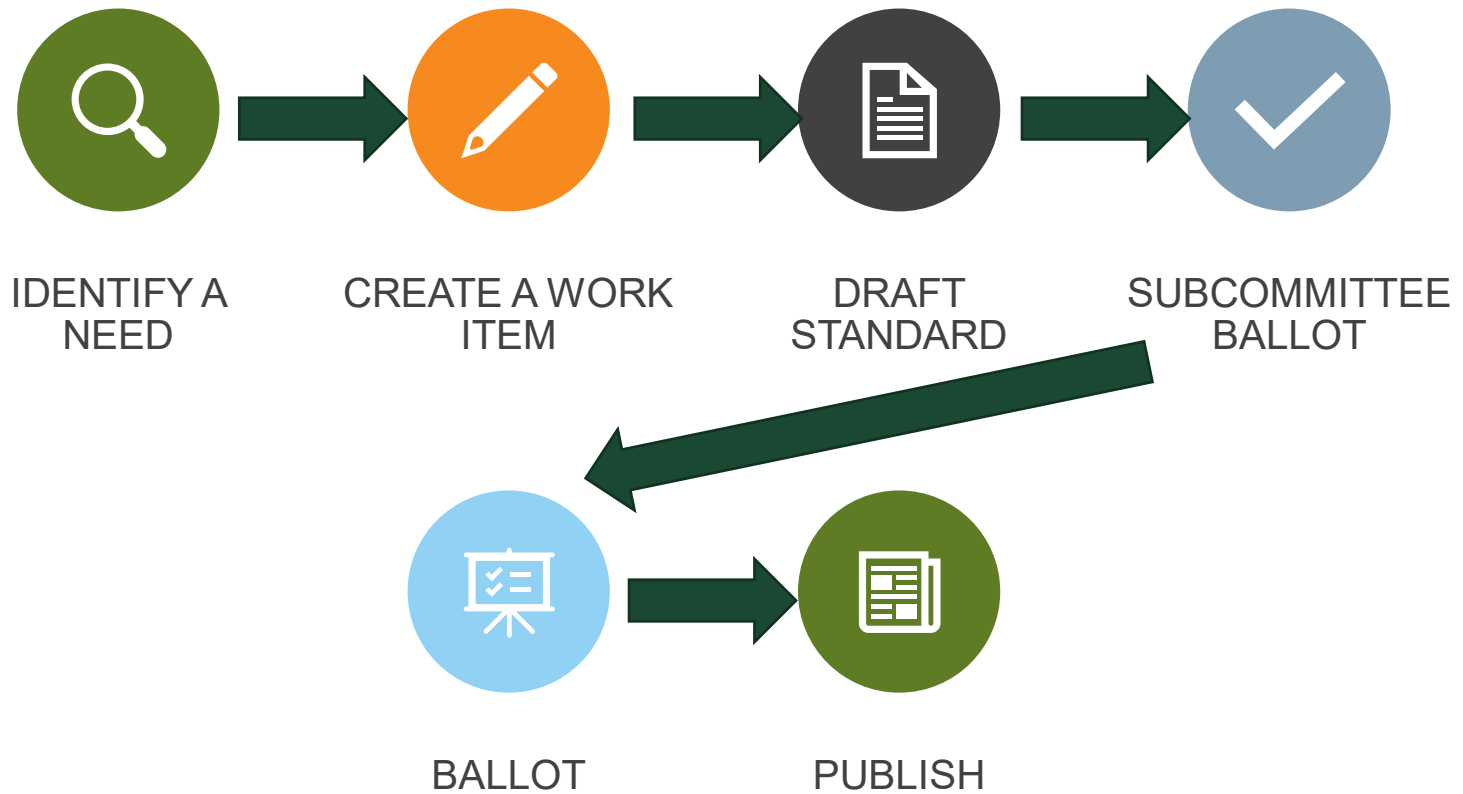
Coherence

Development Dimension

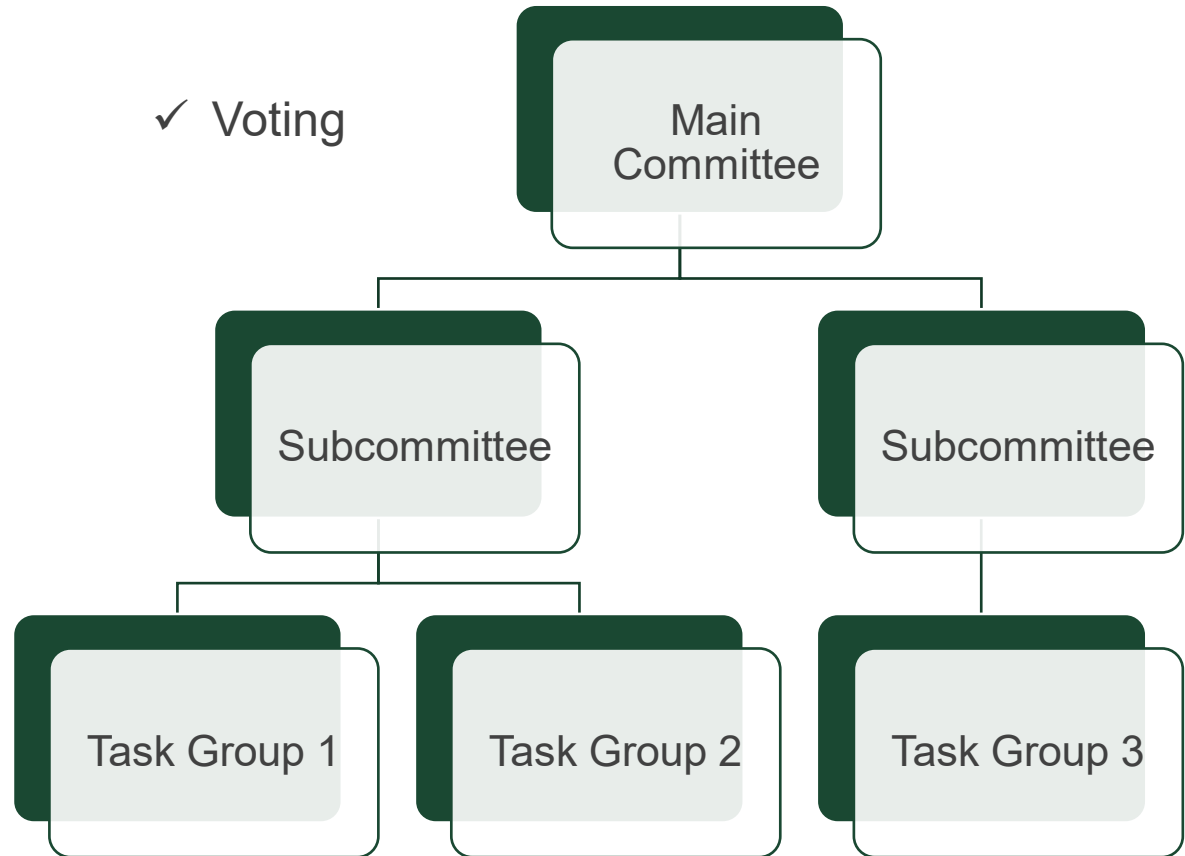
# Many types of ASTM Standards



# The birth of an ASTM standard

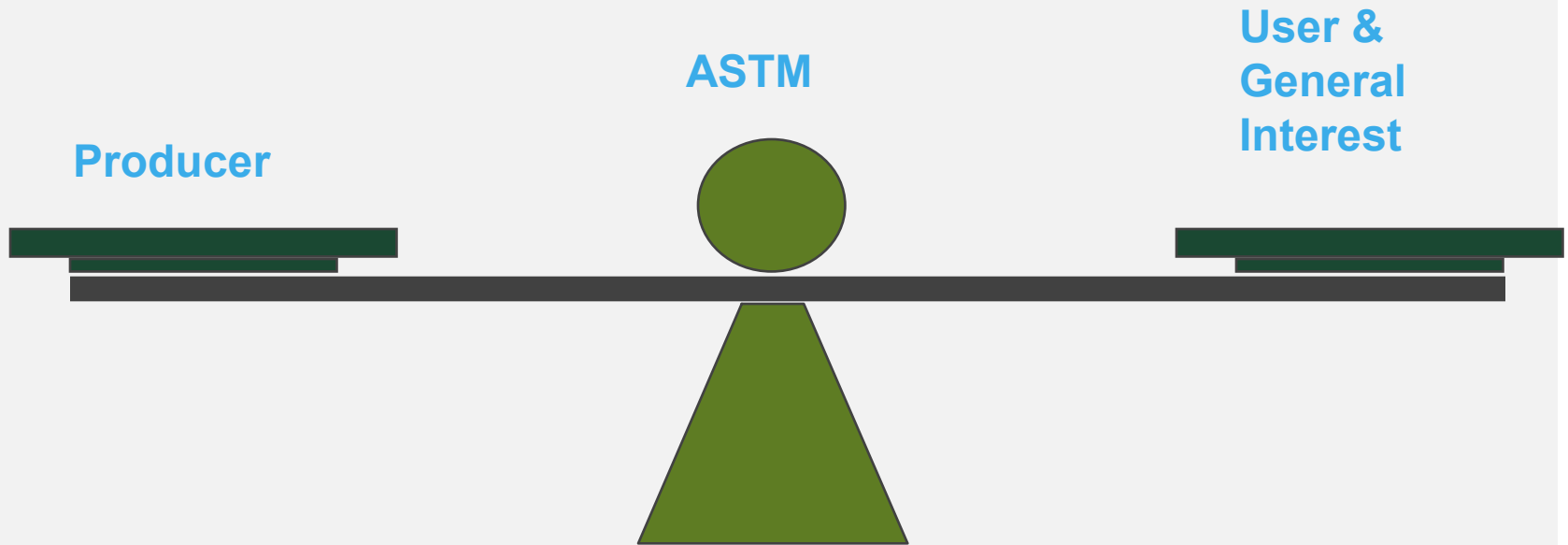


# A standards journey through the Committee



- Work items
- Standards drafted or revised

# Voting: A Balance of Interest



**Technical Committees are balanced  
No excess influence by any interest group**



# Committee D37 on Cannabis



Formed in 2017

1200+ members, 30+ countries  
10 technical subcommittees

48 approved standards as of  
December 2022

Meet twice a year in person – January  
and June

Next – San Antonio, TX, USA  
Jan 23-25, 2023

## Represented by

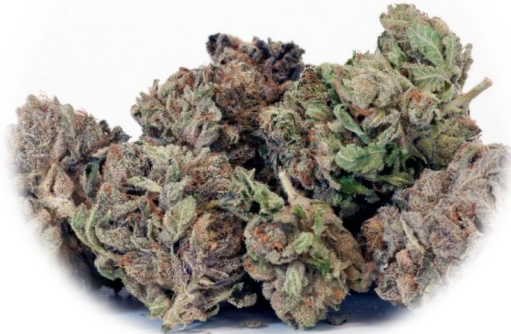
- Academia
- Laboratories
- Farms and Agriculture
- Government
- Extractors
- Packaging companies
- Accreditation bodies
- ... and more



Designation: D8197 – 21



Standard Specification for  
Maintaining Acceptable Water Activity ( $a_w$ ) Range (0.55 to  
0.65) for Dry Cannabis Flower Intended for Human/Animal  
Use<sup>1</sup>



NLT 0.55  
NMT 0.65

- D37's first standard specification
- Safety and quality
- Referenced by USP expert panel

# Examples of useful Cannabis standards



**Designation: D8309 – 21**

## **Standard Guide for Stability Testing of Cannabis-Based Products<sup>1</sup>**

*2.2 ICH Documents:<sup>3</sup>*

*Q1A(R2) Harmonised Tripartite Guideline – Stability Testing of New Drug Substances and Products*

*Q1B Harmonised Tripartite Guideline – Stability Testing: Photostability Testing of New Drug Substances and Products*

**3. Terminology**

**Designation: D8250 – 19**

## **Standard Practice for Applying a Hazard Analysis Critical Control Points (HACCP) System for Cannabis Consumable Products<sup>1</sup>**

# Standard Specification for Medicinal-use Cannabis Inflorescence

TABLE X1.1 Quality Attributes for Medicinal-Use Cannabis Inflorescence

	Quality Attribute		Pesticides
			Elemental Impurities
Identity	Macroscopic & Microscopic Analysis Cannabinoids	Contaminants	Microorganisms and Mycotoxins
Phytochemical Profile	Cannabinoid Profile		
	Terpene Profile	Other Quality Attributes	Water Activity ( $a_w$ )
			Foreign Organic Matter
			Total Ash
			Total Insoluble Ash



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

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-

<sup>1</sup>Intended for Harmonized Use  
D8450 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**—the atmosphere immediately surrounding the cannabis/hemp flower as it is transferred from drying/packing to packaging, whether controlled within the immediate vicinity in which the flower is created, or in the larger space surrounding the packaging operation of the flower.

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

3.2.2.1 **Dewpoint**—The MKT is widely used in the pharmaceutical industry. The mean kinetic temperature can be expressed as (D).<sup>2</sup>

<sup>1</sup>This specification is under the jurisdiction of ASTM Committee D07 on Cannabis and is the direct responsibility of Subcommittee D07.01 on Processing and Handling.  
Current edition approved May 1, 2022; Published July 2022; DOI: 10.1533/1200-001-2022-0001

<sup>2</sup>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.

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

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## D8450 – 22

$$T_m = \Delta H/R \cdot \ln \left[ \frac{1}{t} \sum_{i=1}^n t_i \exp \left( \frac{E_a}{RT_i} \right) + \dots \right] \quad (1)$$

where:

- $T_m$  = 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>),
- $T_i$  or  $T_n$  = temperatures at each of the sample points in kelvins, and
- $t_i$  to  $t_n$  = time intervals at each of the sample points.

3.2.3 **relative humidity**—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<sub>H<sub>2</sub>O</sub>) over a flat surface of pure water at a given temperature.

$$RH = pH_2O/p_0 \quad (2)$$

### 4. Significance and Use

- 4.1 The cannabis/hemp industry, from seed to consumption, is developing a transition and modernization. Thus, standards for ensuring safety, quality, and weight stabilization during key steps of the cannabis/hemp flowers system 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 **Measuring Equipment:**  
5.1.1 **Exposures**—Devices 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**—Devices 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 20 °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 humidity are maintained during packaging, the  $a_w$  of the cannabis/hemp may rise into the 0.55 to 0.65 range specified in Specification D917. 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 D917 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 location 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; temperatures; water activity; water content; weight stabilization

TABLE 1 Temperature and Relative Humidity of Packaging Operations Environment

Notes 1—Derived from data in references (1)–(3) and internal testing.	
Temperature of Packaging Environment, °C	Relative Humidity of Packaging Environment, % RH
25 to 30	60 ± 5
20 to 25	65 ± 5
15 to 20	70 ± 5
10 to 15	75 ± 5
5 to 10	80 ± 5
1 to 5	85 ± 5



# Problem: Cannabis plant is not homogenous!



**Designation: D8334/D8334M – 20**

## Standard Practice for Sampling of Cannabis/Hemp Post-Harvest Batches for Laboratory Analyses<sup>1</sup>

Builds off existing knowledge

GOOD AGRICULTURAL AND COLLECTION PRACTICES AND GOOD MANUFACTURING PRACTICES FOR BOTANICAL MATERIALS

CONTAINS NON-BINDING RECOMMENDATIONS

May 2021 (Revised)  
Prepared by the American Herbal Products Association



USDA  
United States Department of Agriculture  
Marketing and Regulatory Programs  
Agricultural Marketing Service  
Federal Grain Inspection Service  
Washington, D.C.  
July 2022

Hop Inspection Handbook

**D8334/D8334M – 20**

complicated arrangement of branches. Morphologically, it is the modified part of the shoot of seed plants where flowers are formed.

4.2 Harvest batch size for batches of inflorescence shall have a maximum weight of 6.8 kg [15 lb], unless local jurisdiction has alternative requirements for maximum batch size.

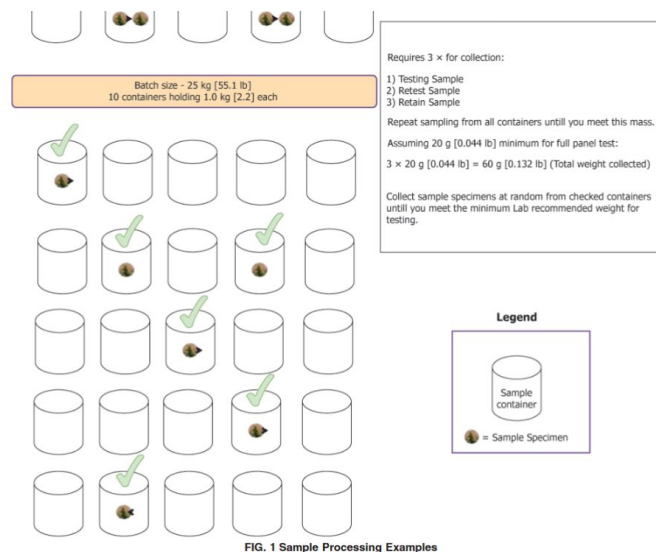
#### 4. Summary of Practice

4.1 This standard provides best practice procedures and protocols for sampling cannabis harvest batches to collect representative samples used for laboratory testing that are representative of an entire harvest batch that is intended for

4.3 The sampling protocols in this standard:  
4.3.1 Apply to harvest batches of cannabis grown indoor or outdoor;

4.3.2 Attempt to minimize harvest lot variation;

4.3.3 Requires that all material in a harvest batch comes



# ASTM D8441/8441M, Specification for an International Symbol for Identifying Consumer Products Containing Intoxicating Cannabinoids



## – Scope

- Establishes international symbol for all consumer products containing intoxicating cannabinoids at a defined quantity
- Finished products intended for consumer use including topical, ingestion, inhalation, or other adsorption method on or in the body of a human or animal.

## – Significance & Use

- Uniformity in identifying health and safety hazards of a substance that may cause mind altering effects.
- Visual clarity and consistency – improve recognition and comprehension for end user.

ASTM International Intoxicating Cannabinoid Product Symbol (IICPS)



Light Background



Dark Background

# Personnel and Credentialing – Who is qualified to do what?

## Designation: D8452 – 22

### Standard Guide for Requirements for Medical-related Professionals within the Cannabis and Hemp Industries<sup>1</sup>

**TABLE 2 Cannabis and Hemp Medical Professional Body of  
Knowledge (BoK)**

BoK	Section <sup>A</sup>
Legal Landscape of Cannabis and Hemp	A1.1
History of Cannabis and Hemp in the World	A1.2
The Endocannabinoid System	A1.3
Cannabinoids, Terpenes, and Opioids	A1.4
Delivery Systems for Medical Cannabis and Hemp	A1.5
Patient-centered Dosing	A1.6
Laboratory Testing	A1.7
Clinical Practice and Broad Therapeutic Uses	A1.8
Cannabis and Opioids	A1.9

<sup>A</sup> Details for each BoK topic are provided in [Annex A1](#).





# Much more in development



## Test Methods

- 84190 - Test Method for Determination of **THC Isomers** in **Hempseed Products** Intended for Animal Feed and Ingredients by Gas Chromatography and Flame Ionization Detection (84190)

## Sampling and Process Methods

- Guide for The **Sampling** of Field and Bulk **Harvest Lots** of Cannabis and Hemp for Laboratory Analyses (80447)
- Guide for **Cleaning and Disinfecting Water and Fertigation Systems** in Cannabis Cultivation Facilities (82019)
- Guide for Indoor/Outdoor Cannabis Cultivation **Space Entry Protocols** (81375)
- Guide for **Process Validation** Requirements in the Cannabis Industry (73764)
- Practice for **Decontamination of LP Cylinders** used in Biomass Extraction (81376)
- Specification for **Restricted Substances** used or contained in Materials to manufacture Herbal Product **Vaporizers** (76669)



COME JOIN US!



# Converging for quality and safety



## Problems demand solutions

- We have a wide breadth of standards
- Leverage ASTM's robust process
- All with an interest in cannabis standardization are invited to participate



ASTM International Committee D37 on Cannabis

**THANK YOU!**

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For more information about ASTM  
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[www.astmcannabis.org](http://www.astmcannabis.org)