



WA State Department of Ecology's Compostable Product's Advisory Council

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Touching Every Part of Everyday Life

Introduction

- ASTM collaborates with businesses, governments and experts – worldwide
- Combining market relevance and technical quality
- Harnessing our members' expertise and commitment
- Building on good science, good engineering, good judgment
- Going beyond safety – also help things work appropriately, efficiently, profitably
- Influencing entire industries and encouraging growth
- Relevant, effective and timely in a fast-changing world



90

industry sectors
represented and
80% of world
commodity trade
affected by standards

ASTM Committee Examples

D02 on Petroleum **D19** on Water



D34 on Waste Management &
E48 on Bioenergy



E44 on Solar



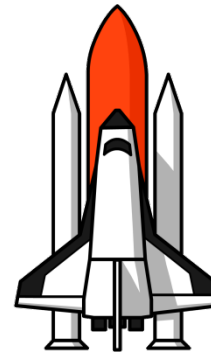
F45 on Driverless
Vehicles



F24 on Amusement
Rides



F47 on Commercial
Spaceflight



D37 on Cannabis





“A technical document developed by consensus and under certain procedures and regulations”

Role of Standards:

- Ensure safety, quality and reliability
- Support established and emerging economies and free and fair global trade
- Establish a common language



Types of ASTM Standards

- Six types of ASTM Standards:
 - Test method
 - Specification
 - Guide
 - Practice
 - Classification
 - Terminology

Voluntary vs Mandatory Standards



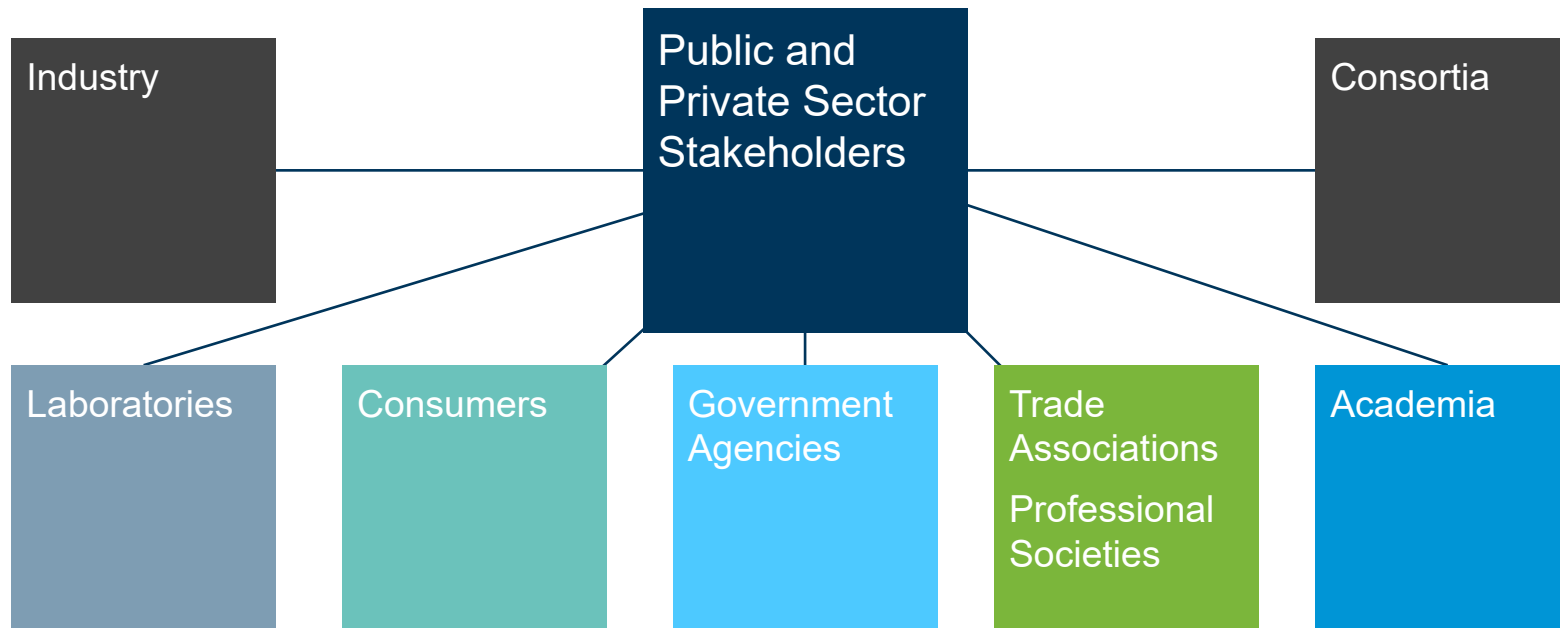
Voluntary Standards

- Developed/adopted by “industry”
- Absolute minimum requirements/baseline
- Standard of care
- Developed by Standards Development Organizations (SDOs) (i.e. ASTM, UL, ISO, ASME etc.)
- OMB Circular A-119
 - All federal agencies must use voluntary consensus standards in lieu of government-unique standards in their procurement and regulatory activities, except where inconsistent with law or otherwise impractical.

Mandatory Standards

- Mandated into law, regulations, codes by government
- Developed by SDOs or government agencies
 - Voluntary standards are often the basis for mandatory standards or regulation
 - Voluntary standard could become mandatory
- Enforceable by regulatory bodies (i.e. recalls, denial at ports of entry, etc.)

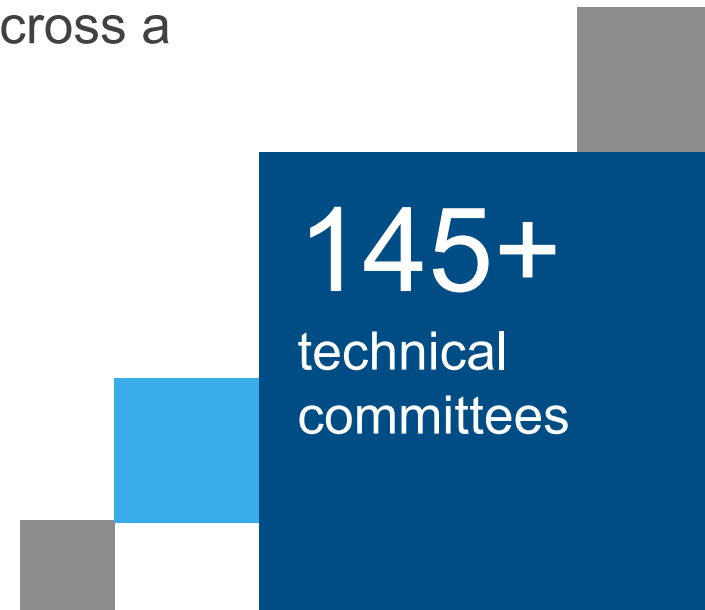
U.S. Standards System



ASTM Members

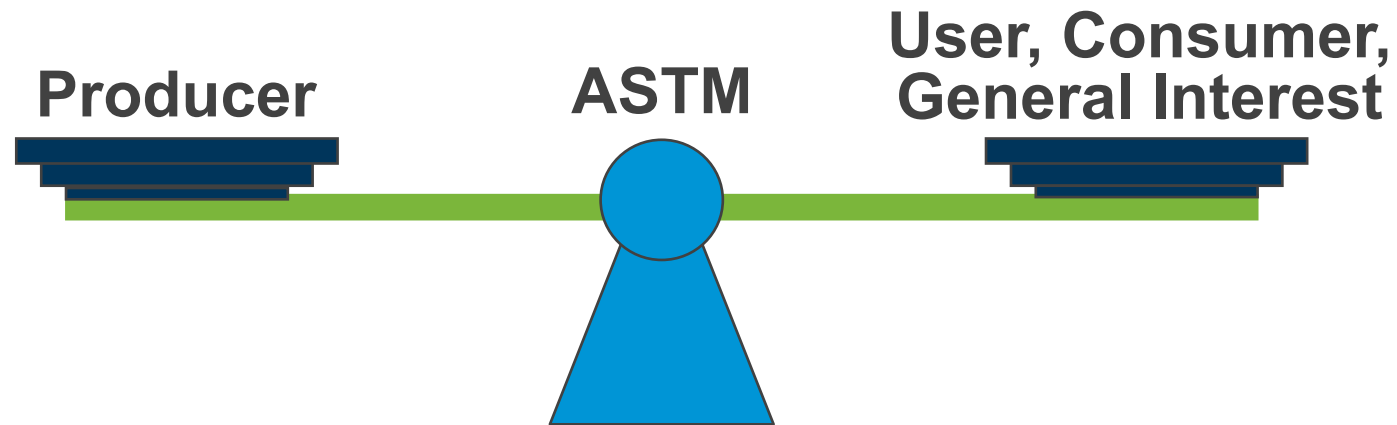


- ASTM Standards are developed by volunteer members
- [Membership is open to everyone with material interests](#)
- Technical experts from industry, governments, academia, professional societies, trade associations, and the general public
- Serve on any of our 145+ technical committees across a broad range of fields
- Over 135 countries represented



Equal Voice, Equal Vote

- Openness
- Consensus based
- Balance between Producers and Users/General Interest
- One official vote per “voting Interest”
- But all members can vote
- All negatives are addressed



Technical Committees are balanced.

Balloting



- Documents are drafted and revised in the task group
- New standards are required to be balloted at the subcommittee level at least once
- After subcommittee approval, the main committee & entire Society



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Helping our world work better

ASTM Standards:

Open Projects supporting the Industry





ASTM Committee D20 on Plastics

Founded in 1937

Membership from 45 different Economies

15 APEC Economies represented in membership

Approx. 500 standards cover areas in:

- raw materials, components, compounding ingredients, and
- finished products made from plastics such as
 - sheets,
 - rods,
 - reinforced tubes and pipes,
 - cellular materials, and
 - molded or fabricated articles.

Active liaisons with other Committees involved with the plastics marketplace including:

- D10 on Packaging
- E13 on Molecular Spectroscopy and Separations Sciences
- E30 on Composite Materials
- E37 on Thermal Measurements
- E42 on Surface Analysis
- E60 on Sustainability
- E62 on Industrial Biotechnology
- F17 on Plastic Piping Systems
- F42 on Additive Manufacturing

1100+
global ASTM members
of D20

D20 Subcommittees

Circular Polymers



- [D20.95 Recycled Plastics](#)
- [D20.96 Environmentally Degradable Plastics and Biobased Products](#)

Finished Products



- [D20.19 Film, Sheet, and Molded Products](#)
- [D20.20 Plastic Lumber](#)
- [D20.24 Plastic Building Products](#)
- [D20.22 Cellular Materials - Plastics and Elastomers](#)

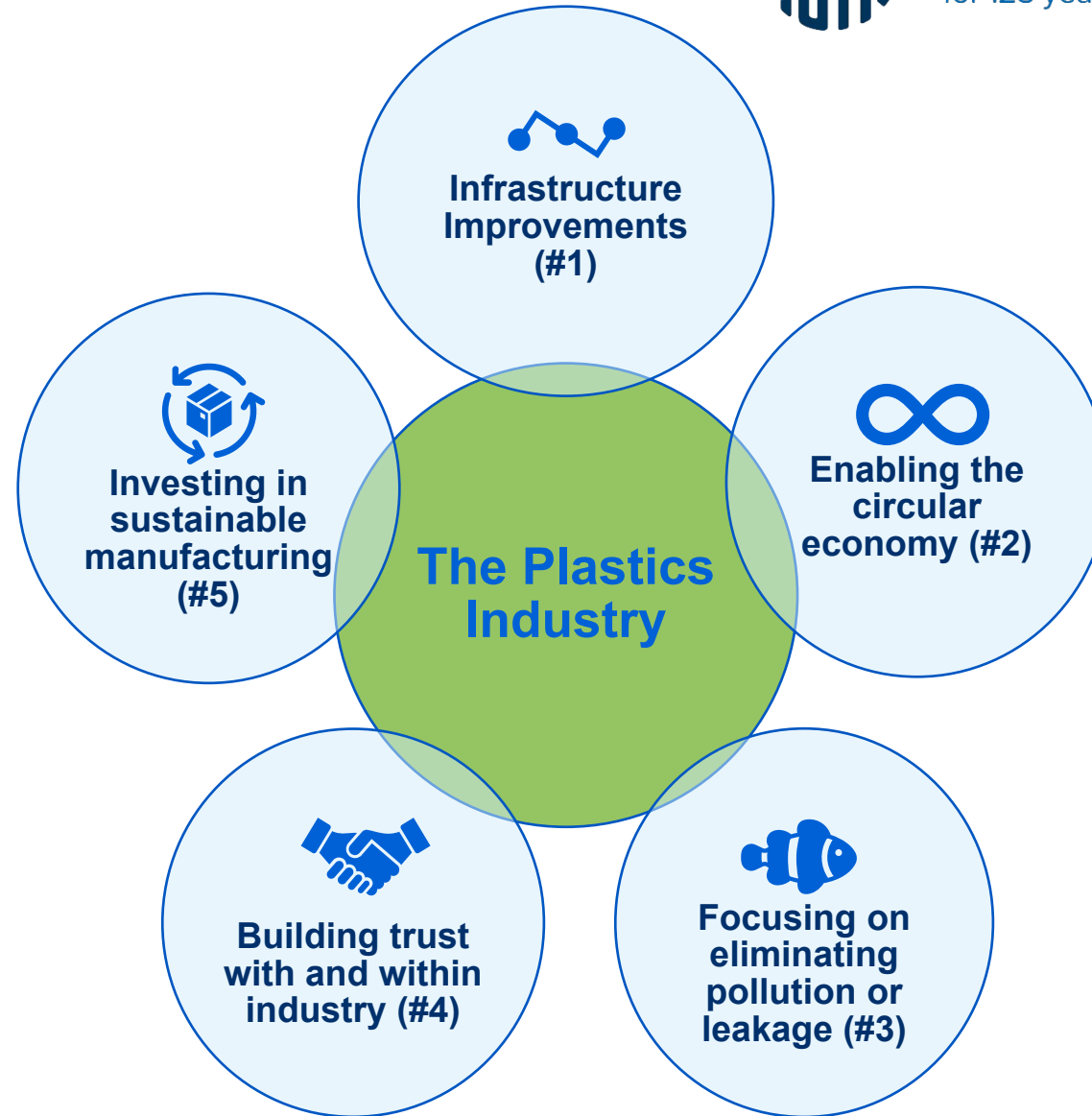
Materials and Testing



- [D20.10 Mechanical Properties](#)
- [D20.15 Thermoplastic Materials](#)
- [D20.30 Thermal Properties](#)
- [D20.40 Optical Properties](#)
- [D20.50 Durability of Plastics](#)



What is the vision for the future of the plastics industry?





Environmentally Degradable Plastics and Biobased Products

Subcommittee D20.96

- The promotion of knowledge and the development of standards for plastics which are intended to environmentally degrade and for biobased products.
- Four administrative sections
- **D20.96.11** Material Content Origin (Beginning of Life)
- **D20.96.12** Natural Environment Degradation/Biodegradation (Anaerobic/Aerobic)
- **D20.96.13** Man-Made Environment Aerobic Degradation/Biodegradation
- **D20.96.14** Man-Made Environment Anaerobic Degradation/Biodegradation



D20.96.13 Man-Made Environment Aerobic Degradation/Biodegradation

- Primary Focus: Aerobic Environment, Composting
- [D5338-15\(2021\)](#) Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials Under Controlled Composting Conditions, Incorporating Thermophilic Temperatures
- [D6400-22](#) Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities
- [D6868-21](#) Standard Specification for Labeling of End Items that Incorporate Plastics and Polymers as Coatings or Additives with Paper and Other Substrates Designed to be Aerobically Composted in Municipal or Industrial Facilities
- **Certification Program – Examples**
- Principal documents for compliance are:
 - ASTM International D6400 and D6868





D6400 compostability *specification* requirements

Related to products made with plastics

1. Disintegration: $\geq 90\%$ through 2mm sieve within 84 days
 - Test methods are ISO 16929 or ISO 20200



2. Biodegradation/Mineralization: $\geq 90\%$ of carbon converted to carbon dioxide (and/or humus) within 180 days
 - Test method is ASTM D5338
3. Terrestrial safety
 - Test for heavy metals
 - Test for plant toxicity



D6400 compostability specification requirements (cont.)

- Plant growth: $\geq 90\%$ biomass and germination rate of control plants
 - Monocots (e.g., wheat and barley)
 - Dicots (e.g., water cress and tomato)
- Test by OECD 208
- Metals content: $\leq 50\%$ national regulations for heavy metal content in sludge or compost





D6400 compostability specification requirements (cont.)

Additional requirements

- Specific additives added at 1% to 10% must be tested separately
- Untested additives may not exceed 5% total combined
- Additives include fillers, resin, colorant, ink and adhesive
- No preconditioning allowed
- Thickness dependent
- Crystallinity dependent
- Material or product must be tested in final commercial form



D6868 compostability specification requirements

- Products where plastics are used as a coating or additive with paper and other substrates
- Each layer must pass mineralization per ASTM D6400 independently
 - 1% and 5% additive rules for each layer still in effect except when
 - Layer of ‘natural origin’ not ‘chemically modified’ fiber passes if >95% biobased content by ASTM D6866
- 1% and 5% additive rules for end material/ product still in effect
- End material/product must pass disintegration
 - Additional testing may be required.
 - End material/product must pass heavy metals and plant toxicity testing



D20.96.11 Material Content Origin (Beginning of Life)

- **Primary Focus: Biobased Products, Renewable Content**
- [D6866-22](#) Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis
 - D6868 references D6866 for determination of biobased content

– Certification Program – Example

- Goal is to increase purchase and use of biobased products
- Sets mandatory purchasing requirements for US federal agencies and their contractors and provides for a voluntary labeling initiative.
- Principal document for compliance is ASTM International D6866





Example New Standards Work Groups Supporting Composting

Industrial Composting

- [WK80528](#) * Standard Test Method for Determine the Degree of Disintegration of Items under Defined In-Field Composting Conditions
 - (Committee D34 on Waste Management)

PFAS Measurement

- [WK76848](#) Standard Test Method for Total Fluorine in Packaging Products by the Oxygen Bomb Combustion/Ion Selective Electrode Method

Home Composting

- [WK81525](#) Standard Specification for Home Compostable/Backyard Conditions for Plastic Packaging Materials and Products



ASTM Strategies for creating broad stakeholder engagement

Broad Policy on International Standards

- Encourage use of international standards with choice and flexibility
- Foster technical quality, competitiveness, and innovation

Support Participation in Standards Development

- Engage an array of stakeholders, globally
- Cooperative discussions to maximize ideas and leadership
- Leverage existing networks and partnerships
 - US TAG to ISO TC 61 on Plastics
 - US TAG to ISO 147 on Water Quality
 - Many, many more!

Proactive SDO Engagement

- ASTM – CEN Cooperative Program in Plastics
- UN Environmental Assembly - Plastic Pollution Working Group
- APEC Partner Organization -
 - Subcommittee on Standards and Conformity

Not a Member Yet?



Check out the Benefits of ASTM Membership!

- Access to Standards, Technical Documents and Information
- Networking Opportunities
- Leadership Growth
- Recognition in the Industry





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Thank You

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Additional Resource Slides





Over a Century of Openness

- Worldwide acceptance and trust comes from the principle of openness
- Experts, individuals, organizations, academia, governments, trade associations, consultants and consumers come together
- Over 30,000 members from 149 economies
- Exchanging expertise and knowledge
- Participating in a transparent process – open to anyone, anywhere
- Timely and relevant. Fully representative of sectors. An aid to innovation, not a hurdle to overcome





**Laboratory
Services;**
More than just Standards

Proficiency Testing

Why Participate?

- A useful and meaningful statistical quality assurance tool to
 - monitor the strengths and weaknesses of your laboratory's performance in conducting testing.
 - The resource you need to satisfy proficiency testing elements of laboratory accreditation.
 - A periodic comparison against other participating laboratories.
 - A stable and homogeneous test material that may be used for quality control
-
- Elemental Analyses of Thermoplastics
 - Flammability
 - Mechanical Properties of Plastics
 - Plastic Film Testing
 - Polyethylene
 - Polypropylene
 - Thermal Analysis of Plastics





Instructor Led Training

- Biobased Content and Biodegradability: A Primer on Definitions, Testing, Specification and Certification
- Major Testing Techniques for Plastics: An Introduction
- ASTM | EnginZone NDT Training



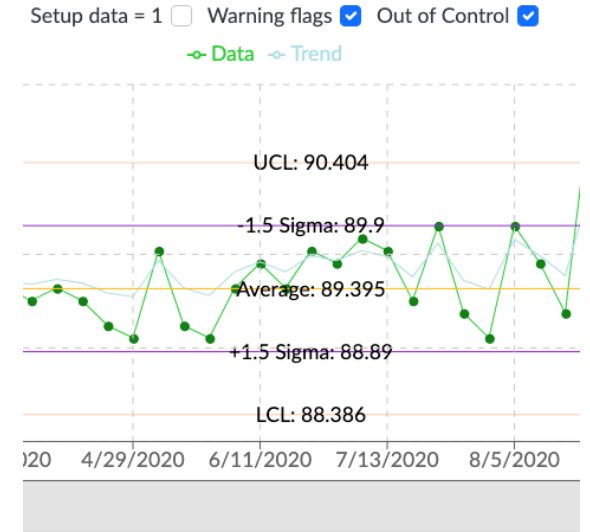
E-Learning

- The Basics of Testing Plastics
- Classification and Definitions of Plastics Testing
- General Guidelines for Plastics Testing
- Measuring Mechanical Properties of Plastics
- Responses to Flame Exposure



Reference Materials

- Polyolefin Resins
- Reinforced Acetal
- ABS
- Polycarbonate
- Polystyrene
- Polypropylene
- Polyethylene
- LLPE, LLDPE-A, LLDPE-B and HDPE



SQC and Control Chart Software

- User Friendly
- Configurable Notifications
- Automated Assessment Process
- Chart Overlay and Filter by Analyst Function

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Additional Working Groups supporting bioplastics and circularity





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D20.96.12 Natural Environment Degradation/Biodegradation (Anaerobic/Aerobic)

- [D5988-18](#) Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials in Soil
 - [D6691-17](#) Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials in the Marine Environment by a Defined Microbial Consortium or Natural Sea Water Inoculum
 - [D7473-21](#) Standard Test Method for Weight Attrition of Non-floating Plastic Materials by Open System Aquarium Incubations
 - [D7991-22](#) Standard Test Method for Determining Aerobic Biodegradation of Plastics Buried in Sandy Marine Sediment under Controlled Laboratory Conditions
- **Primary Focus: Water and Soil Degradation**
 - See D6691 Revision - [WK82370](#)
 - See D7991 Revisions - See [WK80360](#)
 - [WK75797](#) * Standard Specification for Non-Floating Biodegradable Products in the Aquatic Environment



NEW* Standard Specification for Non-Floating Biodegradable Products Designed for use in an Aquatic Environment

- [WK75797](#) – ASTM Project Tracking number
- Replace withdrawn specification for non-floating biodegradable plastics in the marine environment (D7081).
- Non-floating products that are designed for use in an aquatic environment and are biodegradable in a stated aquatic environment.
- This specification is intended to establish the requirements for labeling products as “Biodegradable in a stated aquatic environment as a non-floating object at 20°C in X, per ASTM DXXXX.”

**The work is ongoing:
Join Us!**



D20.96.14 Man-Made Environment Anaerobic Degradation/Biodegradation

- Primary Focus: Industrial Anaerobic Environment, Disintegration, Landfill
- [D5511-18](#) Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic-Digestion Conditions
- [D5526-18](#) Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under Accelerated Landfill Conditions
- [D7475-20](#) Standard Test Method for Determining the Aerobic Degradation and Anaerobic Biodegradation of Plastic Materials under Accelerated Bioreactor Landfill Conditions



Working Cooperatively outside ASTM

Supporting the US TAG Representation to ISO

ISO TC 61 on Plastics

- ASTM is the mirror committee US TAG holder
- Working closely with:
 - SC 14 on Environmental Aspects

ISO TC 147 on Water Quality

- ASTM is the mirror committee US TAG holder
- Working closely with:
 - SC 2 on Physical, chemical, and biochemical methods
 - SC 4 on Microbiological Methods



ASTM – CEN Cooperative Program



MOA Signed in 2019

- Technical Cooperation Agreement
- Designed to enhance the complementary roles of ASTM and CEN as standards developers
- Collaborative discussions between technical members, information sharing, and awareness
- Collaborative Working Groups:
 - ASTM Subcommittee D20.95 on Recycled Plastics
 - CEN TC 249 – Working Group 11 on Plastics Recycling
 - ASTM Subcommittee D20.96 on Environmentally Degradable Plastics and Biobased Products
 - CEN TC 411 on Biobased Products





OECD Case Study

International Regulatory Co-operation

- Developed in the context of the OECD Partnership of International Organisations for Effective International Rule-Making
- Studies ASTM International’s standard-setting practices and related governance mechanisms
- Contributes to the OECD’s analytical work on international rulemaking with the perspective of an atypical form of international organization
- Cites ASTM’s “unique membership structure”, “open participation” and “inclusive and representative decision-making process” as features that enable ASTM International to quickly develop standards in fast-moving markets.

ASTM International standard-setting activities

“Quick to react to emerging areas in need of standardisation action, notably around key new production technologies.” -- OECD



International Regulatory Co-operation and
International Organisations

The Case of ASTM International

