Aligning the Standards and Innovation Communities to Benefit All

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www.astm.org
What is ASTM?

A Proven and Practical System
- Established in 1898
- 148 Committees & 12,500+ Standards
- 32,000 members
  - 8,000+ International Members from 135 countries
  - 5,100 ASTM standards used in 75 countries
- Accreditation:
  - American National Standards Institute (ANSI)
  - Standard Council of Canada (SCC)
- Process complies with WTO principles: Annex 4 of WTO/TBT Agreement

Business Model
- Innovative Development and delivery of information
- A common sense approach: industry driven
- Market relevant globally
- No project costs
Important. Every Day.

The Role of ASTM Standards

- **Ensures safety, quality and reliability**
- **Emerging Industry Support**: Standards are a foundation to build upon
- **Responsive**: innovations, new challenges, new technology and new markets
- **Industry Lead**: Effective and relevant across diverse markets
- **Built on Consensus**: 90% approval; balanced and equal
- **Helping Everyone**: all stakeholders involved directly impacts content
- **Voluntary until Referenced**: contracts, regulations, codes, and laws around the world.
“More than ever before, businesses throughout the world need high-quality standards that evolve in tandem with rapid advances in 3D printing, nanotechnology, robotics, and other cutting-edge fields.

Together, we can meet that challenge by creating aligned roadmaps, by maximizing participation in standards development, and more.”
What We Have Heard from Industry:

Lower R&D Costs

− “If a technology or system has a standard in place, it will lower my R&D costs”

Gain Competitive Edge

− “In the standardization process, I will get insider knowledge and early access to information”

Shorten Cycles

− “If standardization is happening either before or during my research and prototyping, I can cut my time to market”

Influence the Technical Foundation

− “If I am at the table, I can influence the requirements and guidelines to benefit my industry, my company, and my product”
Manufacturing Innovation Initiatives

Key Opportunities to Align Efforts

- Goal of new initiatives/institutes is often to support emerging technologies where standards do not yet exist

- Immediate need for standards to speed product testing, qualification, certification, etc.

- Idea: Standards development process could serve as a conduit because it is inherently collaborative: fosters exchange of knowledge, expertise, perspectives, etc.
Case Study: Additive Manufacturing

First “Manufacturing USA” Institute

- Memorandum of Understanding
- Goal of institute: mainstream additive manufacturing
- Standards component: transition AM technologies into broader use
  - Example: Researchers extending guidelines to test metal products to those made via AM
- AM Standards Collaborative creates roadmap with priority areas and gaps
- ASTM International / ISO partnership to prevent duplication globally
An Integrated Approach Drives Innovation

Early Engagement

Robust Participation

Leverage SDOs Strengths
1. Early Engagement in Strategic Planning

Linking Standards and Tech Roadmaps

- Early, formal partnership prevents delays and reduces time to market
  - Examine tech developments v. existing standards landscape: Where are the gaps?
  - Audit standards-based resources worldwide
  - List SDOs and key standards to focus on which leaders need to be engaged
  - Align to ensure robustness, market-relevancy, first-attempt compliance
Additive Manufacturing Structure

General AM Standards
- Terminology
- Data Formats
- Qualification Guidance
- System Performance & Reliability
- Round Robin Test Protocols
- Design Guides
- Test Methods
- Test Artifacts
- Safety
- Inspection Methods
- etc.

Feedstock Materials
- Material Category-Specific
  - Metal Powders
  - Ceramic Powders
  - Photo-polymer Resins
  - Polymer Powders
  - Metal Rods
  - Polymer Filaments
  - etc.

Process / Equipment
- Process Category-Specific
  - Material Jetting
  - Powder Bed Fusion
  - Binder Jetting
  - Directed Energy Deposition
  - Sheet Lamination
  - Material Extrusion
  - Vat Photopolymerization

Finished Parts
- All Finished Parts
  - Mechanical Test Methods
  - NDE/NDT Methods
  - Post Processing Methods
  - Bio-Compatibility Test Methods
  - Chemical Test Methods
  - etc.

Material-Specific
- Titanium Alloy Powders
- Steel Rods
- Nylon Powder
- Nickel-Based Alloy Powders
- ABS Filament
- etc.

Process-Material-Specific
- Powder Bed Fusion with Nylon
- Directed Energy Deposition with Titanium Alloy
- Powder Bed Fusion with Steel
- Material Extrusion with ABS
- etc.

Application-Material-Specific
- Aerospace
- Medical
- Automotive
- etc.

Application-Process-Material-Specific
- Aerospace
- Medical
- Automotive
- etc.

General Top-Level AM Standards
- General concepts
- Common requirements
- Generally applicable

Category AM Standards
Specific to material category or process category

Specialized AM Standards
Specific to material, process, or application
2. Robust Participation

All Stakeholders Contribute

- SDOs in both traditional and advanced manufacturing work to both anticipate and respond to emerging technologies
  - Examples: Pharma, industrial biotech, additive manufacturing, 3D imaging, nano, smart textiles, robotics

- Quality and relevance of standards are directly proportional to participation from entrepreneurs, innovators, universities, governments, etc.

- Sustained outreach and commitment to WTO principles
3. Leveraging Strengths of SDOs

What do SDOs bring to the table?

- Speed
  - Online meetings
  - Digital paths
- Collaborative Expertise
  - Partnerships with leading trade associations
  - Partnerships between/among SDOs
- Agility
  - Responsiveness to immediate needs (e.g., hazards, consumer safety issues)
  - Supporting analyses
- Service offerings
  - Training, proficiency testing, certification, symposia
A New Model: Bridging the Gap

RESEARCH
- Basic manufacturing research
- Proof of concept
- Production in laboratory
- Capacity to produce prototype
- Capability in production environment
- Demonstration of production rates

MARKET

TRENDS

EMERGING TECH

STANDARDS ROADMAP

PRE-STANDARDS

STANDARDS DEVELOPMENT

POST STANDARDS ACTIVITIES

AWARENESS
- Spotlight early-stage innovative technologies
- Engage with innovation community
- Map cutting edge technologies to existing activities
- Identify gaps

STANDARDS COMMUNITY

EARLY-STAGE ENGAGEMENT
- Provide technology acceptance and compliance planning and advisory services
- Convene stakeholders
- Coordinate emerging technology and industry standards roadmap development
- Identify, assess, and determine needs for standards and implementation specifications
- Close gaps
- Leverage trusted knowledge to smooth the road to market

LIFE CYCLE STANDARDS ECOSYSTEM
- Host symposia and innovation workshops
- Testing, standards, certification, labeling
- Training and proficiency testing
An Approach that Benefits this Community

Industrial Applications
E61 Radiation Processing
F45 Driverless Automated Guided Vehicles
F48 Exoskeletons and Exosuits
F47 Commercial Spaceflight
E21 Space Simulation and Applications of Space Technology
F42 Additive Manufacturing

Public Safety Personnel
E54 Homeland Security Applications
F48 Exoskeletons and Exosuits
F38 Unmanned Aircraft Systems
F23 Personal Protective Equipment
F40 Declarable Substances in Materials
D13.50 Smart Textiles
F42 Additive Manufacturing

Medical Applications
F04 Medical and Surgical Materials and Devices
F48 Exoskeletons and Exosuits
F42 Additive Manufacturing
D20 Polymers
F23 Personal Protective Equipment
D13.50 Smart Textiles
E55 Manufacture of Pharmaceutical and Biopharmaceutical Products
Cross-Sector Technologies

Committees Supporting Various Industries

– F42 Additive Manufacturing Technologies
– F23 Personnel Protective Equipment
– D15 Textiles / Smart Textiles
– F48 Exoskeletons and Exosuits
– F38 Unmanned Aircraft Systems
– More..
# Radiation Activities

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White Paper

Standards Development: Enabling Manufacturing Innovation and Accelerating Commercialization

Classifications

Executive Summary

Standards are essential to accelerating the widespread implementation of new technologies in the manufacturing sector, to reduce costs, improve quality, and drive innovation. Standards enable all stakeholders to work together to achieve common goals, and they facilitate the exchange of information and knowledge. By providing a common language and framework, standards enable collaboration and innovation, and they help ensure the reliability and interoperability of technologies and systems.

Introduction

While other industries (e.g., manufacturing, utilities, and transportation) have similar needs, the manufacturing sector is particularly dependent on standards to drive innovation and accelerate commercialization. Standards provide a common language and framework for describing, designing, and implementing manufacturing processes and systems. They enable manufacturers to collaborate effectively and efficiently, and they facilitate the exchange of information and knowledge across industries and regions.

Conclusion

The role of standards in driving innovation and commercialization in the manufacturing sector cannot be overstated. Standards enable collaboration and innovation, and they help ensure the reliability and interoperability of technologies and systems. By providing a common language and framework, standards enable manufacturers to work together to achieve common goals, and they facilitate the exchange of information and knowledge.