Testing Programs
Improve Quality, Lower Costs and Facilitate Conformance

Programs include:
Test Methods
Proficiency Testing
Training
Certification
Conformity

www.astm.org
Boosting Quality and Consumer Confidence through Testing

In industries around the world, standardized test methods and conformance programs play a vital role in the development, manufacturing and international trade of the products we rely on every day. From the toys our children play with and the gasoline that fuels our cars to the homes and office buildings we live and work in, testing ensures that these and countless other products, structures and services are safe and perform as expected.

Standardized test methods, developed in a consensus process by leading technical experts, offer scientifically proven solutions for scrutinizing product characteristics, evaluating materials and systems, and qualifying performance. Used in both laboratory and field settings, test methods are an essential component of quality control, aiding in the delivery of better overall goods and services. When the testing process is conducted as part of an overall conformance program — one that tests and certifies products and personnel to industry-accepted standards — companies can better meet regulatory requirements and facilitate an even higher level of consumer and supply chain confidence (see “The Benefits of Testing”).

ASTM International: Meeting the Testing Needs of Global Industries

For more than 100 years, ASTM International has been the pre-eminent provider of voluntary consensus standards and test methods to diverse industries. ASTM’s expertise in the field of standard test methods is rooted in a long history of success. The journey began at the turn of the 20th century, when engineers at what was then called the American Society for Testing and Materials pioneered the development of uniform test methods to measure the properties of steel and cement in support of the burgeoning railroad and construction industries. Today, thousands of ASTM test methods form the technical underpinning of research, manufacturing, quality control and innovation across growing sectors such as energy, building construction, consumer products, metals, plastics and many more.

ASTM International leads the way in testing solutions worldwide.

100+ Years

ASTM International has been the pre-eminent provider of voluntary consensus standards and test methods to diverse industries.
The Benefits of Testing

**For Consumers:**
- Ensure safer products and services
- Create brand loyalty and satisfaction
- Enable quicker access to new technologies
- Facilitate greater selection of goods and services
- Support improved product compatibility
- Enhance health and environmental safety

**For Businesses:**
- Improve quality of products and services
- Strengthen customer confidence
- Lower R&D and manufacturing costs
- Reduce rework and waste
- Shorten time-to-market cycles
- Facilitate compliance with government regulations
- Reduce risk of product recalls
- Enhance marketing and branding strategies
ASTM Test Methods: Advancing Precision through Science

ASTM International’s expansive portfolio of more than 12,000 voluntary consensus standards includes over 5,400 test methods that support testing requirements across dozens of global industry sectors.

ASTM test methods deliver scientifically proven guidance in determining the fundamental properties of a material, an assembly of materials or a product. Methods are an integral component of the industrial supply chain, supporting the buying and selling of materials. To assist supply chain stakeholders in determining that materials meet exacting industry specifications, ASTM test methods provide orderly procedures for proper testing. These directions also address testing requirements such as apparatus, test specimens, calculations and other elements needed to achieve satisfactory precision and bias. The testing process may include a variety of different laboratory procedures such as chemical and spectrochemical analyses, mechanical and electrical tests, weathering tests, visual examination, fire tests, performance characteristics, sampling, nondestructive tests and radiation exposure tests.

THE COMPONENTS OF ASTM TEST METHODS INCLUDE:

1. **Scope:** provides information on the purpose of the test, describes if the method is quantitative or qualitative, and identifies any known limitations;
2. **Apparatus:** provides a brief description of the equipment required for the test;
3. **Reagents and Materials:** lists the reagents and materials required for each procedure when more than one procedure is included in the standard;
4. **Hazards:** provides general safety caveats in conducting the test method;
5. **Sampling, Test Specimens and Test Units:** provides directions for physically obtaining sample test units;
6. **Procedure:** includes the proper sequence and detailed directions for performing the test; and
7. **Precision and Bias Statements:** statements addressing precision and bias are required in ASTM methods (see “Precision and Bias: A Closer Look”).
Precision and Bias: A Closer Look

Precision and bias statements are essential to the quality of ASTM test methods, validating that the methods do what they intend.

- Precision, which includes the repeatability and reproducibility of a test, is the closeness of agreement between test results obtained under prescribed conditions. The precision statement offers guidelines regarding the type of variability that can be expected among test results when the method is used in one or more laboratories.
- Bias is a systematic error that contributes to the difference between the mean of a large number of test results and an accepted reference value. When included in a test method, this statement describes the bias and the methods used to provide corrected test results.

Precision and bias is a required component of ASTM test methods. ASTM International’s Interlaboratory Study Program assists ASTM technical committees in the development of precision and bias statements to enhance the quality of test methods (see page 7 for more).

Testing and ASTM Journals

Housed within the Digital Library are ASTM International’s journals, including the Geotechnical Testing Journal and the Journal of Testing and Evaluation, which contain peer-reviewed papers on a wide variety of subjects of interest to ASTM members, from civil engineering to materials performance.

“One of the things that makes ASTM journals unique and tremendously valuable is the fact that there is a very real synergy between the journals, which define the state-of-the-art, and the ASTM testing standards, which define the state-of-practice.”

William J. Likos, Ph.D.
Associate professor of geological engineering, University of Wisconsin-Madison, and technical editor of the ASTM Geotechnical Testing Journal.

Quality

ASTM International’s Interlaboratory Study Program assists ASTM technical committees in the development of precision and bias statements to enhance the quality of test methods.
World-Class Testing Solutions Under the ASTM Umbrella

ASTM International offers a comprehensive range of testing support programs and technical solutions that raise the value of ASTM test methods, enhance precision and facilitate conformance.
Laboratory Programs – Enhancing Testing Quality

Interlaboratory Study Program
In 2004, ASTM International launched the Interlaboratory Study Program (ILS) to assist technical committees in enhancing the inherent value and utility of ASTM test methods. The ASTM ILS Program supports committees in developing precision statements backed by high quality laboratory data. The ILS Program provides assistance with identifying volunteer laboratories and sample vendors; coordination of sample distribution; data collection and statistical processing; and other administrative and financial support. To date, more than 80 ASTM committees have participated in the program, registering over 1,000 interlaboratory studies, and successfully balloting more than 400 precision statements.

Proficiency Testing Programs
The ASTM Proficiency Testing Program comprises statistical quality assurance programs that enable laboratories to assess their performance in conducting test methods within their own laboratories when their data are compared against other participating laboratories worldwide.

More than 3,400 labs participate in over 50 PTP programs for petroleum products, metals, plastics, textiles and others.

Cement and Concrete Reference Laboratory
One of ASTM International’s longest standing laboratory quality programs is offered through its Cement and Concrete Reference Laboratory (CCRL). Established in 1929, and sponsored by ASTM Committees C01 on Cement and C09 on Concrete and Aggregates, CCRL (www.ccrl.us) provides laboratory inspection and proficiency sampling programs that serve nearly 1,600 laboratories worldwide. The sampling programs help laboratories monitor testing quality by comparing their results with those of other labs, and laboratory Inspection provides direct evidence of a laboratory’s ability to perform ASTM test methods.

Certification Programs – Raising the Bar on Compliance

Product Certification Program
To further enhance the quality and safety of products, ASTM International offers a voluntary Product Certification Program. A product certified through the program is tested using ASTM test methods at the direction of ASTM at an independent third-party laboratory to determine its ability to conform to one or more standards. For manufacturers and other industry stakeholders, the program:

- Increases consumer confidence through independent testing that verifies that the product meets the parameters covered by the certification program;
- Enables a level playing field for manufacturers as competing products are tested and rated to the same standard; and
- Provides support for addressing regulatory requirements.

Personnel Certification Programs
To help verify the competence of personnel across a wide range of professions, ASTM International sponsors Personnel Certification Programs. Personnel certified through the program have prerequisite levels of relevant education and experience as deemed appropriate by industry standards; have passed an objective examination that is either written, oral, practical or observational; and have participated in approved continuing education activities to maintain their professional competencies.

Personnel Certificate Programs
ASTM also offers Personnel Certificate Programs that enable participants to receive a certificate by engaging in a one-time training program. Certificate programs help employers set competency levels, promote good practices and maintain trained staff. Certificates are currently available for test monitoring center rater personnel; coal chemistry technicians; light sport aircraft personnel and vapor encroachment condition screening personnel.

Declaration and Conformity Programs – Increasing Credibility in Product Claims

Environmental Product Declarations
ASTM International is a program operator for developing Product Category Rules (PCR) and verifying Environmental Product Declarations (EPDs) in response to the growing need to understand the real environmental impact of products from raw material extraction to disposal and recycling. PCRs detail the rules and guidelines for developing environmental declarations for products that can fulfill equivalent functions.

Supplier’s Declaration of Conformity Program
The Supplier’s Declaration of Conformity Program benefits product suppliers by providing evidence for customers that their declaration of conformity to an ASTM standard test method is supported by being registered and documented with ASTM. Administered by ASTM International, the program authorizes a supplier who is having their product tested to an ASTM standard test method to register certain information, including general company and product information; ASTM test method identification; sample selection procedures; testing laboratory test report(s) and data; and more.
Testing for Success: Fulfilling Business and Regulatory Goals

For over 100 years, ASTM International test methods have been the strategic tools of quality, safety and efficiency relied on by corporations, small and medium-sized businesses, and government bodies around the world.

**Driving Corporate Strategy**
For global corporations that invest time and resources in standardization and testing, the payback can be realized well beyond the quality lab. By enhancing product value in the marketplace, testing programs can drive revenue growth and foster customer loyalty, directly impacting bottom line results. Quality processes, built on proven testing methodologies, streamline the development and manufacturing of new products, leading to lower costs, shorter time-to-market cycles and easier international market penetration. Rigorous adherence to ASTM test methods in the product development stage can also reduce the potential public harm and liability associated with safety recalls.

**Leveling the Playing Field for Small and Medium-Sized Businesses**
The use of test methods and other voluntary consensus standards can play a significant role in helping smaller businesses to compete with larger competitors. When small to mid-sized organizations invest in testing to monitor product quality and improve manufacturing processes, they can lower costs, enhance profitability and make their entire business more agile. Through testing, smaller businesses also access a level playing field, demonstrating that their products meet the same rigorous standards as those from larger manufacturers. Greater customer confidence becomes a true asset in the execution of marketing and sales strategies while aiding customer retention and opening the doors to new markets.

**Improving Government Efficiency, Protecting Consumer Safety**
Standardization and conformance programs have long had a vital role in public policy initiatives around the world. Government agencies rely on test methods and consensus standards developed in the private sector to guide and strengthen the laws that protect the public interest. Numerous ASTM test methods are cited in U.S. regulations promulgated by the Consumer Product Safety Commission, Federal Aviation Administration and other U.S. government agencies. By supporting private sector standards development, government bodies can tap into the vast technical knowledge bank offered by diverse industry experts. This approach results in the delivery of high quality, market-relevant standards that meet consumer needs, advance global trade, and protect public health and safety.

“Standards and manufacturing go hand in hand. Achieving quality control goals requires that key international testing standards are performed accurately and efficiently. Virtually every product we make has one or more ASTM test methods associated with it and is designed to perform these test methods at the highest level of accuracy.”

_Earl Ruth_
Director of technology, Tinius Olsen Group, a leading specialist manufacturer and supplier of static tension and compression materials testing machines.
Role of Third Party Testing Laboratories

Third party testing laboratories provide independent testing services that are utilized by a broad range of industries worldwide. With highly trained personnel, proven testing processes and accredited practices, third party labs provide the trusted core competency that is valued by product manufacturers worldwide. Benefits provided by third party testing labs include:

- Objectivity and accuracy in test results
- Extensive array of testing and validation services
- Documented quality control programs
- Safe handling of hazardous materials
- Cost effective testing support for smaller businesses
- Support for regulatory requirements for independent testing
Developing Global Expertise in ASTM Test Methods

Through a comprehensive suite of training programs, ASTM International helps industry professionals gain the know-how and hands-on skills that maximize proficiency in ASTM test methods and standards. From corrosion to concrete, petroleum to textiles and more, ASTM courses provide in-depth education that facilitates the application of ASTM test methods at the highest level of quality and accuracy.

Diverse Training Programs for Global Stakeholders
ASTM International offers an array of customer-driven training solutions that are structured to support the learning requirements of professionals around the world. Through a blend of continuing education courses delivered in cities worldwide; on-site training; and online learning, ASTM provides easy access to high quality technical education programs:

- Training Seminars – one- to three-day seminars provide practical knowledge and build understanding about ASTM test methods and standards in fields such as aviation, construction, metals, plastics, rubber, textiles and others;
- Online Training – ASTM online training provides professional, self-guided computer-based learning focused on construction material testing, petroleum lab technician training, and environmental and property professional training;
- On-Site Training – ASTM on-site training offerings are available in a wide range of technical fields and enable larger groups of employees or an entire organization to learn together, saving time and travel expenses.

The ASTM Learning Center, a learning management system, ties this all together in a portal from which learners can access self-paced e-learning modules, instructional videos and virtual classroom sessions. Online training is available by subscription and includes advanced features such as automated learning plans, performance management and social learning tools — allowing users to access, track and report all in one system.

Take a Seat at the Standards Table — Join ASTM International
Become a member of ASTM International and participate in the development of the high quality, market-relevant technical standards and test methods that are the foundation of quality, safety, innovation and trade. ASTM’s membership includes more than 30,000 technical experts from 140 countries around the world. These technical experts serve on one or more of ASTM’s more than 140 technical committees, developing standards for a broad range of areas, including metals, paints, plastics, textiles, petroleum, construction, aviation, energy, the environment, consumer products, electronics, medical services and devices, computerized systems, homeland security and much more. ASTM membership enables you to:

- Influence standards that impact your industry
- Collaborate with technical experts from around the world
- Learn about the latest technology in your field
- Gain credibility for business transactions and interactions
- Connect with customers and clients
- Increase your company’s visibility
- Network with your peers
- Advance your career
- Access leadership opportunities
A Sample of ASTM Test Methods in Action

**GREENHOUSE GAS EMISSIONS**
ASTM D6348 for determination of gaseous compounds is an important test method used for measuring gaseous emissions from stationary sources, such as toxics and greenhouse gases. These measurements can be used for determining compliance with emissions standards, evaluating the performance of emissions control devices, or evaluating and optimizing process operations.

**BUILDING CONSTRUCTION**
Insulation product manufacturers benefit from the use of ASTM C1338 on fungi resistance of insulation materials and facings, used to determine the ability of an insulation to support or resist fungal growth under high humidity.

**ENERGY EFFICIENCY**
Controlling air leakage – an unwanted flow of air through the external fabric of the building envelope – is central to energy efficiency. Assisting green building stakeholders in testing and quantifying the airtightness of a building envelope are test methods ASTM E779 on air leakage rate and ASTM E1827 on airtightness of buildings.

**HAZARDOUS SUBSTANCES**
Regulations have placed restrictions on the content of certain hazardous substances in materials used across several global industries. Helping stakeholders across manufacturing supply chains with meeting compliance requirements are test methods such as ASTM F2617 for identification and quantification of chromium, bromine, cadmium, mercury and lead in polymeric material.

**METALS**
Corrosion can impact the ongoing safety and reliability of industrial equipment and infrastructure such as piping systems and bridges, resulting in potential hazards from structural failures, fluid contamination and other issues. ASTM G28 for detecting susceptibility to intergranular corrosion has long assisted stakeholders in conducting critical corrosion testing applications.

**MEDICAL PRODUCTS**
Referred to as the “bubble leak” test, ASTM F2096 for detecting gross leaks in packaging, is used in laboratory testing for visually inspecting medical packaging for bubble streams caused from a defect in the packaging/sterile barrier system. F2096 offers a practical way to examine packages for gross leaks, which may render the product non-sterile.

Eclectic and Varied
ASTM’s membership includes more than 30,000 technical experts from 140 countries around the world. These technical experts serve on one or more of ASTM’s more than 140 technical committees, developing standards for a broad range of areas, including metals, paints, plastics, textiles, petroleum, construction, aviation, energy, the environment, consumer products, electronics, medical services and devices, computerized systems, homeland security and much more.
Robust Standards Products and Services: Reduce Your Time to Knowledge

ASTM International, a world leader in standards development and delivery, offers powerful, easy-to-use solutions for accessing, managing and sharing technical information throughout an organization.

**ASTM Compass: Standards, Training and Learning Portal**
ASTM Compass brings together all of ASTM's comprehensive technical content and resources in one customized web portal. With ASTM Compass, an entire organization has instant access to ASTM standards, test methods, training programs, publications, translations and more. ASTM Compass offers powerful tools for managing and sharing information on ASTM standards organization-wide, enabling users to preserve critical corporate knowledge and tackle mission-critical work processes with greater speed and efficiency.

**ASTM Digital Library**
With more than 1,400 books, 60,000 articles and chapters, and more than 12,000 standards written by leading technical experts from around the world, the ASTM Standards and Engineering Digital Library is one of the world's most comprehensive and credible resources for technical standards and related information. Through easy access on the ASTM website, users can rapidly access technical information across diverse fields, including petroleum, metals, construction, forensics, consumer products and more.