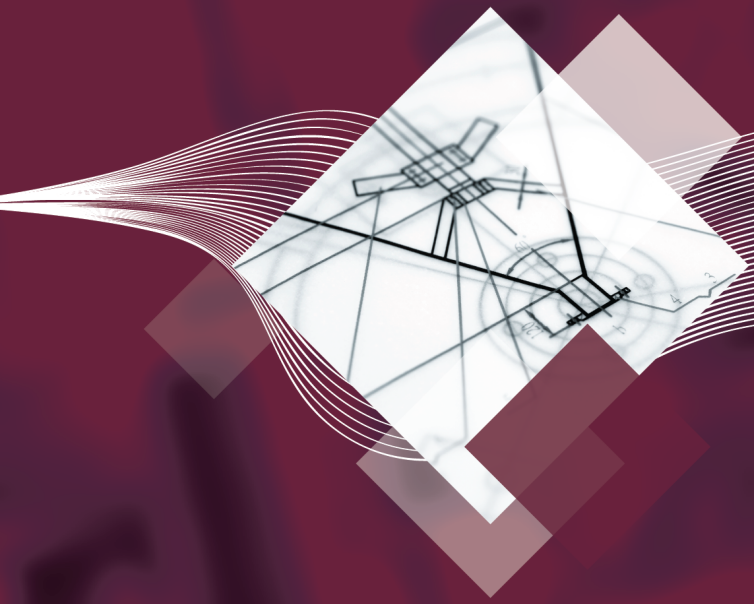
The Why & How of ASME Standards & Certification



The American Society of Mechanical Engineers®
ASME®

ASME
SETTING THE STANDARD

Introduction

While most people rarely give them a second thought, standards are vital to the safe and efficient operation of virtually every part of our infrastructure. Standards help ensure the compatibility and strength of fasteners that hold together automobiles and other machines; the safety and quality of machinery that moves both people and materials; and the reliability and safe operation of power plants that deliver electricity to our homes and offices.

In addition to helping to ensure interoperability, safety, reliability and quality, by establishing a framework of accepted best practices, standards serve as fundamental building blocks for research, product development and innovation. Standards also facilitate trade by establishing confidence between purchasers and suppliers of goods and services.

About ASME

Founded as the American Society of Mechanical Engineers in 1880 by a small group of leading industrialists to solve critical engineering challenges, ASME has played a significant role in standardization from its very beginning (see inset). Today ASME is a premier not-for-profit membership organization that enables collaboration, knowledge sharing, career enrichment, and skills development across all engineering disciplines. With the help of its **125,000 members from around the globe**, ASME continues to help solve critical challenges and advance engineering knowledge for the benefit of humankind. Among its numerous activities is the development, maintenance, and publication of more than 500 standards, covering everything from simple equipment such as hand tools and plumbing fixtures to complex systems governing computational analysis and the design and operation of power plants.

THE BEGINNING OF ASME'S ROLE IN STANDARDS DEVELOPMENT

When ASME's founders – including Henry R. Worthington, Alexander Lyman Holley and John Edson Sweet, along with other prominent industrialists and technical innovators of the nineteenth century – gathered in New York City for the first time in 1880, the main topic of discussion centered on the need for standardized tools and machine parts as well as uniform work practices in the dawning industrial age. Engineering standards, the founders agreed, would ensure safety, reliability and operational efficiency in machine design and mechanical production.

During the annual meeting of the Society in 1883, a paper was presented to initiate discussion on the need to adopt a set of rules for conducting boiler tests which would be generally accepted among engineers as a standard code of practice. The paper emphasized that "every engineer who makes a boiler test makes a rule for himself, which may be varied from time to time to suit the convenience or interests of the party for whom the test is made." In 1883 a committee on standards and gauges was created, and in 1884, the Code for the Conduct of Trials of Steam Boilers was published, becoming ASME's first standard.

The Beginning of ASME's Role in Standards Development

ASME is not alone in developing technical standards; however, it is globally recognized as the leader in providing consensus standards relating to the field of mechanical engineering.

What roles do standards play in everyday life?

As noted in the Introduction, standards serve many roles. Standards provide manufacturers and service providers an industry-approved benchmark for which to design and offer their products. Likewise, individuals involved with procurement frequently need to compare the products offered by vendors. Contracts requiring fabrication or construction often specify that work be performed to a specific standard. For example, many industrial contracts which require welding specify that it be performed in accordance with ASME Boiler and Pressure Vessel Code, Section IX, ASME Boiler and Pressure Vessel Code, Section IX, Welding, Brazing and Fusion Qualifications. Requiring products or processes to meet a given standard helps to ensure better quality and facilitates the comparison of two or more competing products or services. And using globally relevant standards, such as ASME's, enables industries to achieve economies of scale and gain access to multiple markets, thereby lowering costs for producers and consumers alike.

Who uses ASME standards?

Some standards, such as ASME's B107 Standards on Hand Tools, and its PALD Standard on Portable Automotive Lifting Devices, are used primarily by manufacturers and suppliers as a means of ensuring the quality and safe design of products that come in direct contact with consumers. Other standards, such as ASME's B30 Standard on Cranes, Hoists, and Related Lifting Equipment, its A17 Safety Code for Elevators and Escalators, and its B31 Pressure Piping Codes, govern not only the safe design of equipment, but also the operation, inspection, testing and maintenance of equipment. While these standards contain information primarily useful for manufacturers, purchasers and users (such as technically skilled contractors), they also contain provisions that result in greater protection of the general public from potential hazards.

How are ASME standards developed?

Each ASME standard is developed (and maintained) by one or more volunteer committees comprised of subject matter experts. These committees are tasked with incorporating advancements in technology and lessons-learned from real world use in order to ensure the standard continues to be relevant to the industries that use it. Members of ASME Standards & Certification committees are technically qualified individuals with a concern and willingness to participate in the scope of work of a given standard. While members participate (including vote) as individuals rather than as representatives of their employer or of any other organization, their selection includes consideration of the business interest of the employer, if any, who supports the member's standards committee participation (as well as the type of experience or expertise the individual brings to the standards committee), in order to ensure a proper balance among stakeholders. Terms for membership are typically five years, and members are eligible for reappointment.

ASME standards committees are required to maintain a balance of members in various interest classifications so that no one group dominates. Some examples of the various interest classifications are: users, manufacturers, insurance interests, testing laboratories, government regulatory agencies and general interest (including academia and consultants).
Volunteers must agree to adhere to the ASME Policy on Conflict of Interest, the Engineer's Code of Ethics and Standards and Certification's policies regarding intellectual property.

The inclusion of specific provisions within standards is typically supported by real-world experience. Occasionally, however, instances arise where data in support of a standardized approach is not available. ASME Standards Technology LLC (STLLC) was established to manage research and development projects which yield data in support of standardization, particularly for new and innovative technologies.

STANDARD FAQ's

What are standards? A standard can be defined as a set of technical definitions, instructions and guidelines for people involved with the design, manufacture, installation, inspection, maintenance, and/or operation of equipment. Standards can run from a few paragraphs to hundreds of pages, and frequently make reference to other related standards. The terms "codes" and "standards" are often used interchangeably.

Are standards mandatory? Standards themselves are voluntary unless the use of the standard is required by a legally binding contract between two or more parties or it is adopted into regulations by a governmental authority having jurisdiction.

What are performance-based standards? Technical standards have traditionally been prescriptive, providing one or more detailed methodologies as the basis for achieving a particular objective. Performance-based standards, however, such as the ASME A17.7 Performance Based Code for Elevators and Escalators, establish performance objectives without prescribing a precise methodology.

What is conformity assessment? Conformity assessment comprises activities taken to verify that products and processes conform to particular standards. ASME accredits third party organizations that satisfactorily demonstrate they are capable of implementing activities such as inspection and testing, and certifies individual manufacturers that satisfactorily demonstrate they can build products that meet ASME standards. ASME also certifies personnel to attest that their qualifications conform with applicable ASME standards.

What is consensus? Consensus means substantial agreement has been reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution.

What is due process? Due process means that any person (organization, company, government agency, individual, etc.) with a direct and material interest has a right to participate by expressing a position and its basis, have that position considered and appeal any decision or action.

Why aren't ASME's standards free? While ASME standards aren't free for commercial uses, we provide copies and extractions to interested parties upon request. Developing high quality, globally relevant consensus standards is costly and complex. Recouping costs via the sale of standards (rather than charging for participation) enables ASME to foster an inclusive and diverse environment by minimizing costs to participate and ensures that the standards developing process is not overly influenced by commercial or political interests.

What makes ASME's standards development process different?

ASME is not alone in meeting the needs of industry, governments and the public at large through the development of standards; numerous organizations around the world create voluntary standards, best practices and guidance documents. Over the course of its history, however, ASME has adopted numerous policies and procedures that ensure that its standards are among the most respected – and most relevant – in the world. In addition to being accredited by the American National Standards Institute (ANSI), which establishes essential requirements and procedures for ensuring due-process (see Standards FAQs), ASME abides by standards development principles established by the World Trade Organization including transparency, openness, impartiality and consensus, relevance and effectiveness, coherence and developing country interests.

Not all standards developing organizations are open to participation...

Participation on ASME standards development committees is free and open to all technically qualified and materially affected stakeholders, regardless of citizenship, nationality or affiliation.

...nor do they provide the public with the ability to express concerns.

ASME's consensus process ensures that all stakeholders – both direct participants and members of the general public – have the opportunity to submit comments and requires that the developing body provides a formal response following due consideration of the comment. ASME routinely publishes information related to its standards activities on its website (http://go.asme.org/standards), its S&C Update newsletter, and within ANSI's weekly Standards Action publication. In addition, its standards committees and boards have individual webpages (cstools.asme.org/csconnect/CommitteePages.cfm) that provide staff and committee contact information, meeting notices and other pertinent information. In addition, all ASME standards development meetings are free and open to the general public.

ASME offers true consensus.

Participants on ASME's standards developing committees are classified by stakeholder interest in order to ensure that the resulting standard or conformity assessment program – in addition to being technically sound and commercially relevant - reflects a balanced solution. Procedural due process provides the ability for any person or corporate entity to have direct access to the standard development process and, if requested, to have an impartial hearing of appeals on actions. This is in stark contrast to standards developers who may provide free access to the standard once it is developed, but strategically limit participation and access during development in order to ensure their members gain a commercial advantage by embedding proprietary technology into the standard or simply by getting a head start over any potential competition.

...independent from political or commercial interests.

ASME is not funded by any trade or business and underwrites the considerable cost of standards activities through the publication and sale of their standards. Funding standards development via the sale of standards, rather than from up-front funding from industry, businesses, government or individual participants, has several key advantages, such as:

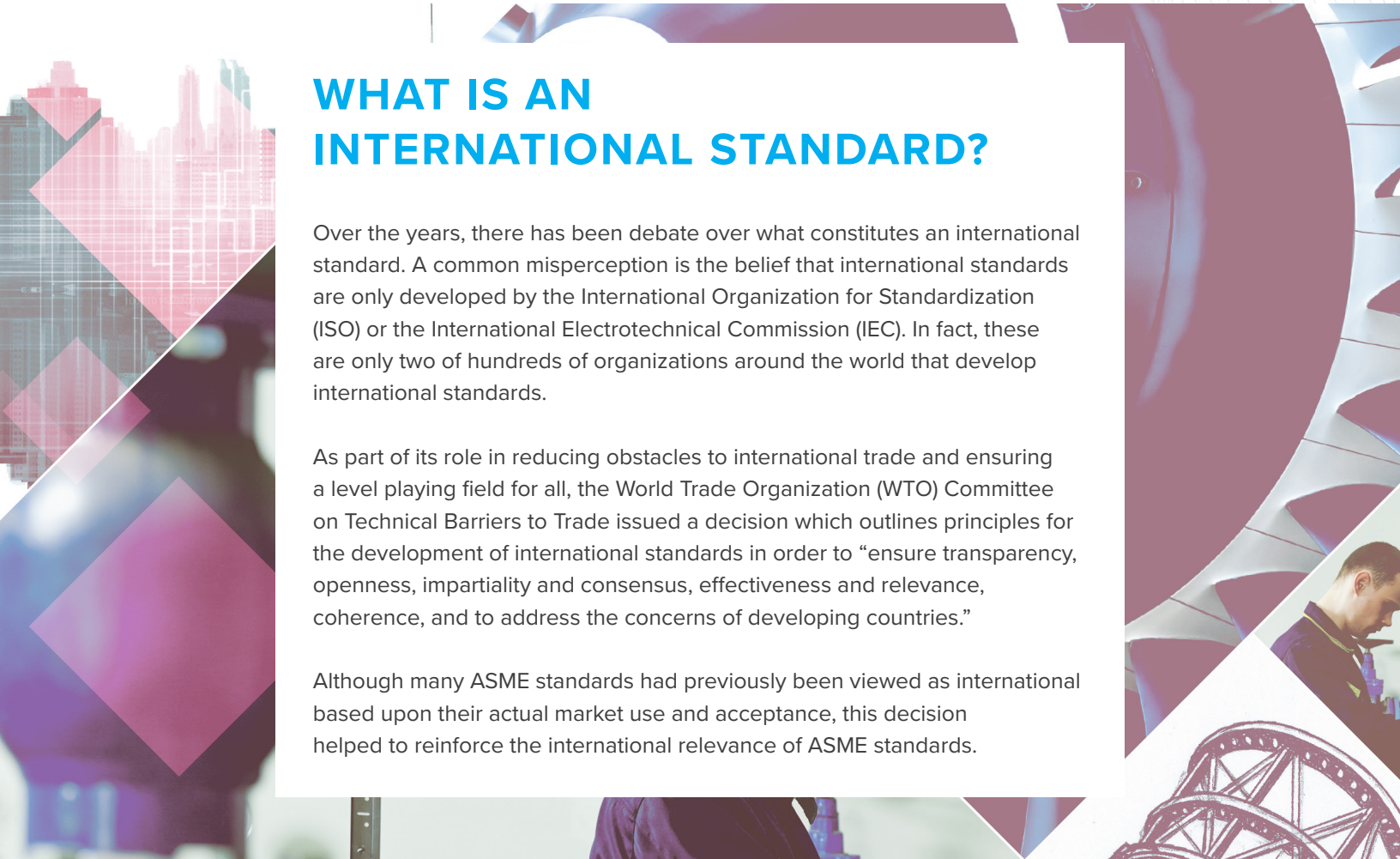
- precluding specialized commercial or political interests from dominating the standards development process
- creating a low barrier to participation, thereby maximizing stakeholder diversity, inclusion, and expertise
- fairly placing the cost of standards on those who directly benefit and efficiently distributing those costs across all affected industries and all jurisdictions where they are used

Additionally, unlike the "one country–one vote" model employed by some standards developers, consensus is achieved based on technical merit rather than a national delegate voting system which can be skewed to benefit commercial or political interests.

ASME is responsive and relevant.

ASME's standards are reviewed at least every 5 years – with many being maintained in a continuous state of review. This ensures that they keep pace with advancements in technology and reflect the current state of industry practice. ASME's commitment to being responsive to stakeholder needs is taken a step further in that it provides technical interpretations (at no cost) in instances where the existing wording in a standard is construed as ambiguous.

Quite simply, many standards developers lack the transparency, inclusivity, and due process afforded by ASME.



WHAT IS AN INTERNATIONAL STANDARD?

Over the years, there has been debate over what constitutes an international standard. A common misperception is the belief that international standards are only developed by the International Organization for Standardization (ISO) or the International Electrotechnical Commission (IEC). In fact, these are only two of hundreds of organizations around the world that develop international standards.

As part of its role in reducing obstacles to international trade and ensuring a level playing field for all, the World Trade Organization (WTO) Committee on Technical Barriers to Trade issued a decision which outlines principles for the development of international standards in order to "ensure transparency, openness, impartiality and consensus, effectiveness and relevance, coherence, and to address the concerns of developing countries."

Although many ASME standards had previously been viewed as international based upon their actual market use and acceptance, this decision helped to reinforce the international relevance of ASME standards.

The Why and How of ASME standards & Certification

Why does ASME update its standards so frequently/infrequently?

ASME revises or reaffirms its standards at least once every five years. Aside from being a requirement of ANSI accreditation, this ensures that standards are optimally responsive to regulatory and market needs. Whether developing a first edition standard or revising an existing one, ASME seeks to engage critical stakeholders to ensure it has access to information related to the latest available technological, practical and commercial developments.

Why are some standards referenced in regulations?

Standards that are linked with the interest of public safety are useful not only for industry, but also for regulators. If a government agency with responsibility for protecting public safety elects to make a standard mandatory, the standard will carry the force of law. The ASME Boiler and Pressure Vessel Code, for instance, has been incorporated into the laws of all 50 United States, throughout the provinces of Canada and is in use in 100 countries around the world, with translations in a number of languages. Many countries, including the United States, have policies that encourage government agencies to use voluntary standards rather than develop government unique standards. Such policies have been very effective in lowering costs for governments and businesses alike by reducing the potential for the duplication of effort and the development of conflicting standards.

Why does conformity assessment matter?

While standards establish widely accepted guidelines and requirements, it is often difficult to know whether a product or service meets a standard without some form of verification. Conformity assessment refers to activities that ensure such compliance.

A primary type of conformity assessment is certification, in which a company or individual is evaluated to ensure they are able to meet a given standard. Another type of conformity assessment is accreditation, in which an organization is reviewed to ensure it has the capacity to offer services such as inspection or testing.

ASME's oldest and most widely-known product certification program – for manufacturers of boilers and pressure vessels – is used by more than 6,000 companies in over 70 countries around the world. ASME operates product certification programs for manufacturers and suppliers of nuclear components; nuclear material; bioprocessing equipment; and reinforced thermoset plastic corrosion resistant equipment. It also operates a certification program for nuclear quality assurance.

ASME also certifies personnel in areas such as plant operations and geometric dimensioning and tolerancing. These certification programs provide industries with a means to benchmark professional competency in areas where mistakes can be extremely costly.
Not all standards have or need an accompanying conformity assessment program; however, certification and accreditation programs are often beneficial in areas where safety and reliability are critical.

How do people gain experience using ASME Standards & Certification programs?

Standards have always been a great tool for engineers – and engineers traditionally learned how to apply them through on-the-job experience. As they gained more experience in their given field, they eventually became fluent with their application. In today's workforce, however, engineers and technical professionals rarely spend decades working in a single field; a continuously evolving global market means the most skilled and experienced engineers may leave for opportunities in another field – or another part of the world.

Employers can no longer depend on informal mentoring networks to ensure their employees have a good grasp on the relevant standards for the project at-hand, and employees have learned that to maximize their value, they need to quickly be able to expand their technical competencies. Adapting to this new reality, ASME has placed an increased emphasis in providing workforce training and offers standards-related training courses in multiple formats, including public seminars and workshops, self-guided eLearning courses, and in-company training, which may be customized to individual company requirements.

For more information about ASME Learning and Development courses, visit: http://go.asme.org/education

What global areas are served by ASME Standards & Certification?

ASME strives to serve the needs of engineers and technical professionals throughout the world. Whether in person or in cyber-space, ASME Standards & Certification collaborates with industry groups and governments from various countries on a daily basis. Through workshops, seminars and other types of information exchange, ASME works to raise awareness of the benefits of standardization and conformity assessment and to foster a greater understanding of its programs and publications.

What are the benefits of participating in the standards developing process?

Participating in the development and maintenance of ASME's standards provides benefits to both individuals and sponsoring organizations. These benefits include the ability to have a significant influence on the direction and quality of a given standard; increased opportunities to interact with and learn from the foremost technical experts in a given field; ensuring that the organization's interests, practices and experience are thoroughly considered in developing and updating requirements in standards; and gaining an in-depth understanding of how potential changes may impact your industry and organization.

How can I get involved?

Whether you are a prospective member or materially affected organization, ASME has a number of ways to get involved.

For more information on becoming involved with ASME Standards & Certification activities, visit: http://go.asme.org/standards

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