

Article on Board on Standardization and Testing for the ASME 125 Anniversary

It has been said that standards, which started out as agreements among makers and users of manufactured items on their dimensions and other characteristics--are crucial to the workings of advanced industrial economies. Codes and standards serve society in various roles. They serve, for example, as key supports of global trade, and they promote the transfer of technology and knowledge.

For 125 years ASME has supported the needs of government, industry, and consumers by quietly providing solid, valuable, and needed standardization services.

A typical example of the influence of standards dates to the 1940s, when ASME quietly served the United States during the Second World War. The U.S. government had begun discussions with Britain and Canada concerning the modifications to a certain screw thread. These meetings were later expanded to consider the wider prospect of a possible unification of inch-based screw threads and of other basic engineering practices. This later evolved into the ABC (American-British-Canadian) projects for the unification of engineering standards. ASME members were involved in these efforts in such areas as unified screw threads and gauging practices, pipe thread, bolts nuts and screws, engineering drafting practices, and other issues.

By standardizing on these and other basic engineering practices, interchangeability of parts of manufactured products was greatly enhanced and led to increased trade and commerce among the three countries.

In 2005 the Board on Performance Test Codes was merged into the Board on Standardization to create the Board on Standardization and Testing, which currently oversees 19 standards-writing committees.

The department's codes and standards cover a very large assortment of topics. It has dimensional standards on screw threads, fasteners, plumbing fixtures, and many other products. These standards also provide test procedures. There are measurement standards on metrology, fluid flow, pressure and temperature. There are specifications for chemical pumps, steel stacks, and hoists.

The committee on drawing practices has written Y14.5, which establishes uniform practices for stating and interpreting design language of geometric dimensioning and tolerancing. ASME offers two levels of certification for Geometric Dimensioning and Tolerancing Professional. In recent years the committee has prepared a standard which establishes requirements and reference documents applicable to the preparation and revision of 3-D digital models.

Performance test codes are applicable to the determination of performance of specific mechanical equipment used in power generation, which is designed to meet specified criteria for performance and operability. The codes provide requirements for instrumentation, test procedure, test environment, and interpretation of test results. They provide a basis for evaluation of performance compared to the specifications for equipment acceptance tests or qualification criteria to demonstrate operability.

The first ASME standard, published in 1884, was a performance test code, a method to test boilers. As technology has advanced, so have test standards. One of the more recent developments is a code on procedures for performance testing of integrated gasification combined cycle (IGCC) power generation plants to determine fuel gas flow and quality, thermal efficiency, and power output at specified operating conditions. Four additional publications on IGCC are under development.

The Board on Standardization and Testing recently formed a new committee on Verification and Validation in Computational Modeling and Simulation. A *Guide for Verification and Validation in Computational Solid Mechanics* was published in 2006. A second standard, *Verification and Validation in Computational Fluid Dynamics and Heat Transfer* will be available later this year. Five other related verification and validation documents are being considered.

In 2008, the Committee on Industrial System Energy Assessment was formed to prepare standards for conducting energy improvement assessments for steam systems, compressed air systems, process heating systems, and pumping systems. The Department of Energy has studied more than 200 plants that performed energy assessments and found that their assessments had identified ways to reduce energy consumption by more than 10 percent the first year and ways to reduce carbon emissions, as well. The development of these drafts is being expedited to meet the needs of industry, and it is expected that four energy assessment standards will be published by the end of 2009. Guides in these areas will also be developed.

Other committees are working on standards for alternative energy sources. One is a published code which provides test procedures and definitions for the performance characterization of fuel cell power systems, which convert input fuel and oxidizer into output electrical and thermal energy. Another is a project to prepare a performance test code for concentrated solar power using parabolic troughs, dishes, or towers to heat a circulating fluid. Committees are also initiating projects to update existing standards on flue gas desulfurization units, and flue and exhaust gas analyses.

Written by Steve Weinman, Director Standardization & Testing Department in April 2009