

Effectively Dealing with the Increase of Electronics Industry Standards

IHS Whitepaper

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As the Institute of Electrical and Electronics Engineers (IEEE) approaches having 1,300 standards either completed or under development¹, it serves as an example of the ongoing increase of electronics and electrical industry standards in existence today. Achieving and maintaining standards compliance has become more complex than ever as the number of standards, regulations, Quality Management Systems (QMS), and standards-related organizations that electronics and electrical companies and engineers have to deal with continues to grow.

This white paper explores:

- the background to today’s industry standards environment
- challenges and issues of the current electronics and electrical standards climate
- tools and techniques that simplify the process

of standards research, identification and procurement

- technology solutions designed to save time and money associated with standards management

The Evolution of Today’s Electronics and Electrical Standards

As early as the 1880s, America’s leading electrical engineers were lobbying for a formal body to promote and regulate their flourishing industry, leading to the formation of the American Institute of Electrical Engineers (AIEE) in 1884. The AIEE actively led the way in developing electrical industry standards, setting the course for American standards development in the years to come².

Through World Wars I and II, manufacturing and industry related accidents increased the demand for written procedures and standards development³. Even

before the end of WWII, the U.S. Congress was considering ways to create a more unified and standardized approach to the then fragmented activities of the military. Ultimately, a department of national defense was formed, setting the trend of standardization through coordination of various departments

Significant Events In the Evolution of Electronics and Electrical Standards	
1884	American Institute of Electrical Engineers (AIEE) forms.
1947	National Military Establishment is formed. Renamed the Department of Defense (DoD) in 1949.
1959	U.S. develops Quality Program Requirements standards for military supplier procurement conformance.
1963	American Institute of Electrical Engineers and Institute of Radio Engineers merge to form Institute of Electrical and Electronics Engineers (IEEE) .
1971	British Standards Institution (BSI) publishes first UK quality assurance standard, BS 9000 .
1987	Initial ISO 9000 document is released, influenced by numerous standards in use around the world.
2003	European Union (EU) adopts Restriction of Hazardous Substances (RoHS) and Waste Electrical and Electronic Equipment (WEEE) directives.
2006	RoHS and WEEE directives take effect in EU, impacting local and international manufacturers, suppliers, and exporters of electronics products and components.

under a single governing body.

Over the next 40 years, standardization in the electronics and electrical industries continued to evolve along more regional lines. By the late 80s, however, ISO 9000 set a new trend in standardization with the emphasis being on international standards and Quality Management Systems.

An Electronics Standard Case Study: IEEE Std. 1680

In May 2006, the IEEE announced its electronics recycling-related standard, Std. 1680 “Standard for Environmental Assessment of Personal Computer Products,” providing a real world example of:

- why standards exist
- what benefits standards bring
- motivations behind standards and regulations development
- value added to a specific product through the application of a standard

Std. 1680, the first environmental standard to come out of IEEE, is also the first national standard on computer recycling in the U.S. In contrast to this national standards initiative, at least 10 individual states have, or are considering, electronics recycling programs, with California’s most closely resembling the EU’s RoHS and WEEE directives. The likely result of each state creating its own independent program is inconsistency between the standards and regulations applicable to the electronics industry.

Preventing such inconsistencies is one of the main reasons standards were initially created. The more universally a standard is accepted, the more it can benefit regulators, manufacturers, and consumers in terms of:

- consistency in quality and safety measures
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- compatibility between products or components manufactured by different producers
 - efficient integration of distinct regulatory bodies
 - reduced development time and cost through sound engineering practices

In the case of Std. 1680, however, marketing considerations were one of the main motivations behind the standard’s development. As consumers continue to become increasingly sensitive to the “greenness” of the products they choose, manufacturers can benefit from making it clear where they fall on the environmentally friendly scale. In a win-win scenario, purchasers can consult the independent Green Electronics Council (GEC) website to see evaluations of specific computer products as measured against the Std. 1680 standard, while manufacturers are rewarded for voluntarily following the standard through increased likelihood of sales.

In order to involve all interested stakeholders in the development of Std. 1680, the IEEE collaborated with representatives of the procurement, recycling, academic, and state government fields over 3 years of publicly accessible effort. The hope is that such cross-discipline integration during the standard development process will result in more universally accepted standards, and thus a greater realization of the potential benefits standards offer to all involved.

Challenges and Issues of Today's Standards Climate

This 100+ year tradition of development of standards, requirements, and standards-related organizations has left today's electronics and electrical manufacturers and suppliers to deal with a standards reality where:

- both historic and current standards can apply to the same product
- both domestic and international standards can apply to the same product
- the company can choose between various approved Quality Management Systems when seeking compliance for a given product

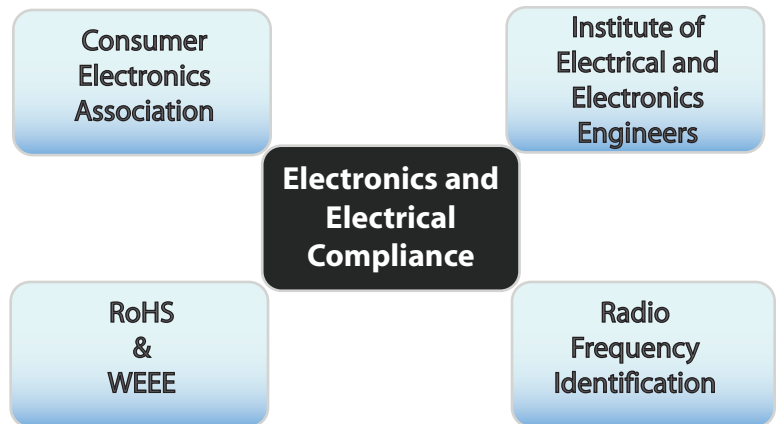
In other words, despite the ongoing development of standards over the last century, there is no single QMS or standards-related organization that provides truly global standards for the electronics or electrical industries. For example, an electronics manufacturer concerned about achieving or maintaining compliance needs to consider:

- Consumer Electronics Association (CEA) standards related to product safety and compliance for the development, manufacturing and distribution of audio, video, mobile electronics, communications, information technology, multimedia and accessory products, as well as related services sold through consumer channels.
- Institute of Electrical and Electronics Engineers (IEEE) technical standards, journal articles, and conference papers when locating background information, challenging hypotheses, validating assumptions, or generating ideas (IEEE publications exceed 12,000 from the past 12 years alone).
- Restriction of Hazardous Substances (RoHS) and Waste Electrical and Electronic Equipment (WEEE) directives in connection with developing and distributing electrical and electronic equipment free of the identified six hazardous substances for use in the European Union, and the development

of programs in each of the 25 member countries for the reclamation of such products.

- Radio Frequency Identification (RFID) standards and specifications in order to adhere to RFID mandates while doing business with the U.S. Department of Defense and/or corporations that require RFID tags on items shipped to their distribution centers.

This example is far from an exhaustive examination of the various standards, regulations, standards-related bodies, and conditional criteria that can apply to the design, development, manufacture and distribution of a single electronics product.



Fortunately, industry standards developers, such as the IEEE and others, do not simply create standards that electronics and electrical companies and engineers must follow, but also welcome participation in the standards development process. For example, the Telecommunications Industry Association's (TIA) Standards and Technology Annual Report for 2005 cites that users often establish requirements for technology being standardized in such industry segments as private radio communications systems and equipment for voice and data, as used by business, industry, police, ambulance, and fire fighters⁴.

Effectively Identifying Electronics and Electrical Standards

While the IEEE rightly points out such benefits of standards as sound engineering practices, increased product quality and safety, and reduced market risks, the fact remains that the added time and costs currently associated with achieving and maintaining standards compliance have created new business challenges for the electronics and electrical industries, particularly when it comes to identifying the specific standards or regulations that apply to a given product or process.

In order for businesses to minimize their standards-related research costs, tools and techniques can be

used to reduce the amount of time and money required to narrow the standards procurement process. For example, a simple technique for speeding the research process involves identifying those standards most commonly procured by competitors in a given electronics or electrical industry segment. Such “most popular” lists can be referenced online to quickly locate standards and regulations being used for comparable situations.

The table below provides an example of some of the most common electronics and electrical standards and regulations acquired from a 3rd-party standards supplier:

Standard/Requirement	Description
NEMA C119.1 Electric Connectors Sealed Insulated Underground Connector Systems Rated 600 Volts	This standard covers sealed, insulated underground connector systems rated at six hundred (600) volts for utility applications and establishes electrical, mechanical, and sealing requirements for sealed underground connector systems.
API RP 500 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2	This document applies to the classification of locations for both temporarily and permanently installed electrical equipment. It is intended to be applied where there may be a risk of ignition due to the presence of flammable gas or vapor, mixed with air, under normal atmospheric conditions.
IEC 60529 Degrees of Protection Provided by Enclosures (IP Code)	This standard applies to the classification of degrees of protection provided by enclosures for electrical equipment with a rated voltage not exceeding 72,5 kV. The object of this standard is to give: a) Definitions for degrees of protection provided by enclosures of electrical equipment, b) Designations for these degrees of protection, c) Requirements for each designation, and, d) Tests to be performed to verify that the enclosure meets the requirements of this standard.
IEEE C63.4 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment	This standard specifies U.S. consensus standard methods, instrumentation, and facilities for measurement of radio-frequency signals and noise emitted from electrical and electronic devices in the frequency range 9 kHz to 40 GHz. Where possible, the specifications herein are harmonized with other national and international standards used for similar purposes.
DLA MIL-STD-883 Test Method Standard Microcircuits	This standard establishes uniform methods, controls, and procedures for testing microelectronic devices suitable for use within Military and Aerospace electronic systems including basic environmental tests; mechanical and electrical tests; workmanship and training procedures; and other controls and constraints.

When it comes to tools for effective standards procurement, third-party standards suppliers offer wide ranges of products designed to reduce the time and money invested in document research, purchasing, and management. With the advent of the Internet, these tools usually take the form of online interfaces that ease the process of searching and accessing massive databases that are regularly updated with the most recent standards and regulations. The more sophisticated third-party services go far beyond mere standards searching and purchasing to create a centralized document management solution and access point to the collection of standards-related bodies pertaining to the electronics and electrical industries.

How IHS Simplifies the Electronics and Electrical Standards Challenge

IHS (<http://www.ihs.com>) is an industry-leading third-party standards supplier and recipient of the IEEE's exclusive "Partnership Award." IHS offers an integrated, online solution for the searching, researching, procuring, and tracking of both current and historic standards for electronics and electrical companies. Whether leasing access to a set of documents through a subscription, or purchasing individual retail documents, IHS simplifies the process of effectively dealing with the growing number of electronics and electrical standards while increasing ROI by decreasing the time and costs involved.

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Resources

¹"IEEE Standards." Institute of Electrical and Electronics Engineers. 5 Oct. 2006. <<http://www.ieee.org/web/standards/home/index.html>>.

²"History of the IEEE." Institute of Electrical and Electronics Engineers. 5 Oct. 2006. <<http://www.ieee.org/web/aboutus/history/index.html>>.

³"ISO 9000." Wikipedia. 15 Aug. 2006. <http://en.wikipedia.org/wiki/Iso_9000>.

⁴"Standards and Technology Annual Report 2005." Telecommunications and Industry Association. 2005. p. 4.

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