

Chapter 2

Standards Setting in the United States

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Standards Setting in the United States

Introduction

The current U.S. standards process **was** adopted at the turn of the century, as the Nation entered the industrial age. Its form reflects American political culture and the manner in which industrialization took place in the United States. In contrast to many other countries, where unified national standards bodies were established in conjunction with the State, standards development organizations in the United States first emerged in the private sector, in response to specific needs and concerns.

Today, the U.S. economy is in a state of flux due to a number of developments. These include the emergence of a highly competitive global economy in which the United States is no longer dominant; the rise of regional trading blocs, the growing importance of multinational corporations and other transnational nongovernmental institutions, and the rapid advance of technology.

Just as the industrial era gave rise to the present standards development system, so too these major structural changes will likely place new demands on it. To understand the implications of these changes for the U.S. standards process, one must first look historically at the evolution of standards within the U.S. economy and the institutional arrangements that promote their development.

The Evolution of Standards in the U.S. Economy

The Role of Standards in Economic Transactions

Standards are part of all social interactions. Interpersonal relations cannot occur without some mutual expectation. Language, itself, is based on a common understanding, as are simple gestures.¹ Shared expectations give coherence and meaning to social life. They are necessary for cooperation. When reenacted and reinforced over time, such normative expectations give rise to “standards of behavior.”

Standards also serve to govern economic interactions. In preindustrial societies, for example, economic interactions were often regulated by family relationships and codes of human behavior.³ Bureaucracy provided a parallel function in more complex organizations. By standardizing roles, relationships, and responses, workloads were greatly reduced.⁴ Standards are especially important in the marketplace, because market interactions require a high level of cooperation and coordination. Standards lower the cost of economic transactions and, thus, can greatly improve efficiency.

Economic standards have proliferated and become more highly valued, as economic relationships became more intricate. One major impetus for standardization was economic specialization. With

¹Irving Goffman, *Frame Analysis* (New York, NY: Harper and Row, 1974).

²Norms”. . .designate any standard as a rule that states what human beings should or should not think, say, or do under a given set of circumstances.” Judith Blake and Kingsley David, “Norms, Values, and Sanctions,” Robert E.L. Fairs (ed.), *Handbook of Modern Sociology* (Chicago, IL: Rand McNally, 1964), p. 456. Norms guide the behavior of individuals belonging to a group. People conform to norms not only for fear of punishment, but also because norms are internalized, so people believe they correctly define the right thing to do. John and Erma Perry, *The Social Web: An Introduction to Sociology* (New York, NY: Harper and Row, Publisher, 1979), p. 95.

³As Karl Polanyi notes:

in preindustrial societies trading relations were governed by standards relating to magic, etiquette, and norms of reciprocity.

See Karl Polanyi, *The Great Transformation: The Political and Economic Origins of our Time* (Boston, MA: Beacon Press, 1957 cd.), p. 57. For a discussion of the relationships between social and economic interactions in preindustrial England, see Neil Smelser, *Social Change in the Industrial Revolution: An Application of Theory to the Lancashire Cotton Industry, 1770-1840*, (London: Routledge and Kegan Paul, 1959).

⁴As James Beniger notes:

One example from within bureaucracy is the development of standardized forms. This might at first seem a contradiction in that the proliferation of paperwork is usually associated with a growth in information to be processed not with its reduction. Imagine how much more processing would be required, however, if each new case were recorded in an unstructured way, including every nuance and in full detail rather than by checking boxes, filling blanks, or in some other way reducing the burdens of the bureaucratic system to only the limited usage of formal, objective, and impersonal information required by standardized forms.

James Beniger, *The Control Revolution: Technology and the Economic Origins of the Information Society* (Cambridge MA: Harvard University Press, 1986), pp. 15-16.

the division of labor and specialization, tasks became more interdependent, requiring greater cooperation and information exchange.⁵

Mass production provided a tremendous impetus for standards development, since standardized processes required that there be standardized parts.⁶ Mass production, and with it the demand for interoperable parts, was especially prominent in the United States where the economic conditions for large-scale production were ripe. In no other country was there a geographic market large enough to absorb the output of a single standardized commodity or stable enough to sustain continual large-scale production.⁷ Nor was there anywhere else a labor or consumer market equivalent to that in the United States, which could take advantage of an ever expanding volume of mass produced capital and consumer goods.

Henry Ford was one of the first to recognize the relationship between mass production and mass consumption, and he paid generous wages accordingly. However, by 1920, most businessmen subscribed to the view that it would be the wage earners who would be “the spenders of the nation.” Not surprisingly, therefore, by 1928 the average American’s national income was estimated to be one-third greater than the average European’s.⁹

The relationship between standards and mass production **was** self-reinforcing. Further advances in precision manufacturing required the development of machine tools and precision gauges, which in turn further drove the need for standards and standard measures. Of particular importance was the vernier caliper, which was first made in the United States in 1851.¹⁰ Inexpensive and capable of reading to thousandths of an inch, the new caliper permitted ordinary machinists—whether they were gun smiths, watchmakers, or sewing machine manufacturers—to develop precision, interoperable parts.¹¹

Standards were also spurred on by the extension of markets across great distances. Coinage, for example, was used to standardize value, increasing both the potential and geographic scope of trade.¹² Coinage allowed people to compare things in the abstract, and hence carry out exchanges irrespective of time and distance. As trade became more dispersed, standards were needed to assure that products manufactured in different locals could work together and be easily replicated, assembled, and repaired¹³ (see box 2-A). Moreover, standards were required to facilitate trading, itself. For example, the railroad extended trade over vast regions, so proce-

⁵ See, for a discussion, Emile Durkheim, *The Division of Labor in Society* (New York, NY: Free Press, 1933).

⁶ As noted by Harold Williamson:

Chief among the other elements in the pattern of mass production is the principle of standardization. Stemming from the rudimentary division of labor, standardization involved the continuous pursuit, and progressive realization, of uniformity of the materials, operations and products of industry, which made possible the future subdivision and mechanization of labor.

Harold Williamson, (ed.) *The Growth of the American Economy* (New York, NY: Prentice Hall, 1951), p. 722.

⁷ Michael J. Piore and Charles F. Sabel, *The Second Industrial Divide: Possibilities for Prosperity* (New York, NY: Basic Books, 1984).

⁸ As Williamson notes:

Mass consumption was the main support as it was the prerequisite of mass production. . . The American home market, in the words of Andrew Carnegie, is a “vast homogeneous market,” and this factor too was a major influence affecting the evolution of mass production. Across the horizontal plane and its great geographical extent, as well as up and down the vertical social scale, the American market place underwent a standardization of taste and consumption that bore profound psychological and economic significance. In part, the demand for great quantities of identical and similar commodities was built up by the subtle suggestions of salesmanship and advertising that were a parallel and logical accomplishment of mass production itself.

In part also, such ready standardization of consumption was due to the scarcity of craft skills in the new country. This basic compatibility between mass production and standardized mass consumption was, furthermore, a practical manifestation of that democratic egalitarianism. Williamson, op. cit., footnote 6, p. 721-722.

⁹ Ibid.

¹⁰ Constance McLaughlin Green, “Light Manufacturing and the Beginning of Precision Manufacture,” Harold Williamson, op. cit., footnote 6, p. 201.

¹¹ Ibid.

¹² See, for a discussion, Donald B. Woodwind and Marc A. Rose, *A Primer of Money* (New York, NY: McGraw Hill Book Co., Inc., 1935).

¹³ Ibid., p. 6.

Box 2-A—The Need for Standards

Everyday, millions of pictures are taken by thousands of people who profess not to understand standards. There are few better illustrations of the types and nature of standards than this example. It gives some indication of the number of types of standards involved.

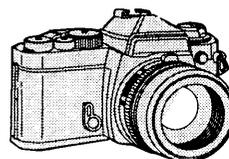
To begin, the film and the camera matched. They were not made by the same manufacturer, but they **interoperated**. This **interoperation** was made possible by voluntary consensus standards. The film maker and the camera maker agreed to conform to market pressure and used a standard 35mm format. No law requires this; the market expects the standard to be honored. The camera understood that the film speed was one specified by an ISO number-ISO standing for the International Organization for Standardization. Again, the market expects conformance to a standard.

The film **was** sent to a processing plant-and the **internal** standards of the processing plant require that the film be tagged with appropriate header information to ensure that it is returned to the owner. The film is developed according to a certain process, usually specified on the outside of the film canister. The chemicals used to develop it must be disposed of in a manner approved by environmental authorities, and the final pictures are printed in a reasonably standard format, usually three inches by five inches. These were then returned to the sender, the check cashed, money deposited and the transaction completed. It is a simple occurrence, but one that is completely driven and controlled by standards, on which our industrialized society is built.

SOURCE: Carl Cargill, "Justifying the Need for a Standards Program," *Standards Management: A Handbook for Profits* (New York, NY: ANSI, 1990), pp. 1-2.



The film:
standard size and sprocket
and sensitivity



The camera:
standardized speeds, lens
size, f-stop, batteries,
flash, and film advance.



The developer:
regulations,
internal standards
on processing speed,
rules for film return,
disposal of dangerous
chemicals.

SOURCE: Reproduced with the permission of ANSI.

dures for billing and exchange were also standardized through bills of lading.¹⁴

Stakeholders in the Standards Process

As the role of standards increased, so did the number of people who had a stake in the selection of

standards. Many early standards were simply set unilaterally, by 'the powers that be. **European monarchs**, for example, established standard weights and measures as a matter of royal **prerogative**.¹⁵ In similar fashion, Article 1, Section 8 of the United States Constitution **authorizes** the Federal Government to set standard weights and **measures**.¹⁶

¹⁴As noted by Kirkland:

A national railroad system required business innovations facilitating joint and through operations. Passengers must make connections with tolerable certainty and ease: the freight cars of a corporation must not come back to stop at some corporate terminus where an agency would have to unpack their cars and transfer it to the cars of another carrier, like as not just across the street. Almost unchronicled and undated, the railroads introduced through bills of lading, and though shippers still carp at their limitations, these bills became the accepted method of freighting in the seventies. . .

Edward Kirkland, *Industry Comes of Age: Business, Labor, and Public Policy* (New York, NY: Holt, Rheinhard, and Winston, 1961), p. 49.

¹⁵As Soloman notes:

. . . according to *The Oxford English Dictionary*, the word *standard* is derived from an early concept of the flag or standard bearer; one might say, "the King's Standard."

Richard Soloman, "New Paradigms for Future Standards" (Cambridge MA: Research Lab of Electronics, MIT, 1989), pp. 1-2.

¹⁶It is noteworthy that Congress did not act directly on this authority. On Apr. 2, 1722, Congress adopted the decimal system of money; weights of coins, however, were not standardized until 1828, when Congress adopted the British troy pound as the standard for American coinage. Rexmond C. Cochrane, *Measures for Progress: A History of the National Bureau of Standards* (Washington DC: National Bureau of Standards, 1966) p. 24.

Producers got involved in standardization when trade was extended across greater distances. Standards served as a trademark, allowing them to differentiate their products from their competitors, and to price products for different markets. It was to this end, for example, that American farmers played such an important role in setting agricultural standards during the first half of the 18th century. They realized that by grading and classifying their products, they could set up separate distribution channels and increase their profits. Thus, when farmers moved west, they labeled their products by the region of their origin, while wholesalers used these names—Goschen butter, Genessee flour, and Herkimer cheese—as designations of grade.¹⁷

Suppliers were brought into the standards process with industrialization and the development of precision manufacturing. Recognizing that production costs could be greatly reduced with interchangeable parts, they began to produce to specifications.¹⁸ Gun manufacturing was one of the first industries in the United States to take advantage of production based on interchangeable parts, followed by clock making and the manufacturing of bicycles and sewing machines.¹⁹ In 1813, Simon North signed a contract with the Federal Government to produce 20,000 pistols. His contract specifically stipulated that, “the component parts of pistols, are to correspond so exactly that any limb or part of one pistol, may be fitted to any other of the twenty thousand.”²⁰

No one understood the value of interoperability better than Henry Ford, who, in 1913, limited

production at his Highland Park plant to the standard, black Model T. “Any customer can have a car painted any color he wants,” he said, “so long as its black.”²¹ Ford, however, was not the only one to standardize the production of cars. Henry Lebland, who created the Cadillac and the Lincoln, illustrated the benefits of interchangeable parts when, in 1908, he took apart three Cadillacs; mixed up the parts; put the cars back together, and then drove them away.²²

Consumers also gained from standardization. Mass produced goods were cheaper. Thus many consumer goods—such as cars, refrigerators, and vacuum cleaners, which were once regarded as luxuries—became more accessible to all. Between 1914 and 1924, Ford produced more than 15,000,000 standardized Model Ts, the cost of which dropped during the same period from \$950 to \$240.²³

Standards also conveyed product information and provided greater quality control. One of the first product areas to benefit from standards was that of food. Responding to scandals in the meat packing industry, Congress passed the Pure Food and Drug Act of 1906. This legislation not only protected against misbranding and food adulteration; it also standardized containers for marketing fruits and vegetables, thereby eliminating false measurements and deceptive shapes.²⁴ Later the Department of Agriculture, continuing the standards program initiated during the First World War, developed standards for fruits, vegetables, peanuts, honey, butter, cheese, eggs, and meat, and established inspection stations at a number of key distribution centers.²⁵

¹⁷ James Beniger, *op. cit.*, footnote 4.

¹⁸ As Cargill points out:

It was the secondary suppliers who most spurred the growth of voluntary standards; screw sizes, pipes and valve fittings, and rail ties were just a few of the scores of newly standardized objects. Various interest groups coalesced within industries to insure that their industry has its standards—standards were intended to make the industry grow or to make it more profitable and/or less complex.

See Carl Cargill, *Information Technology Standardization: Theory, Process, and Organization* (Digital Press, Boston 1989), pp. 20-21.

¹⁹ Siegfried Giedion, *Mechanization Takes Command: A Contribution to Anonymous History* (New York, NY: Oxford University Press, 1948), pp. 47-50.

²⁰ As cited in G.S. Radford, *The Control of Quality in Manufacturing* (New York, NY: The Ronald Press Co., 1922), p. 270.

²¹ Allan Nevins and Frank Ernest Hill, *Ford: The Times, The Men, The Company* (New York, NY: Scribner, 1954).

²² For a discussion of the impact of standards on the automobile industry, see George V. Thompson, *Journal of Economic History*, vol. 14, Winter, 1954, pp. 1-20.

²³ In this sense it can be said that Ford's real genius was in recognizing the explosive market for a less expensive “everyman” car—easily built, sold, and maintained. Personal communication, Carl Cargill, DEC. Williamson also notes that:

the philosophical and practical relation between mass production and mass purchasing power was perceived early by Henry Ford. By 1920, it had become a commonly held business option that “wage earners . . . are the spenders of the nation.”

Williamson, *op. cit.*, footnote 6, p. 721; See also Giedion, *op. cit.* footnote 19.

²⁴ One of the problems for consumers was the lack of standard weights and measures.

²⁵ Alice Edwards, “Standardization in the Household,” in *Annals of the American Academy of Political Science*, 1928, p. 213, hereafter referred to as *Annals*.

The general public became even more attuned to the need for standards because of the many problems accompanying industrialization. With more and more mishaps due to the rapid expansion of technology, safety standards were introduced.²⁶ Explosions averaging 1,400 per year led the American Society of Mechanical Engineers, for example, to write a comprehensive boiler code in 1910. Once most States and cities had moved to adopt the code, such explosions were virtually eliminated.²⁷

The leaf fire in 1904 on the grounds of the National Bureau of Standards also had a significant impact. Dealing with the fire was made much more difficult because the fire hoses could not be coupled because of differences in threads. The incompatibility between hoses and hydrants also accounted for the problem controlling the Baltimore fire, which occurred the same year. Buildings numbering 1,526 and all electric lights, telegraph, telephone, and power facilities in an area of more than 70 city blocks were destroyed before the fire burned out. And fire companies from outside the area could not link their hoses to the Baltimore hydrants, making it impossible for them to help²⁸ (see box 2-B).

With the advance of technology and its further deployment in industry, scientists and engineers began to play a special role, as a group, in standards development.²⁹ Faced more and more with the need to quantify their results, they could not proceed in their work without more accurate standards of measurements, precision instruments, and better tools.³⁰ Thus, even though standards were a boon to industry, it was the scientist and not the industrialist who called for national standards to be developed through a Federal Bureau of Standards.³¹ The demand for electrical standards was especially acute, and it was in fact the scientist and engineers working in this field that supplied the frost cadre of workers for the National Bureau of Standards after it was established in 1901.³²

Although the Federal Government became involved in standards as early as the mid-eighties through the work of the Office of Weights and Measures, and later with the establishment of the Bureau of Standards, it was not until World War I that the government's stake in standards was really brought home to the Nation. In 1917, product diversity was so great it threatened to hinder the war effort. To deal with the problem, the government set

²⁶ As David Van Schaack, writing in 1928, described the impetus behind safety standards:

One of the most interesting developments of the last decade or two has been the rapid increase of interest in industrial safety. It was only natural that the astonishing progress in machine production which had placed the United States in the forefront of industrial nations should direct its attention to the human waste accompanying it. . . . This waste made its first appeal to the moral sense, but this was soon supplemented by a steadily increasing belief that accidents in industry have more than a humanitarian aspect—that they have such an impact on production that they must be taken into consideration from an economic point of view.

David Van Schaack, "Development of Safety Codes," *op. cit.*, footnote 25, *Annals*, p. 70.

²⁷ Achsah Nesmith, "A long, arduous march toward standardization" *Smithsonian Magazine*, February 1985, p. 185.

²⁸ Remond C. Cochrane, *op. cit.*, footnote 16, pp. 84-86. To overcome such problems it is not enough to merely set standards; standards need to be implemented. As Nesmith notes:

Sixty years after the Baltimore fire, the city learned that firemen in an adjoining county were requesting fireplugs which did not fit hoses made to national standards be marked with fluorescent paint so firefighters could tell where special adapters were needed.

Nesmith, *op. cit.*, footnote 26, p. 188.

²⁹ As described by Cargill:

Standardization was pushed by the growing group of technocrats, headed by the engineers—civil, metallurgical, mining, electrical. For the first time an emerging discipline had a body of literature that dealt with demonstrable reality, capable of being duplicated. . . . This reliance on a factual, demonstrable base is the hallmark of the standards industry. It is no accident that in the late 1800s, the American Society for Testing Materials (ASTM) was one of the first organizations to gain prominence as a standards group.

Cargill, *op. cit.*, footnote 18, p. 21.

³⁰ The first real effort to develop accurate weights and measures did not occur until 1832 under the direction of Ferdinand Rudolph Hassler, who collected the various standards used in government departments. It was a slow process, however, and Hassler's work was only half completed when he died in 1843. Cochrane, *op. cit.*, footnote 16, pp. 24-25.

³¹ As Cochrane notes:

The builders of America's industrial complex had little interest in standards as such, but the scientists, engineers, and experimenters working for them found themselves increasingly hampered without them.

Cochrane, *op. cit.*, footnote 16, p. 9.

³² According to Cochrane:

Electric light and power companies developed at a phenomenal rate throughout this period. So numerous were the demands of the electrical industry and of electrical research labs for basic measurements, instrumentation tests and calibrations that almost half of the new people coming into the Bureau went into this division,

Ibid., p. 109.

up a Commercial Economy Board of the Council of National Defense, whose task was to simplify the use of labor, capital, and equipment for all industries.³³ In 1918, the Board was incorporated within the War Industries Board, which eventually supervised the manufacture of over 30,000 articles of commerce. The intensity of this campaign made every American conscious of standards—its impact “reached into every home, every office, factory, institution, and government agency in the United States.”³⁴

Concern about the post war economy led government to take a continued—if not more intense—interest in standards, in the period following the war. The hope that wartime simplification efforts would endure was dashed when manufacturers’ sought to revive consumer demand by increasing product diversity during the “buyers’ strike” of 1919–1920.³⁵ The government’s response to the post war slump was quite the opposite.³⁶ Inspired by the report, *Waste in Industry*, written by the American Academy of the Federated American Engineering Societies, the government hoped to revive the economy by increasing economic efficiency through greater standardization.

The driving force behind this “crusade for standardization,” was Herbert Hoover, Secretary of Commerce under President Harding. Hoover called for a three-pronged approach to the reduction of waste in industry: 37

- . standardization of business practices and of materials, machinery and products;

- . specifications to insure good quality of products; and
- . simplification in variety of products.

In contrast to the wartime simplification program that had focused on military products, Hoover’s program was directed at the economy as a whole. To carry out the program, he organized agencies within the Department of Commerce to provide standards assistance to business at their request.

The standards crusade was considered a success. It reached a peak in the late twenties when, according to the American Standards Association:³⁸

Standardization had become “the outstanding note of this century,” its influence pervading “the remotest details of our industrial regime” topping “all sources of scientific knowledge and [affecting] every phase of design, production, and utilization.”

Balancing the Public and Private Interests in Standards

As more and more stakeholders became involved in standards, it became necessary to differentiate the responsibilities among them. Of prime importance was the relationship between the public and the private sectors. Although the government actively promoted standardization at the turn of the century, it gradually relinquished this responsibility to the private standards development organizations. However, because standards serve both public and private functions, this arrangement was not without tensions. And, every so often these tensions erupted from under the surface, as they have today.

³³ The government worked in cooperation with industry. In 1917, the American Chamber of Commerce met in Atlantic City, where it endorsed the committee system. According to this system, each industry would organize its own committee and cooperate with government in its own fashion. Reflecting the attitudes of business, W.E. McCullough, a participant noted:

The experience of the members of these committees, which were largely made up of executives of several industries opened their eyes to the danger which they had been drifting into prior to the war in permitting the increasing of their varieties, which also meant the insidious reduction of volume, thereby decreasing their plant efficiency, and greatly increasing their costs.

E.W. McCullough, “The Relation of the Chamber of Commerce of the United States to the Growth of the Simplification Program in American Industry,” pp. 9–10, *Annals*, op. cit., footnote 23.

³⁴ According to Cochrane:

Labor savings in the manufacture of products from clothing to coffins reportedly reached as high as 35 percent. Savings over prewar consumption of materials in some instances rose to 50 percent as simplicity ruled and plentiful wood, paper, zinc, and cotton replaced the steel, tinsplate, copper, brass, bronze, pig@ nickel, and raw wool consumed by the war. The country had experienced nothing like it before.

Cochrane, op. cit., footnote 16, p. 167.

³⁵ Ray M. Hudson, “Organized Effort in Simplification,” op. cit., *Annals*, footnote 23, p. 1.

³⁶ Cochrane, op. cit., footnote 16, p. 255.

³⁷ Congressional Research Service, Science Policy Division, *Voluntary Industry Standards in the United States: An Overview of their Evolution and Significance for Congress*, Report to the Subcommittee on Science, Research, and Development of the Committee on Science and Astronautics, U.S. House of Representatives, 93rd Cong. 2nd Sess., July 1974, hereafter referred to as CRS 1974.

³⁸ *Ibid.*

Box 2-B—Facsimile Edition of NFPA’s First Standard—the Fire Sprinkler Standard

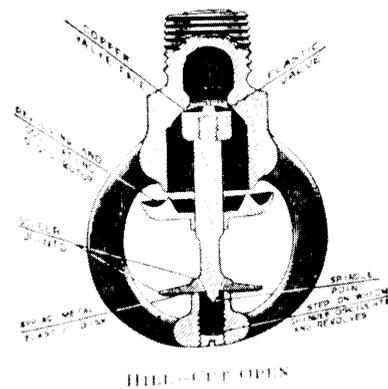
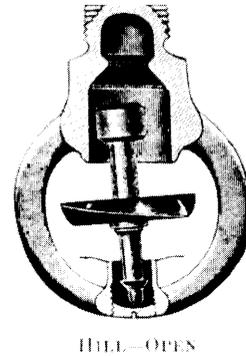
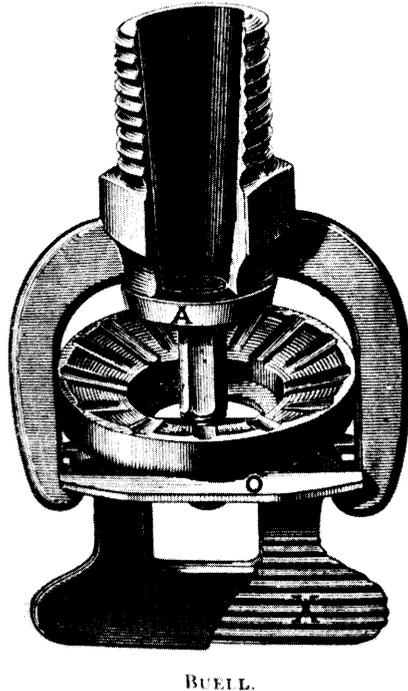


Photo credit: James Smalley/NFPA

This is a facsimile edition of NFPA’s First Standard—the Fire Sprinkler Standard. It is the very standard which led to the creation of the National Fire Protection Association in 1896. At that time, the Association’s first Secretary, Everett U. Crosby, reported that within a small radius of New York City alone, “nine radically different standards for size of piping and sprinkler spacing” existed.

In 1897, he described the principles applied in creating the Sprinkler Standard—a process that continues to direct NFPA technical committees today:

To bring together the **experience of different sections** and bodies of underwriters, to come to a mutual understanding, and, if possible, an agreement on general principles governing fire protection, to harmonize and adjust our differences so that we may go before the public with uniform rules and conditions which may appeal to their **judgement** is the object of this Association.

SOURCE: National Fire Protection Association.

*The American Preference for
Pluralist Solutions*

The American preference for private, pluralist solutions is as old as the Constitution itself. Presag-

ing the loosely organized and fragmented standards system to be found in the United States, Publius (a.k.a. James Madison), in the *Federalist Papers* (no. 10) contends that the only way to guard against domination by a majority faction is to promote a large number of diverse competing

ones.³⁹ Writing to Thomas Jefferson, James Madison summed up this view:

Divide et impera, the reprobated axiom of tyranny is, under certain qualifications, the only policy by which a republic can be administered on just principles.⁴⁰

The Founding Fathers were successful in framing the Constitution to have just such an effect. From the outset of the new republic, Americans proved to have a penchant for joining factions and establishing associations, a trait that did not escape the observation of Alexis de Tocqueville when he visited America in the mid-1800s. As he described in *Democracy in America*:

Nothing . . . is more deserving of our attention than the intellectual and moral associations of America. Americans of all ages, all conditions, and all dispositions constantly form associations. They have not only commercial and manufacturing companies, in which all take part, but associations of a thousand other kinds, religious, moral, serious, futile, general or restricted, enormous or diminutive.

. . . Wherever at the head of some new undertaking you see the Government of France, or a man of rank in England, in the United States you will be sure to find an association.⁴¹

This support for voluntary, private sector associations⁴² was reinforced by a general suspicion of the

state and preferences for market solutions.⁴³ Although these values were often supported more by rhetoric than practice, they were greatly popularized by the progressive movement, which had its heyday in the late 1800s just at the moment when industrialization was primed to take off.⁴⁴ Thus, whereas in many other countries government actively sponsored the growth and development of business, in the United States industrial development was managed, directed, and financed primarily by the private sector.⁴⁵

The Emergence of Standards Organizations

The first American standards organization were in keeping with this tradition. They generally emerged to deal with specific needs as they arose, and thus took a variety of forms (see table 2-1). Often established on an industry by industry basis, there was little interaction between them.⁴⁶ The first American standards organization was the United States Pharmacopial Convention, which was setup in 1829 to establish uniform standards for drugs. The American Iron and Steel Institute, established in 1855, was the first trade association to develop standards. The American Society of Civil Engineers, which was formed in 1852, was the first scientific

³⁹ As described by Plattner:

How can a republic be protected from such a faction? The first and most important part of Publius's answer is that "the existence of the same passion or interest in a majority at the same time must be prevented." In other words, far from seeking the greatest possible unity among the citizens, as the legislators of the small virtuous republics did, the framers of the American Constitution made the choice of encouraging multiplicity and disunity.

See Marc F. Plattner, "American Democracy and the Acquisitive Spirit," Robert A. Goldwin and William Seabam (eds.) *How Capitalist is the Constitution?* (Washington DC: The American Enterprise Institute, Constitutional Studies Series, 1982), ch. 1.

⁴⁰ James Madison to Thomas Jefferson, Oct. 24, 1787, Galliard Hunt, (ed.) *The Writings of James Madison*, 9 vols. (New York, NY: G.P. Putnam's Sons 1906, as cited in *ibid*).

⁴¹ Alexis de Tocqueville, *Democracy in America* (1963 ed.), pp. 106 and 110.

⁴² For cross-cultural comparisons, see Robert Wuthnow (ed.), *The Voluntary Sector in Comparative Perspective* (Princeton, NJ: Princeton University Press, 1991).

⁴³ See for discussions, Willi Paul Adams, "Republicanism," Jack P. Green, ed., *Encyclopedia of Political History* (New York, NY: Scribners, 1984); see also Dorothy Ross, "Liberalism," *ibid*.

⁴⁴ Member of the progressive movement helped to expose a number of scandals that linked politicians and business, reinforcing Americans suspicions of the government. Ironically, the reputation of big business was actually improved. As Walsh notes:

Laissez-faire economic theory seemed newly justified by the record of great corporate successes between 1889 and 1929. The role of government in that development was discounted and its reputation tarnished.

Annemarie Hauch Walsh, *The Public's Business: The Politics and Practices of Government Corporations* (Cambridge, MA: The MIT Press, 1978), pp. 25-26.

⁴⁵ See, for a discussion, David Vogel, "Government-Industry Relations in the United States: An Overview," Stephen Wilks and Maurice Wright (eds.), *Comparative Government-Industry Relations* (Oxford: Clarendon Press, 1987), ch. 5.

⁴⁶ As described by Cargill:

The tone for the entire voluntary standards effort was set by 1890. There was a strong concentration on creating standards within specific disciplines (metallurgy, mechanical engineering, electrical engineering, etc.), and emphasis on demonstrable and reproducible facts, and an internal focus on the part of the participants—a modified siege mentality.

Cargill, *op. cit.*, footnote 18, p. 21.

Table 2-I—Selected Features of Nine Private Standards Setters

	Founding date
American Society of Mechanical Engineers (ASME)	1880
Underwriters Laboratories (UL)	1894
National Fire Protection Association (NFPA)	1896
American Society for Testing and Materials (ASTM)	1898
Building Officials and Code Administrators international (BOCA)	1915
American Gas Association Labs (AGA Labs)	1918
American National Standards institute (Anal)	1918
The American Conference of Government Industrial Hygienists (ACGIH)	1938
Southern Building Code Congress (SBCCI)	1940

SOURCE: U.S. Department of Commerce, National Bureau of Standards, *Standards Activities of Organizations in the United States*, NBS Special Publication 681 (Washington, DC: U.S. Government Printing Office, August 1984).

and technical society involved in standards development.⁴⁷

While these private standards organizations could boast a number of accomplishments, perhaps the most impressive standardization effort of the period was the interconnection of the Nation's railways. By 1897, 1,158 independent railroad companies laid and interconnected over 240,000 miles of track with little assistance from government. This feat required not only the standardization of gauges but also of cars and their equipment. Also needed were uniform procedures and freight classifications as well as standardized time.⁴⁸ That such an achievement was accomplished within the private sector prompted a New York editorial writer to remark that:

The laws of trade and the instinct of self preservation effect reforms and improvements that all legislative bodies combined could not accomplish.⁴⁹

The private sector approach survived the war time simplification effort, and was reconfirmed by Secretary of Commerce Hoover, when he undertook the standardization crusade in 1921. Hoover was a

staunch believer in the private sector. Vetoing a public power bill that called for an active government role, he proclaimed, for example:

I hesitate to contemplate the future of our institutions, of our government, and of our country if the preoccupation of its officials is no longer to be the promotion of justice and equal opportunity but is to be devoted to barter in the markets. This is not liberalism, it is degeneration.⁵⁰

In accordance with this perspective, the Division of Simplified Practice set up in the Department of Commerce was designed to supply guidance, information, and assistance. But compliance with the program was purely on a voluntary basis.⁵¹

The depression capped the voluntary approach to standard setting. In 1933, Congress cut the Bureau's standards appropriations and impounded its funds. As a result, the staff of the Simplified Practice Division was cut from 40 to 4, and much of its work in the area of commercial standards was transferred to the American Standards Association (ASA).⁵²

Tensions Within the System

Notwithstanding the American preference for voluntary standards, there were a number of tensions in the standards setting community. Consumers were among the first groups to question the system. In the wake of Hoover's standardization crusade, they began to question whether they had derived any benefits from it. It was clear that standardization had saved industry money, but consumers saw little evidence that these benefits were being passed down to them.⁵³ They also looked to the Bureau for consumer product information, an area that business was loath to have government become involved in.

The business community also began to register complaints about the expansion of the Bureau's role, charging it with meddling in their affairs. Alarmed at the establishment of a trade standardization

⁴⁷ U.S. Department of Commerce (Robert Toth, cd.) *Standards Organizations in the United States*, NBS Special Publication 681, P. 4.

⁴⁸ Kirkland, op. cit., footnote 14, pp. 49-51.

⁴⁹ As cited in *ibid.*, p. 50.

⁵⁰ As cited by Annemarie Hauch Walsh, op. cit., footnote 44, p. 15.

⁵¹ Cochrane, op. cit., footnote 16. As Ray Hudson, the Assistant Secretary of Commercial Standards within the Department described:

The committees operate on the principle that if producers, distribution and consumers of a commodity can meet and develop a program of simplification which can be of benefit to all concerned, the Department of Commerce is glad to assist in securing its general adoption and in seeing that it is subject to periodic review so as to keep it in accordance with the best current practice.

Hays, *Annals*, op. cit., footnote 24, p. 9.

⁵² CRS, 1974, op. cit., footnote 37, p. 16.

⁵³ Cochrane, op. cit., footnote 16, p. 202.

division at the Bureau, the American Engineering Standards Committee (AESC) formally petitioned the Bureau to withdraw from all commercial standards activities. Members of the Bureau refused to attend private sector meetings in protest.⁵⁴

For the next two decades, relations between the public and private sectors were severely strained. The Bureau charged that the ASA was deliberately duplicating and blocking its standards. Meanwhile, ASA accused the Bureau of usurping its functions by promoting Federal specifications as commodity standards.⁵⁵

The Need for Cooperation and Coordination

With the government's retreat from the standards arena together with the proliferation of standards organizations, the need for national coordination of standards activities soon became apparent. Standards organizations were not only competing with one another to write standards, they were also writing conflicting standards, thus defeating the purpose.

The first steps towards coordination took place in 1918, during the war, when five national engineering societies, together with the U.S. Departments of War, Navy, and Commerce, formed the nucleus of an organization that was to become the AESC. In 1927, the representatives of 365 national organizations—technical, industrial, and governmental—were officially accredited to the AESC. The following year, this group was reconstituted to form the American Standards Association (ASA). However, despite ASA, coordination continued to prove difficult, because of competition among standards organization.⁵⁶

The second world war placed even greater demands for coordination on the U.S. standards community, again raising the question of the government's role in standards.⁵⁷ To meet the needs of war, the government became involved in setting standards for consumer goods. At the behest of the

Department of Commerce, a special consultant, Carroll L. Wilson, was asked to report on the standards problem, with particular attention to the role the National Bureau of Standards should play in the postwar period. Wilson concluded that both the government and the private sector standards programs fell short. Acting on Wilson's recommendations, the ASA broadened the scope of its concerns to include consumer goods. The ASA constitution was also revised so that all groups with an interest in a particular standard would have a voice in its development. Moreover, the revised constitution required that three members at large be included on the association's board of directors in order to provide a greater voice for consumer interests.⁵⁸

The broadening of ASA's mandate had only a marginal effect on its ability to serve as coordinator of all private sector standards activities. In February 1965, Francis L. LaQue, vice president of the International Nickel Co., issued a report on the state of the United States standards system, which had been undertaken at the request of Herbert Holloman, Assistant Secretary of Commerce for Science and Technology. According to the report, the principle standardization problem in the United States continued to be that of achieving legitimacy and coordination. The study noted that only 2,300 of the 13,675 nationally produced and used standards were designated as American standards through ASA. To overcome this problem, the report called for a national coordinating institution for voluntary standardization with international recognition such as that granted other national standards bodies. To assure such recognition, LaQue proposed that this institution have a Federal charter and that its standards be officially designated as U.S. standards.⁵⁹

Hoping to gain such a charter, the ASA adopted anew constitution and bylaws and took on the name of the United States of America Standards Institute (USASI). Characterizing itself as a federation of trade and other organizations, it redefined its mission. Among its purposes were to:

⁵⁴ Cochrane, *Op. cit.*, footnote 16, p. 302.

⁵⁵ *Ibid.*, p. 304.

⁵⁶ CRS, 1974, *op. cit.*, footnote 37, p. 13.

⁵⁷ To meet the needs of the war, industry advisory committees were set up to serve as liaisons with government on matters concerning simplification and standards.

⁵⁸ CRS, 1974, *op. cit.*, footnote 37, p. 18.

⁵⁹ Report of the Panel on Engineering and Commodity Standards of the Commerce Technical Advisory Board. Francis L. LaQue, Chairman, 1965. Parts A and B.

- act as the national coordinating institution for voluntary standardization;
- assure that the interests of all concerned are included in the process;
- eliminate duplication and conflict;
- promote knowledge and use of voluntary standards;
- simplify the development of standards;
- encourage the development of standards in accordance with the Institute procedures;
- serve as a national clearing house; and
- provide the channel for U.S representation in the development of international standards recommendations.

Acting purely as a coordinating body, the Institute no longer intended to develop standards; rather it would orchestrate their development through the combined technical talent and expertise of its member bodies and certify that these standards development bodies adhered to the consensus process.⁶⁰

The government and other members of the standards community resisted the effort of ASA to strengthen its role. A national charter was not forthcoming, and the FTC protested the use of the name USASI on the grounds that it suggested that ASA was an official organization of the Federal Government. A compromise was reached, and ASA became the American National Standards Institute (ANSI). Reporting on the state of the U.S. standards process several years later, the Stanford Research Institute (SRI) saw little hope for the future. The situation, according to SRI, was in fact deteriorating.

There is little hope that the situation will improve in the next several years. In fact fragmentation is becoming worse. Up through the mid-1960s, a favorable solution appeared possible under the guise of the quasi-official American National Standards Institute (ANSI). . . . Reportedly, however, ANSI now has less support and less probability of succeeding as the nominal national voluntary standards coordinating agency than it did a decade ago.

At the same time, other standards organizations are attempting to strengthen their individual positions, portending less opportunity for a coordinated effort. A leadership conflict exists and will probably persist for some time.⁶¹

The U.S. Standards Development Process as it Exists Today

Were Publius to observe the United States standards process today, he might well be pleased. American standards organizations continue to operate in a pluralistic framework. Almost half of all standards are set as part of a voluntary consensus process, in which all, or most of the key **players**—including government agencies—participate (see figure 2-1).

On the other hand, times have changed. The United States is no longer an isolated, homogeneous agricultural society where the greatest danger is rule by an oppressive majority. Quite the contrary. Among the dangers that the United States faces today is a loss of competitiveness, due partially to a failure at leadership in the international standards development process. Thus, like many reports on the U.S. standards process, Publius might be alarmed by the lack of leadership and failure to develop a national standards policy. However, leadership would require either that the private sector work cooperatively, or that the Federal Government assume a greater role. Ironically, neither remedy is likely, precisely because of the intensity of conflict that Publius prescribed.

Private Sector Standards Organizations

Within the U.S. standards community, there are approximately 400 organizations involved in standards development (see table 2-2). These groups are organized and function independently of one another, although they all arrive at decisions through a process of consensus, and provide some level of due process. All have mechanisms for participation, comment, and appeal.

There are five different types of private sector standards organizations. These include: trade associations, professional societies, general membership organizations, third-party certifiers, and consortia.⁶²

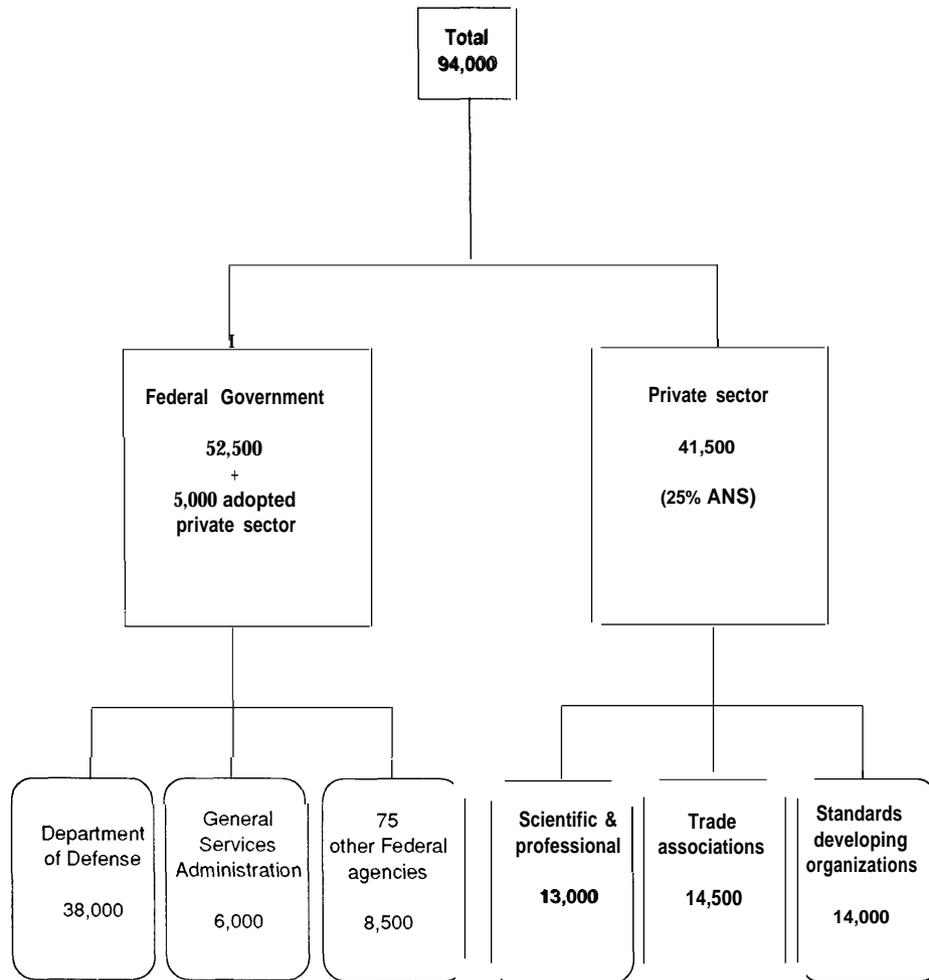
Trade associations are the most homogeneous, since they were most often created specifically to promote their industries' needs. Trade associations are also considered to be among the most exclusive standards bodies. Precisely for this reason, they are

⁶⁰ CRS, 1974, op. cit., footnote 37, pp. *6-*7.

⁶¹ SRI, *Industrial Standards* (Menlo Park, CA: SRI, The Long Range Planning Service, 1971), p. 3.

⁶² Ross E. Cheit, *Setting Safety Standards: Regulation in the Public and Private Sectors* (Berkeley, CA: University of California Press, 1990), p. 150.

Figure 2-1—U.S. Standards



SOURCE: Robert Toth, Toth Associates.

also the most likely to replicate market forces. Although some trade associations sell standards, they are generally supported overall through membership dues. Thus, with funds already committed, participation tends to be high. Among the trade associations participating in standards development are, for example, the National Electrical Manufacturers Association (NEMA), the American Petroleum Institute (API), and the Computer Business Equipment Manufacturers Association (CBEMA). Trade associations are also among the largest supporters of ANSI. This may be because ANSI buffers their activities from potential charges of anti-trust infringement.

Professional societies include organizations such as the American Society of Agricultural Engineers (ASAE), the American Society of Automotive Engineers (ASAE), and the Institute of Electrical and Electronics Engineers (IEEE). These societies are intended to advance theory and practice in a technical field, and thus have a strong engineering bent. Members participate as individuals, not as industry representatives. Not surprisingly, therefore, industry groups sometimes complain that professional society standards do not adequately represent market forces. To support their organizations, these societies often rely on the sale of standards, and thus they jealously guard their turf as they would a

Table 2-2—Twenty Major Nongovernment Standards Developers

	Number of standards
Aerospace Information Association.	3,000
American Association of Cereal Chemists.	370
American Association of State Highway & Transportation Officials.	1,100
American Conference of Governmental Industrial Hygienists.	700
American National Standards Institute.	1,400
American Oil Chemists Society.	365
American Petroleum Institute.	880
American Railway Engineers Association.	300
American Society of Mechanical Engineers.	745
American Society for Testing and Materials.	8,500
Association of American Railroads.	1,350
Association of Official Analytical Chemists.	1,900
Cosmetic, Toiletry & Fragrance Association.	800
Electronic Industries Association.	600
Institute of Electrical & Electronics Engineers.	575
National Fire Protection Association.	275
Society of Automotive Engineers.	5,100
Technical Association of the Pulp and Paper Industry.	270
Underwriters Laboratories.	630
U.S. Pharmacopoeia.	4,450

SOURCE: NIST Special Publication 806.

market. Some of the tensions within the standards communities relate to these standard sales.⁶³

General membership organizations are the most broad based of all the standards development organizations. Included among them, for example, are the American Society of Testing Materials (ASTM) and the National Fire Protection Association (NFPA). These organizations pride themselves on their fair and open standards processes (see figure 2-2, and table 2-3). Efforts are made to assure that participants represent a variety of backgrounds and interests. Moreover, their procedures most closely approximate formal due process. The National Fire Protection Association, for example, has 32,000 members including among them architects, engineers, fireman, manufacturers, and representatives from the insurance industry, government, and labor. And final standards decisions are made in plenary session, with everyone voting. These organizations are heavily dependent on sales for their survival. Standards sales, for example, constitute 80 percent of ASTM's income and 66 percent of NFPA's.⁶⁴

Third-party certifiers are independent organizations that test products to assure that they meet certain standards. Often these groups also write the standards to be certified. Manufacturers pay such labs to test their products for standards conformance. Third-party certifiers tend to have a strong engineering orientation, and they are among those who generally support the canvass method of standards development. These groups have a major stake in the outcome of European decisions about certification and testing. Underwriters Laboratories and the American Gas Association are examples of these kinds of standards organizations.

Consortia are not generally included among the traditional list of standards developers. These groups have emerged to deal with the rapidly developing information and communication technologies, and they are becoming increasingly popular. In the past year, consortia have been established, for example, to set standards for switched multimegabit data service (SMDS), Fiber Distributed Data Interface (FDDI) over twisted pair, asynchronous transfer mode (ATM), and frame relay technologies. They are generally exclusive groups who operate in a relatively closed environment, and thus questions may emerge in the future with respect to due process and the relationship of these groups to the rest of the standards community.

The Role of ANSI

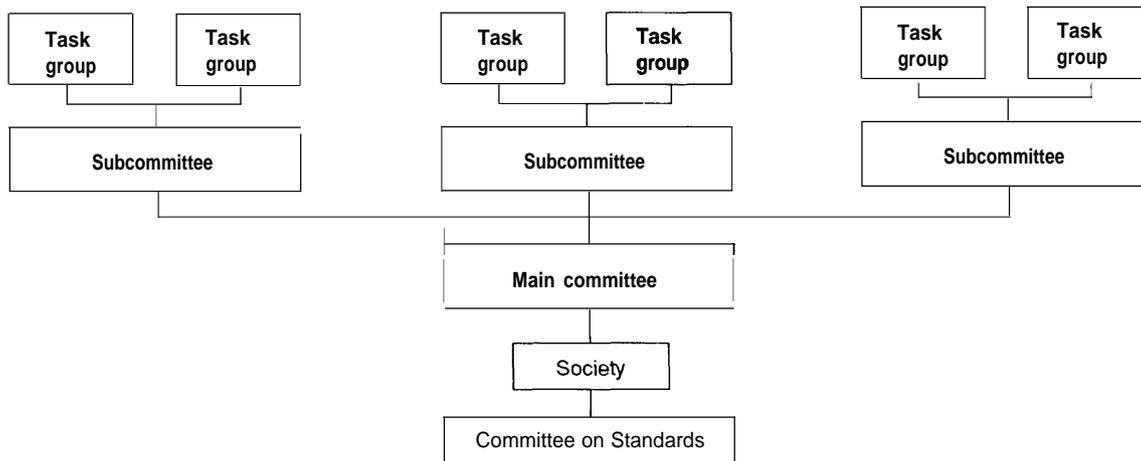
While functioning independently, many of these standards bodies coordinate their activities through the American National Standards Institute (ANSI). ANSI is a private, non-profit federation of standards organizations. Having no official charter, ANSI is in effect the "self-designated" national coordinating body for U.S. standards development organizations as well as the internationally accepted member body in the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).

Receiving the bulk of its financial support from private sector contributions (28 percent come from standards sales), ANSI's existence depends on its ability to continually meet the needs of its diverse membership. This has not always been easy, and

⁶³ Some claim, for example, that the present troubles between ASTM and ANSI can be traced back to an incident involving ASTM and IEEE. Allegedly, IEEE rushed to register a standard with ANSI that had actually been developed within ASTM. ANSI, it is said, was willing to oblige IEEE because it had a dispute of its own with ASTM. OTA interviews.

⁶⁴ Cheit, op. cit., footnote 64.

Figure 2-2—ASTM Consensus Process



SOURCE: American Society for Testing and Materials.

Table 2-3—Balloting Sequence and Requirements

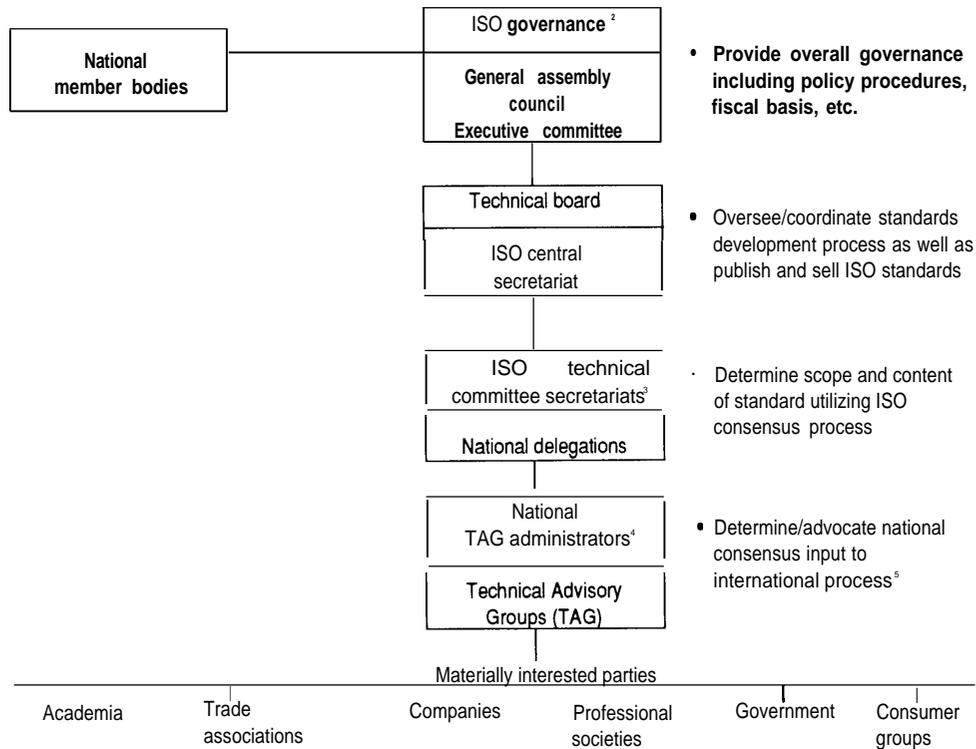
Level	To initiate	To complete successfully and proceed to next level
Task group study	No formal requirements	No formal requirements
Subcommittee ballot.	Subcommittee chairman approval or motion passed at subcommittee meeting At least 30 days between issue & closing date Cover letter explaining reasons for ballot	60% of ballots returned 2/3 affirmative votes (of total affirmative & negative votes cast on each item) All negative votes considered No negative votes are persuasive
Main committee.	Completed submittal form sent to headquarters with item All main committee ballots issued by headquarters	60% Of ballots returned 9/10 affirmative vote (of total affirmative & negative votes cast one each item) All negative votes considered All pink forms completed & returned to staff No negative votes are persuasive
Society ballot.	Staff submits items to society ballot after successful main committee ballot	All negative votes considered All green forms completed & returned to staff No negative votes are persuasive
Committee on.	Staff submits item to Committee on standards after successful society ballot	Committee on standards agrees that correct procedures were followed
Approval & publication.		

SOURCE: American Society for Testing and Materials.

some of the major U.S. standards bodies—such as ASTM, ASME, and IEEE—have refused to defer to ANSI, and continue to act independent both domestically and internationally.

ANSI does not develop standards. Rather, it functions as a central clearing house and coordinating body for its member organizations, which develop standards on a decentralized, committee

Figure 2-3-Overview of ISO-ANSI Process



NOTES: 1 ANSI, AFNOR, BSI, DIN, JISC, SCC, ETC

2 Includes ISO Secretary-General and Treasurer

3 Generally ISO national member body except in U.S. Typically delegated to TAG administrator

4 ANSI- Accredited U.S. administrators include: AAMI, ASME, ASTM, CBEMA, NEMA, etc.

5 In U.S. involves advancing either consensus standard or position as determined by TAG

SOURCE: American National Standards Institute.

basis. Nor does ANSI make judgments about the substance of a standard. Instead, it certifies that these voluntary standards bodies have arrived at standards through one of three ANSI accredited procedures. Having met ANSI's approval, a standard is entitled to become an American National Standard. In 1988, the National Bureau of Standards (NBS)--now the National Institute of Standards (NIST)--estimated that approximately 8,500 standards, or 25 percent of all nongovernmental standards, have been processed through ANSI.⁶⁵

As the member body of ISO and the manager of U.S. IEC activities, ANSI also coordinates the U.S.

standards position in the international arena (see figure 2-3). ANSI is the only member body within these organizations that is not officially so designated, and one of the few that receives no financial support from its national government.

The Role of the Federal Government in Standards

The Federal Government does little to promote voluntary standards. Instead of orchestrating the U.S. national standards setting process, the government has focused much of its efforts on the fairness and effectiveness of the standards development process.⁶⁶

⁶⁵ Patrick Cooke, *A Review of U.S. participation in International Standards Activities* (Washington, DC: U.S. Department of Commerce, National Bureau of Standards, 1988), p. 17.

⁶⁶ The U.S. Government has, however, traditionally set procurement specification for all its purchases. Thus, the Department of Defense and the General Security Administration account for a major portion of all government standards. However, both agencies are moving towards greater reliance on voluntary standards.

This preference for voluntary consensus standards was reaffirmed in the 1979 Trade Act, which formally recognizes the private sector's role in standard development, and in the Office of Management and Budget (OMB) Circular A-119, which directs Federal agencies to use voluntary standards wherever possible in both regulatory and procurement activities. In both instances, however, the Federal Government retains the right to assume a greater role when necessary.⁶⁷

The Consumer Movement and the Rise of Regulatory Standards

The Federal Government's interest in standards was rekindled in the late '60s and early '70s in response to consumer concerns about safety and anti-trust matters. Ralph Nader first raised the issue in 1965, when he published *Unsafe at Any Speed*, which severely criticized automobile standards as they had been developed by the Society for Automotive Engineers. Other horror stories about the standards system abounded. Testifying some years later on the Voluntary Standards Accreditation Act, Nader summarized consumers' concerns about the standards process.

... Trade product standards often harm consumers. The history of standards is strewn with abuses: standards essentially written by large corporations to exclude competitors from the marketplace, standards that misrepresent hazardous products as safe, standards that boost sales while benefiting only the producer, and standards designed to head off

tough government safety requirements rather than protect the public.⁶⁸

Congress was quick to react. In 1967 it set up a National Commission on Product Safety to analyze the effectiveness of consumer product standards. After reviewing more than 1,000 standards, the Commission concluded that the system was 'chronically inadequate both in scope and permissible levels of risk.'⁶⁹ Moreover, it suggested that the voluntary sector process was unable to produce adequate standards, given the dominant role of industry.⁷⁰ This attitude was reflected in much of the health and safety legislation that followed, which often made special provision for standards.⁷¹ It was also the basis on which Senator James Abourezk, in March 1975, and again in 1977, introduced the Voluntary Standards and Accreditation Act (S.825) designed to give the Federal Government considerable control over the voluntary standards system.⁷²

Responding to consumer concerns and allegations of antitrust infringements and unfairness, the Federal Trade Commission also undertook a major investigation of the U.S. standards system. After extensive hearings, at which over 200 people testified, it too concluded that the entire standards process should be regulated. It proposed a rule that would require standard setters to meet a substantive "fairness," criterion.⁷³

Another outcome of this period was a major increase in the number of Federal Agencies issuing standards. From the late '60s until the early '70s a

⁶⁷ OMB Circular A-119 and the 1979 Trade Act.

⁶⁸ Ralph Nader, *Testimony on the Voluntary Standards Accreditation Act, Hearings on S825, Before the Subcommittee on Antitrust and Monopoly of the Senate Committee on the Judiciary*, 1st Sess. 1977.

⁶⁹ National Commission of Product Safety, *Final Report of the National Commission of Product Safety, June 1970*, as cited in Robert Hamilton, "The Role of Nongovernmental Standards in the Development of Mandatory Standards Affecting Safety and Health," *Texas Law Review*, vol. 56, No. 8, November 1978, p. 1372.

⁷⁰ *Ibid.* It should be noted that ANSI created the Consumer Council in 1967 in response to these criticisms. This Council reviews all consumer related standards prior to their acceptance by ANSI.

⁷¹ For example, as Hamilton notes:

... the Federal Energy Authorization of 1977 required that the Administrator consult with the Attorney General and Chairman of the FTC "concerning the impact of such standards on competition," before adopting a voluntary standard, and state in the public notice that the organizations that promulgated the standard meet a number of requirements.

Ibid.

⁷² This legislation, which was strongly opposed by ANSI, would have established a National Standards Management Board that would essentially take over ANSI's role. The Board would have had the responsibility for managing and coordinating the voluntary standards program, including the accreditation of standards development organizations and the listing and approving of "national standards." The FTC would be authorized to consider appeals and order revision in standards when necessary. Some members of the voluntary sector, such as NFPA, supported the bill, with modifications. *Ibid.*, p. 1438.

⁷³ See U.S. Federal Trade Commission, *Standards and Certification: Proposed Rule and Staff Report (December 1978)*. These conclusions were very controversial, however. Under a new administration, the FTC reversed its course. Viewing due process less comprehensive, it decided to enforce standards infringements of antitrust law on a case-by-case basis. See "Memorandum to the Federal Trade Commission from Amanda B. Pedersen, Aug. 29, 1985.

Table 2-4-Legislation: Creating the Need for Government Standards

Safe Drinking Water Act of 1974 (Public Law 93-523)
Child Protection and Toy Safety Act of 1969 (P.L. 91-1 13)
Lead-Based Paint Poisoning Prevention Act of 1970 (P.L. 91-695)
Consumer Product Safety Act of 1972 (P.L. 92-573)
Mobile Home Construction and Safety Standards, Title VI of the Housing and Community Development Act of 1974 (P.L. 93-383)
Traffic and Motor Vehicle Safety Amendments of 1970 (P.L. 91-265)
Highway Safety Act of 1970, Title II, Sec. 202 of Federal-Aid Highway Act of 1970 (P.L. 91 -605)
National Environmental Policy Act of 1969 (P.L. 91-190)
Resource Recovery Act of 1970(P.L.91-512)
Clean Air Amendments of 1970 (P.L. 91-604)
Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500)
Federal Environmental Pesticide Control Act of 1972 (P.L. 92-51 6)
Federal Energy Administration Act of 1974 (P.L. 93-275)
Solar Heating and Cooling Demonstration Act of 1974 (P.L. 93-409)
Medical Devices Amendments Act of 1975 (P.L. 94-295)
Occupational Safety and Health Act of 1970 (P.L. 91-596)
Toxic Substances Control Act of 1976 (P.L. 94-469)

SOURCE: William T. Cavanaugh, "Needed: A National Standards Policy," *ASTM Standardization News*, vol. 5, No. 6, June 1977, p. 13.

rash of environmental, health, and safety legislation **was** passed, and agencies were created to administer these laws (see table 2-4). Included among these, for example, were the Consumer Product Safety Commission (CPSC), the Environmental Protection Agency (EPA), and the Occupational, Safety and Health Administration (OSHA). Whereas private sector

standards bodies adhere to a consensus process in developing standards, government regulatory agencies must comply with the Administrative Procedure Act, which provides for both formal and informal rulemaking.⁷⁴ These agencies vary considerably in their size and resources (see table 2-5). The number of standards that they set is small in comparison **to the** number of overall national standards, and many of them now use standards developed by private sector organizations.⁷⁵

A National Standards Policy - OMB Circular A-119

Responding to repeated appeals for a national standards policy, OMB in 1976 proposed a draft circular that called for the incorporation of voluntary standards by reference. Noting that the voluntary standards process had been greatly improved, it required agencies to use commercial standards whenever possible, and to identify commercial standards when they were used. Comments on the circular were mixed, with some agencies being more responsive than others. A revised circular was issued in 1977 to incorporate many of the concerns that had been expressed. This circular distinguished between procurement and regulatory standards, and estab-

Table 2-5—Selected Features of Six Public Agencies Involved in Safety Regulation, 1988

Agency	Founding date	Budget ^a	Staff ^b
Consumer Product Safety Commission (PSC)..	1972	\$32,696	459
Environmental Protection Agency (EPA)	1970	4,968,429	11,127
Federal Aviation Administration (FAA).	1958	2,367,778	46,811
Federal Drug Administration (FDA).	1906	483,066	7,032
National Highway Traffic Safety Administration (NHTSA).	1970	62,534	503
Occupational Safety and Health Administration (OSHA).	1970	235,474	2,532

^aAppropriated funds only; does not include highway or airport trustfunds.

^bFull-time staff only.

SOURCE: *Federal Budget, 1988* (Washington, DC: Government Printing Office, 1988).

⁷⁴ See, for a discussion, Richard B. Steward, "The Reformation of American Administrative Law," *Harvard Law Review*, vol. 88, No. 8, June 1975, pp. 1667-1813.

⁷⁵ Ross Cheit, *op. cit.*, footnote 62, p. 30.

lished a number of procedural due process requirements, many of which were drawn from S.825.⁷⁶ The revised circular was controversial, and opposed by many voluntary standards organization, including ANSI. A final version of Circular, OMB A-119 was adopted in 1982. Now, with the due process requirements eliminated, OMB Circular A-119 is strongly supported by the private sector.⁷⁷

Coordinating the Federal Role

OMB Circular A-119 also provides a mechanism for coordinating the Federal role in standards policy. In accordance with the circular, the Department of Commerce (DOC) set up an interagency consultative mechanism to advise the Secretary and agency heads in implementing Federal standards policy (as defined in the Circular). Its mission is to coordinate agency views and to develop, where possible, a single, unified position. DOC assigned this task to the Interagency Committee on Standards,⁷⁸ which operates under the direction of NIST Policy .79 Overall oversight rests with OMB, and the committee is required to report back to it on a triennial basis.⁸⁰

While active during its first year, this interagency committee has reportedly not met for the last year and a half.⁸¹ Meetings focused on implementing the Federal policy to encourage agency use of voluntary standards, as directed in its mandate. The committee also set standards for agency participation in voluntary standards bodies and laid out guidelines for public sector use of private certification bodies. Participants claim, however, that scant attention was devoted to evaluating existing policy or finding ways to improve it.⁸² Nor was there much effort to identify future standards issues or to view them strategically as part of the industrial infrastructure.⁸³ Some members claim that the group is not a useful mechanism for sharing information or coordinating interagency issues. One person noted with some irony that his chance of interacting with agency counterparts was better at private sector meetings of ANSI's Government Member Council.⁸⁴

Some of the problems faced by the Interagency Committee on Standards Policy stem from its organizational form. Interagency committees have a poor record of policy coordination.⁸⁵ Among the problems associated with them are that they tend to:

⁷⁶ As described by Hamilton:

The due process and other basic criteria include not only the traditional procedural requirements of fairness, openness and balance, but also require standards organizations to give preference to the use of performance criteria rather than design, materials or constructive criteria, to accept a mediation or conciliation service provided by the Department of Commerce. . . and to include a statement, in all literature they publish that participation by government officials in that organization does not constitute government endorsement.

The Department of Commerce was to police these requirements, and publish a list of the standards bodies that complied with them. Hamilton, *op. cit.*, footnote 69, p. 1442.

⁷⁷ See, Memorandum to Heads of Executive Departments and Agencies, from David Stockman, regarding OMB Circular No. A-119, "Federal Participation in the Development and Use of Voluntary Standards," Oct. 26, 1982. For an evaluation of its effectiveness in promoting the use of private sector standards, see Steve Spivack, *Implementation of OMB Circular A-119: An Independent Appraisal of Federal Participation in the Development and Use of Voluntary Standards*, (Washington, DC: U.S. Department of Commerce, March 1985).

⁷⁸ The ICSP was established in 1985 to coordinate Federal Agency Standards Policy.

⁷⁹ The Committee's Charter goes further than OMB Circular A-119 in calling for interagency consideration of standards policy.

⁸⁰ OMB Circular A-119.

⁸¹ It should be noted that some subcommittees met more frequently. The Commerce mandate establishing the committee requires that a meeting be held at least once a year.

⁸² Personal communications with members of the Committee. All requested anonymity. Annual report to Secretary of Commerce cited and tracked progress of agencies in using voluntary standards. But the analysis provided with the data is minimal.

⁸³ The Charter of the Interagency Committee on Standards Policy, developed by commerce, is much broader than the OMB Circular. However, overall support for the Committee was not sufficient to support this broader mandate. John Donaldson of NIST suggests that the problem was circular. Because the OMB mandate was narrow, people at higher, policy levels didn't get involved. Without their involvement, however, it was impossible to expand the Committee's mandate. John Donaldson, NIST, personal communication.

⁸⁴ Personal communications with member of the Committee, who requested anonymity.

⁸⁵ Characterizing this form of arrangement, Harold Seidman notes, for example:

"Interagency committees are the crabgrass in the garden of government institutions. Nobody wants them, but everybody has them, Committees seem to thrive on scorn and ridicule, and multiply so rapidly that attempts to weed them out appear futile." But, as Seidman is quick to add: "The harshest critics have yet been unable to devise satisfactory substitutes."

Harold Seidman, *Politics, Position, and Power: The Dynamics of Federal Organization* (New York, NY: Oxford University Press, 3rd. ed., 1980), p. 207.

- bury problems rather than resolve them;
- make it difficult to get tasks accomplished because too many people with only a peripheral interest become involved;
- dilute interest in, and commitment to, addressing a problem; and
- lead to outcomes based more on the distribution of power within a committee than on policy considerations .86

Such problems are clearly reflected in the Interagency Committee on Standards Policy.

The Office of Management and Budget (OMB) reviews the work of the Interagency Committee on Standards Policy on a triennial basis. Although OMB is the ultimate coordinating mechanism in the Federal Government, it can do little more than establish a policy directive. There is little staff support in the area of standards.⁸⁷ The Deputy Director of the Office of Federal Procurement Policy is in charge of overseeing Circular A-119. However, there is no one person at OMB who focuses explicitly on standards.⁸⁸

The Trade Act of 1979

The Trade Act of 1979 requires the Secretaries of Commerce and Agriculture to monitor the standards process to assure that United States interests are adequately represented. It provides no guidelines, however, to determine what is required for adequate representation. The Associate Director for Industry and Standards within NIST is assigned responsibility for carrying out the functions specified in the Act.

An interagency task force has also been set up under the auspices of the Office of the U.S. Trade

Representative (USTR) in conjunction with the Act. Although somewhat more active than the NIST Interagency Committee on Standards Policy, its focus is more limited. Agency members meet when necessary to try to reconcile trade and other agency policies.⁸⁹ The committee is not meant to be a forward looking group, or to consider standards in strategic terms. Like the Office of the USTR, it tends to be reactive on standards issues, responding only when the need arises.

Federal Support for the Voluntary Standards Process

Currently, the Federal Government does very little to promote the development of voluntary standards. Whereas in its early years the National Bureau of Standards organized business groups to convene for discussions of standards issues,⁹⁰ NIST has only limited outreach and/or educational programs except for the publications of standards directories and reports. Business concerns about standards are generally channeled to the Federal Government through the Interagency Federal Advisory Committee (IFAC),⁹¹ but there is no information flowing in the opposite direction. Although government agencies, such as the Office of the International Trade Administration (ITA), or the United States Trade Representative (USTR)⁹², respond to business queries and concerns about standards, they make little effort to educate businesses as to the value and use of standards.⁹³ Even within the Small Business Administration there is no standards education or awareness program. The most elaborate promotional event in

⁸⁶ Ibid.

⁸⁷ Ron C. Moe, "The Hud Scandal and the Case for an Office of Federal Management," *Public Administration Review*, vol. 51, July/Aug. 1991, pp. 298-307.

⁸⁸ David Gold, OMB, personal communications.

⁸⁹ Susan Troje, USTR, personal communication.

⁹⁰ Cochrane, *op. cit.*, footnote 16.

⁹¹ The Industry Functional Advisory Committee on Standards for Trade and Policy Matters was established on Mar. 21, 1979, and extended on Mar. 11, 1982, Mar. 6, 1984, Mar. 7, 1986, and Mar. 8, 1988, by the Secretary of Commerce and the United States Trade Representative pursuant to the authority delegated under Executive Order 11846 of Mar. 27, 1975. The Committee consists of approximately 40 members, with approximately 20 members from the Industry Sector Advisory Committees and approximately 20 from such private-sector areas as to provide expertise on the subject of standards.

⁹² The USTR coordinates trade policy between the President, Congress, and the private sector. It manages the private sector advisory system, consults regularly with Congress, and chairs the interagency committees which develop trade policy with the Executive Branch. 1991 *Trade Policy Agenda and 1990 Annual Report of the President of the United States on the Trade Agreements Program*, (Washington, DC: USTR, 1991), p. 103.

⁹³ Don Mackay, National Association of Engineers, and Bob Toth, Toth Associates, personal communications.

which the government is involved is National Standards Week.⁹⁴

Apart from the membership dues paid by Federal agencies to standards bodies, the U.S. Government provides almost no funds for private-sector stand-

ards development. Even the recently established NIST program, aimed at promoting trade through standardization in developing countries, depends heavily on business contributions.

~ Although S.J. Res. 291 would have designated the week Oct. 14, 1990 as "National Standards Week," it failed to pass. Personal communication, Don Mackay, National Association of Engineers.