



WHITE PAPER

The Governance of Standards

Testing and Codes in the
North American Building
Products Industry

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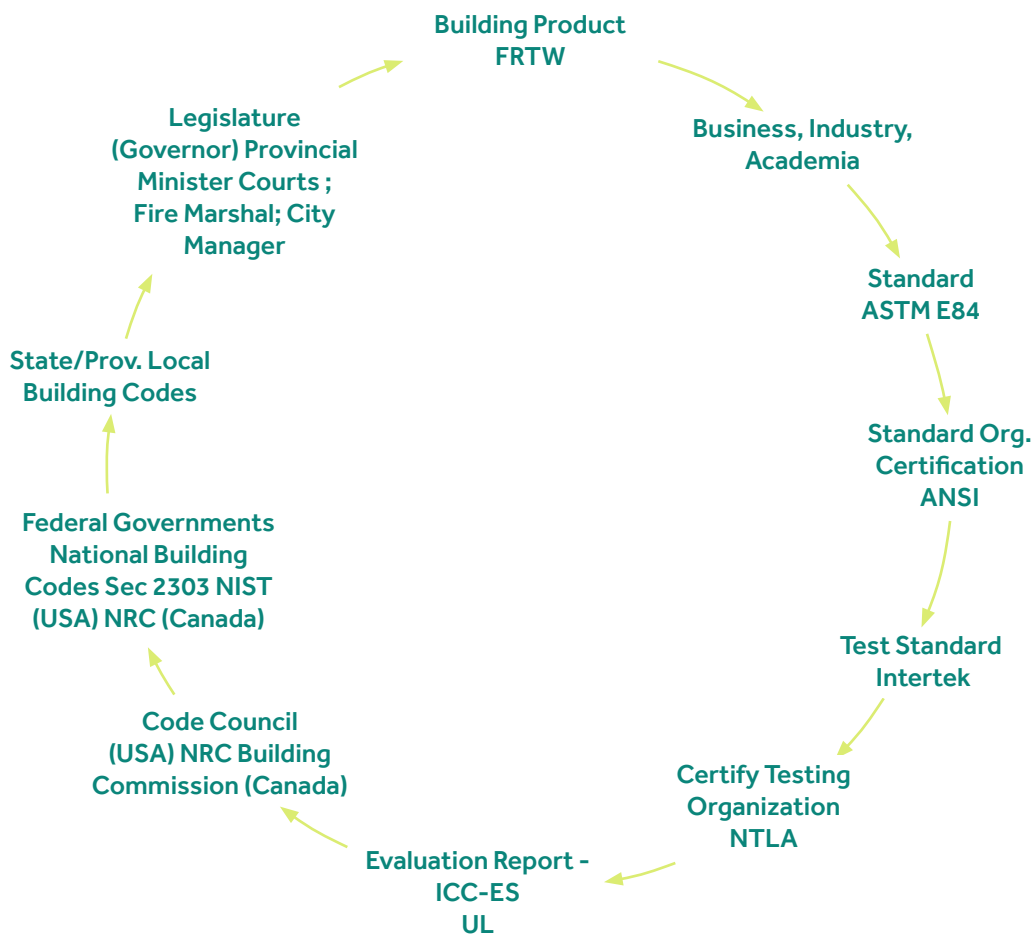


The Governance of Standards:

Testing and Codes in the North American Building Product Industry?

This article surveys the governance system for standards, testing and codes for building products in North America. The products in your home and at your work- doors, plumbing, wiring, internet , flooring and windows are expected to perform to certain standards. Because there are so many items to regulate, there is no possibility that any government could manage the system. One of the more than one-hundred standard organization ASTM manages 12,500

standards - everything from toys to nuclear reactors. Government in North America has allowed business to be responsible for its own regulation. No one entity in the system is orchestrating the entire process. I represented it as a cycle since it is constantly changing as new technology comes on stream. How does it all come together? ***





Academia

Canada and the United States have an extensive university research based program covering every aspect of engineering, architecture, construction and other related disciplines.

The universities have considerable staff, facilities and knowledge and contribute to the rules and regulations in the building products industry. Very often the first place a standard and code starts is in a university laboratory or a paper contributed to an academic journal.

Universities often enter into development pacts with private companies where there is a mutual benefit. Universities have larger R&D facilities and better educated faculties than most corporations.



Oregon State University Industry Program



Professional Organizations

The method of making things properly, safely and in a sustainable manner starts in academia. Universities train and graduate professionals in engineering, architecture building science and other disciplines related to construction industry. Colleges and technical schools train draftsmen, firefighters, plumbers, carpenters, electricians and operating engineers amongst others. After these professionals graduate they interact directly with industry through their professional associations. [The Canadian Society of Civil Engineering](#), for example, have professional study committees and frequent conferences to keep its body of knowledge for its members up to date. For the [American Institute of Architects](#) the number one priority on its website for Architects is [Advocacy on Building Codes](#). Firefighters, Plumbers and Carpenters unions provide recommendations and participate in code committees.

Before new things can be codified and be used in building systems there needs to be a widely accepted standard that all parties can agree on. Architects and firefighters may recommend FRTW in a building but that can mean different things to different persons.



American Institute of Architects



Industry Associations

Almost every industry has an organization that holds annual events, coordinates training and lobbies government on issues that are important to that organization. Many of these industry organizations like the American Wood Preservers Association (AWPA) also set standards which are incorporated into building codes. Most others work as a networking resource. Many of the large industry associations like the American Composite Manufacturers Association work diligently to lobby government on behalf of the plastics industry. Industry Associations don't create standards, do tests or write evaluations; they do contribute to that process by participating in code writing committees and they lobby governments to endorse codes that are favourable to them.

Below is the roster at an ICC committee working on Fire Safety. You can see that the members are from a cross section of industry (Vinyl Siding) and (Home Builders) and a number of Industry Associations (American Wood Council) professional groups (Fire Marshals of Colorado and government (NIST) and (City of Lawrence, NJ) and certification-testing organizations (UL)

ICC

2018 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL BUILDING CODE – FIRE SAFETY

FIRE SAFETY CODE COMMITTEE

Kenneth E. Bush, Chair Rep: National Association of State Fire Marshals Chief Fire Protection Engineer Maryland State Fire Marshal's Office Easton, MD

Joseph McElvaney, Jr., PE, Vice Chair Lead Fire Protection Engineer City of Phoenix Fire Department Phoenix, AZ

Nelson Bryner Chief, Fire Research Division National Institute of Standards and Technology Gaithersburg, MD

Matthew Dobson Rep: National Association of Home Builders Vice President, Regulatory and Advocacy Vinyl Siding Institute Burlington, NC

Kevin Duerr-Clark, PE Assistant Director for Technical Support, Professional Engineer II NY Department of State, Division of Building Standards and Codes Albany, NY

Kara Gerczynski Rep: Fire Marshal's Association of Colorado Fire Marshal Elizabeth Fire Protection District Kiowa, CO

Jefrey Heiss Construction Official Township of Warren Warren, NJ Robert M. Longo, AIA Rep: AIA New Jersey Partner Cornerstone Architectural Group LLC South Plainfield, NJ

John Mendedoht, AIA Senior Associate NBBJ Seattle, WA Bob D. Morgan, PE, CPCU Senior Fire Protection Engineer Fort Worth Fire Department Fort Worth, TX

Dennis Richardson, PE, CBO Western Regional Manager American Wood Council Santa Rosa, CA Richard A. Soltis, Jr. Fire Sub Code Official Lawrence Township Lawrence, NJ

Michael Tomaselli, PE, M. Eng Fire Protection Engineer Anne Arundel County Annapolis, MD

Richard N. Walke Senior Regulatory Engineer Underwriters Laboratories Northbrook, IL

Mang sum Mercy Wong, RA Code Development Architect-Technical Affairs and Code Development New York Department of Buildings New York, NY

GROUP A 2018 REPORT OF THE COMMITTEE ACTION HEARING



Standards

The premier standard setting organization in North America is [ASTM](#). It used to be called American Society for Standards and Measurement. ASTM, sometimes called ASTM International, has been making standards for industry since 1898. Currently it has 12,500 standards and over 30,000 volunteers. The volunteers sit on its many committees and subcommittees. The committees are constantly involved in writing new standards and amending old standards. Membership in ASTM is open to everyone but votes on motions are limited to one producer to avoid too great a conflict of interest. Typically a standard making committee is made up of three producers, persons from academia and government and nationally recognized industry organizations.

In Canada there is the [CSA – Canadian Standards Association](#). The CSA sets standards but also does testing and certification.

Some of the other important standards organizations are:

[ANSI](#) - American National Standards Institute

[IEEE](#) - Institute of Electrical and Electronic Engineers

[NFPA](#) - National Fire Prevention Association

[UL](#) - formerly called Underwriters laboratories, but now UL, LLC

[ISO](#) - International Standards Organization

Standards Oversight

Standards organizations like ASTM are accredited by organizations like [ANSI](#). ANSI follows the [United States Standards Strategy](#) which essentially is a government and industry supported initiative that promotes voluntary standardization activities in the United States and globally. This oversight by ANSI on ASTM indicated the essential governance model in North America in the building industry:

every part of the process has oversight from another part of the process right up to government which is watched by the court system.



Once a standard is written it needs to be tested.



Testing/ Evaluation

For an organization to claim its product meets a particular standard it must be tested in accordance with description of said standard. If a company is claiming its fire-retardant makes solid wood FRTW then its solution needs to be tested by an independent test center to the criteria established by an approved evaluation service. In the case of FRTW that means the International Code Council or [ICC-ES](#) Acceptance Criteria 66. That process is very detailed covering many tests and different standards and is varied depending on the species of wood and whether or not the application is for interior or exterior applications.

All of these testing organizations need to be certified to a standard by a certification company. Some of the testing organizations only do the laboratory or testing function and aren't qualified to certify the test or write an evaluation. In that case they bring in observers from a properly certified evaluation company.

Some of the important testing organizations are:

[Intertek](#)-

[Bureau Veritas](#)-

[Exova](#)-

[UL](#)-

[CSA](#)-

[QAI](#)-

[IAMPO](#)- International Association of Plumbing and Mechanical Officials (IAPMO)

All of these companies apply a listed mark to a tested product.





Testing Laboratory Oversight

The companies that test products to evaluate their adherence to a certain standard need to be certified and audited. They are part of the [National Testing Laboratory Program \(NTP\)](#).

A Nationally Recognized Testing Laboratory (NRTL) is a private-sector organization that OSHA ([Occupational Safety and Health Administration](#)), which is part of the Department of Labor in the United States has recognized as meeting the legal requirements in 29 CFR 1910.7 to perform testing and certification of products using consensus based test standards.

These requirements are:

- ▶ The capability to test and evaluate equipment for conformance with appropriate test standards;
- ▶ Adequate controls for the identification of certified products, conducting follow-up inspections of actual production;
- ▶ Complete independence from users (i.e., employers subject to the tested equipment requirements) and from any manufacturers or vendors of the certified products; and
- ▶ Effective procedures for producing its findings and for handling complaints and disputes

The very interesting part of the OSHA-NRTL system is that Canadian testing laboratories like [CSA and QAI](#) are covered by this arrangement.



Code Development

The sobering part of this standards-testing-certification-acceptance process is that the written standard ends up as government building codes but they aren't written directly by government.

Governments do offer some assistance – like the NIST in the United States and the NRC in Canada but they don't provide the initiative for code changing unless it is a matter of grave immediate importance like the wildland fire example in California.

Building codes are adopted by governments. The codes are a consensus that percolate up through industry-academia-professional organizations-industry organizations-government to code writing organizations.

There are some very large hybrid organizations that exist primarily to write codes for government. The two largest are the National Fire Protection Association (NFPA) and the International Code Council (ICC). The organizations write standards and in the case of ICC it writes evaluations for clients attesting to the legitimacy that work done in testing laboratories is in line with the standard in question. All of the committees contain numerous government members and the codes are written with the understanding that they will be universally adopted.

ICC updates/deletes/adds its total code package every three years. [The code development process](#) is fairly straightforward. Once the code book is published the three year process begins with a call for code changes. As it stands currently the ICC codes are published 2015, 2018, 2021. Consequently, the building codes of countries, states and local authorities are adopted 1-2 years later. It's a workable predictable activity. California building codes are 2016, 2019, 2022. It's the same in every jurisdiction all of the existing building codes can be traced to ICC and to some degree smaller organizations like NFPA.

The codes are not readily available except in California where there [Freedom of Information Act](#) permits access to the California Building Code which, as we know, is mostly a derivative of the ICC and all other building codes. Every where else, if you don't know about the availability through the California government the cost of an entire building code is considerable.



Federal Government

All important regulations and oversight by government starts at the Federal level. Canada and the United States do not have specific legislation regarding building materials, save bans or restrictions on some products due to threats to life or environmental degradation. [Asbestos](#) is one example. Nevertheless, elected officials have the power to establish laws in their jurisdiction. If they wished, they could write original building codes. Any laws they write would override any certification or standards established by the private sector. However, they mostly act as rubber stamp to the conventional code writing program established by the private sector for more than one-hundred years in North America.

The United States and Canada have national building codes that govern the construction, change of and renovation of buildings. In both countries, the national building codes act as guidance to states and provinces. In the United States, the national building code is called the [International Building Code \(IBC\)](#). The IBC is compiled through the [International Code Council \(ICC\)](#), not by the United States government. It is used by the Department of Defence in conjunction with the [Unified Facilities Criteria](#). It is also used by all Federal Government Departments on Federal Lands in conjunction with local building codes throughout the United States. The International Building Code is referred to as "International" because it is adopted by countries other than the United States like Saudi Arabia.

Canada has a national building code called the National Building Code of Canada. It is administered by the [National Research Council of Canada](#) through the [Canadian Commission on Building and Fire Codes](#). Unlike the United States, where the International Building Code is widely adopted directly or indirectly by state and local authorities, the National Building Code of Canada is only used in a few provinces and on lands owned by the federal government.



The United States governments main contribution to standards development is made through the [National Institute of Standards Development \(NIST\)](#) or [standards.gov](#). The NIST provides laboratories and research to companies or individuals writing new building codes. They also provide a database and

software for organizations to compare to compare standards. In Canada, this role is filled by the [National Research Council](#). The NRC publishes [Codes Canada](#) every five years. It's an amalgamation of the National Energy, Plumbing, Building and Fire Codes of Canada.

Our technical services help small and large enterprises overcome workforce constraints and limited resources, accelerating design cycles and helping to identify product performance limits. We have experienced professionals on site to help our clients solve immediate technical problems associated with the transfer, adoption and diffusion of technology. Our specialized services range from testing and certifications to calibration, prototyping, demonstrations, scale-up and consulting.



States and Provinces

Every state in the United States has a state building code based on the International Building Code. In most cases the sections, clauses and numbering are exactly the same. For example:

International Building Code

2303.2 Fire-Retardant-Treated Wood

[Fire-retardant-treated wood](#) is any wood product which, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a listed flame spread index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. Additionally, the flame front shall not progress more than 101/2 feet (3200 mm) beyond the centerline of the burners at any time during the test.

Utah Building Code

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In Canada, each province has a Building Code that incorporates a great deal of the National Building Code and International Building Code with local differences. Most provinces empower the Minister of Housing to make changes to the provincial

building code at his discretion. In British Columbia, the Ministers powers are outlined in the [British Columbia Building Act](#).

In some states, like California, there is a [Building Commission](#). An example of government activism in the building code arena is where California has altered its building code creating a special zone in the state called the wildland-urban interface. In that part of the state Fire-Retardant Wood is necessary for most building projects using wood.

Local authorities (County and City) in the United States and Canada



Local authorities, like the City of Los Angeles, often have their own Building Codes that have been adopted and amended for the state building code. Issues like seismic, green building techniques, parking, [LEED](#) are usually

more stringent and detailed at the local level.

In Canada, large cities like [Vancouver](#) and Toronto have their own separate charters allowing them to create codes that are specific to their own territory.

Governments in the United States and Canada, with some subtle differences, cascade building codes from the federal level down to the local authorities who in turn amend or add codes to suit local conditions.

What they don't do, in most cases, is the research, consensus building, standards setting, testing, and certification of materials and practices that make up building codes.

That work is done by a wide variety of people and organizations outside of government. That process is constantly in flux as technology and science change.



Summary

The approval system in North America for building products is an inscrutable jumble of standards, commissions, committees, testers, evaluators, and certifiers. Government provides oversight through its legislatures, building codes and indirectly via the court system. The many layers of governance mostly leads to a slow moving system. New product development or radical change takes time. The system is an example of government-private sector cooperation and a testament to the value of a consensus based governance model that demands government and the private sector consult each other and work together for the common good. Nevertheless the system is fraught with conflicts of interest wherein the manufacturers have considerable influence over the standards writing and code adoption.



*** This article does not address standards in Mexico, which, of course, is part of North America. The following is a statement of the topic from the Export Trade Department of the USA on this topic:



Mexico - Trade Standards

Describes the country's standards landscape, identifies the national standards and accreditation bodies, and lists the main national testing organization(s) and conformity assessment bodies.

Overview

Mexico's standards-setting regime is similar to the United States. With its extensive engagement in free trade agreements and international regulatory bodies, along with a robust community of industry associations and business chambers, there is a well-established process of notification, public comment, and refinement of standards before they go into effect. The system includes both required and voluntary standards, and standards development is planned annually through a published workplan. In the information below, we cover the various government bodies involved in the setting and enforcement of national standards, the standards development process, and ways in which U.S. companies can participate in the process.

Standards

The Secretariat of Economy (SE), through the General Directorate of Standards (Dirección General de Normas, or DGN), is the organization with the authority to manage and coordinate standards in Mexico. The Secretariat's authority is derived from the Federal Metrology and Standardization Law (Ley Federal de Metrología y Normalización, or LFMN). DGN participates actively in international fora, including the International Organization for Standards (ISO), Codex Alimentarius, the Pan American Standards Commission (COPANT), and the International Electrotechnical Commission (IEC).

Two definitions are important to keep in mind:

1. **Official Mexican Standards (Normas Oficiales Mexicanas, or NOMs).** NOMs are technical regulations, including labeling requirements, issued by government agencies and secretariats. Compliance is mandatory. Any bureau, person, or council can propose the creation or modification of a NOM to the appropriate committee.
2. **Mexican Standards (Normas Mexicanas, or NMXs).** NMXs are voluntary standards issued by recognized national standards-making bodies. Compliance is mandatory only when a claim is made that a product meets the requirements of the NMX, when a NOM specifies compliance with an NMX, and whenever specified in government procurement.

Reference Standards (NRF) are applied to goods and services acquired, leased, or hired, when Mexican or international standards do not cover their requirements, or their specifications become obsolete.



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