

A Perspective on the US Regulatory environment for Fire Alarm Products

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The regulatory environment for fire alarm equipment in the United States can be more than a little confusing, this brief article shows how the various components of regulation and testing come together to cover the whole of the fire alarm selection and installation process.

Local, not national, law governs installation of fire alarm systems in the United States. Generally the local authority, perhaps a city or town has its own requirements, usually as part of the local building codes. The key entity, according to most of the codes and standards, is the AHJ – the Authority Having Jurisdiction, usually represented by a local building inspector or fire inspector.

The local building codes may themselves be based on regional or national building codes either by extraction of specific requirements or by reference to them. There is no uniform building code in the United States, but there are several “model” codes. This independence results in the generation of hundreds of similar yet different local codes. Some communities do not rely on the model codes at all and develop their own unique codes and there are even some localities that don't have a building code at all. There are, however, some State codes and there is a trend to adoption of these to create more uniformity. The most important model codes are BOCA¹, ICBO², SBCCI³ and CABO⁴. There is now a coordination effort through the International Code Council (ICC)⁵ with the International Building Code 2000 (IBC), which is starting to find acceptance and adoption. To add to the confusion, the National Fire Prevention Association⁶ is involved in this arena with its rival NFPA Building Code™ project, to create a new standard NFPA 5000, currently in its third draft, and slated to become effective this year.⁷

These local building codes, of course, cover all aspects of building construction, not simply fire alarm issues. Each contains a section on fire alarm requirements, for example section 907 of IBC requires Group A occupancies with an occupant load of 1,000 or more to have an emergency voice/alarm communications system in accordance with NFPA 72. In this way most codes include, by reference, requirements from the set of NFPA codes and standards for specific fire alarm requirements.

If this isn't enough the local jurisdiction may also adopt fire alarm system requirements directly, in addition to the adoption via the model building codes. Generally NFPA codes

¹ The Building Officials & Code Administrators International, Inc (www.bocai.org)

² The International Conference of Building Officials (www.icbo.org)

³ The Southern Building Code Congress International (www.sbcci.org)

⁴ The Council of American Building Officials

⁵ International Code Council (www.intlcode.org)

⁶ (www.nfpa.org)

⁷ You can read more about the conflict between ICC and NFPA at the SBCCI website at http://www.sbcci.org/News&Information/News%20Releases/about_icc_nfpa.htm

are referenced, but more confusion can result when the local law references a specific issue of a code or standard that has since been revised.

NFPA has both general codes and standards and many codes for specific types of environments and risks. The “life safety” code NFPA101 and the specific occupancy code usually define what type of protection is required. Probably of most interest is NFPA 72, the National Fire Alarm Code, which defines how the fire alarm system must operate. The current edition of this code is 1999 with the next revision due in September 2002. NFPA covers, in a fair amount of detail, the requirements for fire alarm systems and by implication many of the features of fire alarm products.

NFPA 72 in definition 1-5.1.2 requires that “Equipment constructed and installed in conformity with this code shall be listed for the purpose for which it is used”, Listing in turn is defined as “Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.” So in order to install a fire alarm system in the United States, only listed equipment can be used.

In order for equipment to be listed, it first has to be evaluated. For many years Underwriters Laboratories⁸ and Factory Mutual⁹ had a virtual monopoly in the testing of fire alarm equipment. These testing laboratories are private “not for profit” corporations and are not in any way government entities. In 1988 federal law¹⁰ created the concept of “Nationally Recognized Testing Laboratories” (NRTL). The government agency responsible for qualifying and overseeing the NRTL program is OSHA¹¹. A number of laboratories are now qualified to test for conformance with NFPA, but the fire alarm industry has been slow to adopt these alternate testing labs. The OSHA website lists the approved test labs and indicates the standards each is authorized to test to.¹² Note that testing can be to NFPA72 or to an implementation standard such as UL864.

UL standards such as UL864 fire alarm panels, UL268 smoke detectors etc. are implementation standards. In theory any NRTL can create an implementation standard to test equipment for conformity with NFPA72 requirements, in practice the published standards used are generally those produced by Underwriters Laboratories which in many cases have also been submitted and accepted as ANSI¹³ standards. For fire alarm control equipment the standard is UL864 currently in its 8th edition, 1996. Implementation standards have to reflect the requirements of NFPA, clearly the current standard is out of date with respect to NFPA and it is currently undergoing a fairly major revision.

⁸ Underwriters Laboratories, Inc. (www.ul.com)

⁹ Factory Mutual Research Corporation (www.fmglobal.com)

¹⁰ 29 CFR 1910.7 available at http://www.access.gpo.gov/nara/cfr/waisidx_99/29cfr1910_99.html

¹¹ Occupational Safety and Health Administration (www.osha.gov)

¹² <http://www.osha.gov/dts/otpca/nrtl/index.html>

¹³ American National Standards Institute

So all manufacturers of fire alarm equipment in the United States have to submit their products to an NRTL for testing and listing. Most NRTL require the application of a label to every product that has been type tested. NFPA again gives us a definition: “Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner”. Note the reference to periodic inspection, manufacturers must allow the periodic visits of a field inspector from the NRTL who will evaluate the products currently being manufactured to see that they are the same as the products previously tested.

So what governs how the products are to be applied and installed? In addition to general standards such as the National Electrical Code, any special requirements and application rules must be covered by the manufacturers documentation. Since the documentation forms part of the package evaluated by the NRTL and cannot be changed, the whole process of application is regulated. UL are also willing to perform a field inspection to assure the product is applied properly, if there is anything unusual about the application this is sometimes requested by the AHJ but it is rarely done in normal circumstances.

The equipment once installed may be inspected by the AHJ. Presence of the NRTL label confirms the equipment is listed¹⁴. The correct functioning of the system must then be proved to the AHJ, again according to rules established in NFPA codes. Periodic re-testing is also required as proscribed in the NFPA code.

As you can see, there is little scope left for special installations, most of the process from application to installation of approved equipment is regulated, and non-approved equipment is prohibited. A Consulting or Specifying engineer is usually involved only in large projects and then is mainly responsible for characterizing the type of hazard and occupancy, this process impacts the type of equipment, coverage and wiring styles. The engineer is often also responsible for ensuring the proper equipment is installed in the proscribed way.

In summary then, the building codes establish the requirements in conjunction with NFPA special occupancy codes, NFPA72 defines the rules for installation and listed and label products can be selected to implement the requirements. At the completion the AHJ checks for labeled product and correct operation of the system, and issues an occupancy certificate. Clearly this is a simplification but provides an overall perspective of the process.

¹⁴ In theory the AHJ should check with the NRTL to be sure the equipment is current and that its description matches the description on the listing cards.

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