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Know When You Need To List Your Product - And When You Don't

Laws requiring products to be listed are complex. But knowing the law is the key to saving both money and hassle.

Laws requiring the listing of electrical products in the United States are complicated, to say the least. Both the Federal Government and the states have made such laws. In this article, we'll review the regulations that have been enacted by the states and their political subdivisions, counties and municipalities. We will be taking a look at OSHA regulations in the next article.

As with all things not strictly subject to federal power, the basic power to make law resides with the states. They, in turn, can delegate the power to set requirements to counties and cities. Therefore, to begin to understand electrical product safety laws in the US, you first have to look at the laws of all 50 states, no trivial task.

Fortunately, all 50 states base their electrical product safety codes at least in part on the National Electrical Code (NEC). The NEC is published by the National Fire Protection Association (NFPA) based in Quincy, Massachusetts. The NFPA is a private, non-profit voluntary standards organization whose members consist of manufacturers, governmental officials and members of the public. The NFPA revises the NEC every three years, the most recent revision being 1999. The 1999 Code is too recent for most states to have adopted it, so we will refer to the earlier, 1996 Code. (With regard to the matters that we are going to review, the two do not differ significantly.)

Some jurisdictions adopt the National Electrical Code verbatim, others will make some changes. In many states, a statewide code exists, but the latitude given to local authorities varies. In a few states, local authorities must enforce the statewide code as written. In others, local authorities are given the power to adopt amendments to the statewide code or to adopt their own local version.

Much of what product designers have to know can be found in the first few parts, or "Articles" of the Code. A very useful aid to understanding the Code is also published by the NFPA and is known as the National Electrical Code Handbook. It contains not only the verbatim passages from the Code, but commentary written by the NFPA. Strictly speaking, this commentary is not part of the Code, but it is widely respected.

Article 90-1 describes the Code's purpose, "the practical safeguarding of persons and property from hazards arising from the use of electricity."

Under Article 90-4, enforcement is left to a person or group known as the "authority having jurisdiction." That authority "will have responsibility for making interpretations of the rules, *for deciding upon approval of equipment and materials,* and for granting the special permission contemplated in a number of the rules."

Article 90-7 is intended to act as a guide to inspectors reviewing electrical installations and products. The language is a bit difficult to follow, but what is meant is that electrical inspectors are not encouraged to disassemble equipment such as refrigerators, computers and air conditioners to inspect their internals. Rather, inspectors should concentrate on the wiring that they can see or easily access, that is, wiring which can be exposed without engaging in a major disassembly. This includes wiring that is installed in a building when it is built and the manner in which an appliance is connected to the electrical supply, whether it is plug connected, as are most devices, or whether it is connected with screw terminals (known as "field wiring") as would be the case with a major appliance such as an air conditioner.

Therefore, in order to determine whether an air conditioner, for example, complies with the NEC, the inspector should check to see whether it has been properly wired to the electrical supply, but should not disassemble the entire air conditioner to inspect its innards. Rather, the inspector, or "authority having jurisdiction" ("AHJ" in Code parlance), should rely on the certification or "listing" by a competent organization, says the Article. A competent organization, according to the text, is one which performs examinations for safety under standardized conditions and is "properly equipped and qualified." Such an organization must be "recognized" by the AHJ, according to Article 90-7.

Article 90-7 also refers to "inspections of the run of goods at factories, and service-value determination through field inspections." As we all know, the process of certifying or "listing" a product involves more than testing and initial certification as described above. Once the product has been certified as meeting a relevant standard, the Code makes it the obligation of the certification organization to periodically inspect the manufacturer's facilities to make sure that all the products bearing the certification mark of the certifying organization are being manufactured in the same manner as the product which was tested and certified. These are known as "follow-up inspections" and are customarily carried out in the United States four times a year.

The NEC Handbook's commentary on Article 90-7 is most helpful in understanding the intent of the section and is well worth reviewing.

NEC Article 100 contains definitions. As boring as it may be, it is important for professionals to know exactly what the Code means when it uses certain terms. To be "approved" a device must be "acceptable to the authority having jurisdiction." The NEC Handbook notes that "where public safety is primary, the authority having jurisdiction may be a federal, state, local or other regional department; or an individual such as a fire chief, fire marshal, fire prevention bureau chief, labor or health department official, building official, electrical inspector, or other persons having statutory authority." It is estimated that in the United States there are more than 2,700 such "authorities having jurisdiction."

Other definitions of importance are "attachment plug" (what the rest of us simply call a plug; see Figure 1 for general purpose plug types and their names), "devices" which are components that carry but do not consume electricity, "equipment" which is a general term for all things electrical, and "utilization equipment" which is defined as "equipment that utilizes electric energy for electronic, electro mechanical, chemical, heating, lighting, or similar purposes."

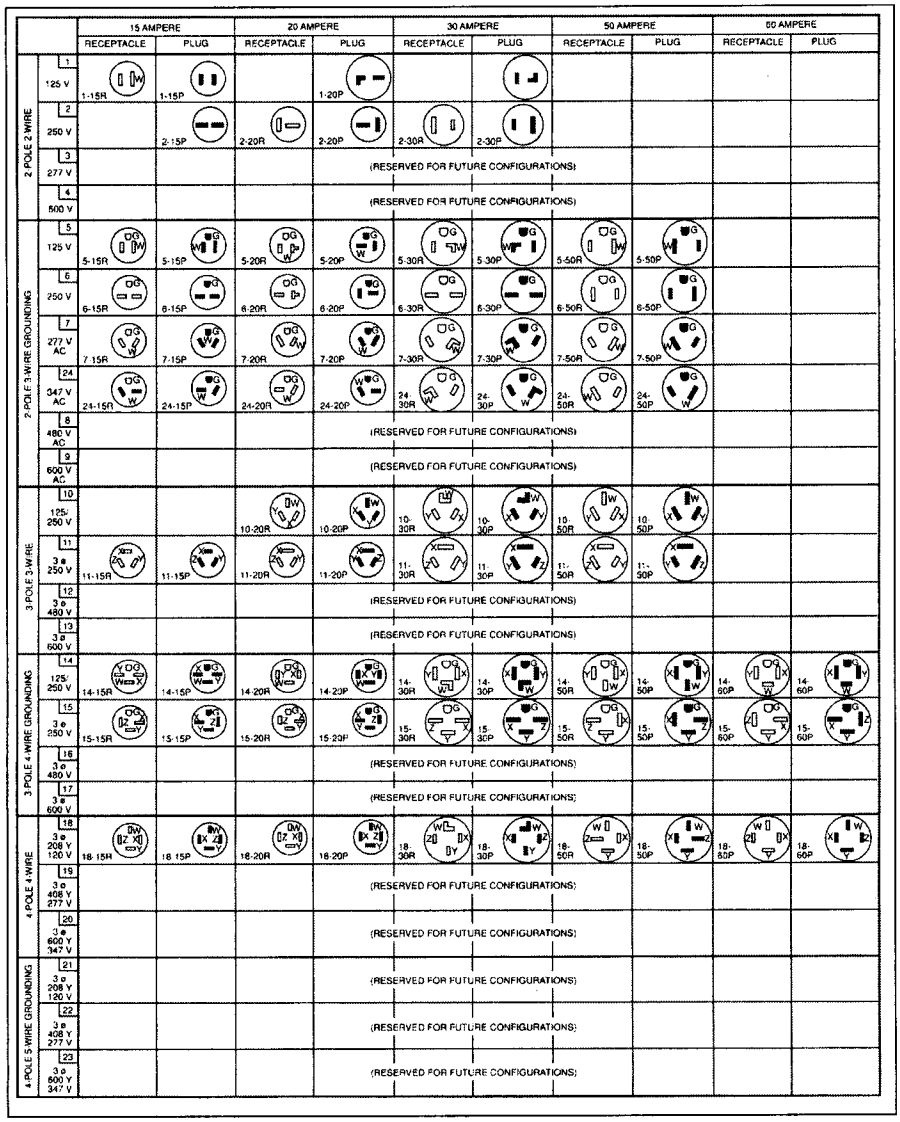

Figure 1: Configuration chart for general-purpose nonlocking plugs and receptacles. Reproduced from NEMA WD 6-88, Wiring Devices— Dimensional Requirements (revision and redesignation of ANSI C73-73).

Article 110-2 states that "conductors and equipment required or permitted by this Code shall be acceptable only if approved" (approved meaning acceptable to the authority having jurisdiction). The NEC Handbook commentary states that the Code does not, in itself, require all devices or equipment to be listed (certified), but it does require all equipment and devices to be approved, which means acceptable to the authority having jurisdiction. It goes on to state that "the most common form of this evidence considered acceptable by authorities having jurisdiction is listing or labeling by a third party." It also goes on to state that there are certain provisions of the Code which *require* certain types of equipment to be listed, citing as an example Section 250-114(a) (grounding devices).

Also among the types of equipment which the Code requires to be listed is "equipment intended to be connected to a telecommunications network." (Article 800) The article is intended to apply to "telephones.. and similar types of equipment," but not Information Technology Equipment (ITE) which is not connected directly to a telecommunications network. Cabling to ITE within an equipment (computer) room is covered by Article 645 and cabling that extends beyond the computer room by Article 725. Fire alarm systems have their own Code section as well, Article 760, which is used in conjunction with Article 800.

Telecommunications devices are one example of what the Code calls "utilization equipment," that is equipment which is not used primarily for the transport of energy, but which utilizes electricity for some other purpose. Most types of utilization equipment use an attachment plug to provide for electrical power, as opposed to being field wired. Nonetheless, they too are subject to the provisions of the Code. This would include, for example personal computers and home appliances. There is no provision within the Code itself that exempts such equipment. For example in one North Carolina court case it was held that a freezer which had had its plug altered was subject to the State's adoption of the National Electrical Code. Alteration of the plug, by removing the grounding pin and creating electrical shock hazard, was a violation of the Code and a violation of State law. (**Jenkins v. Starrett Corp.** , 13 N.C App. 437, 186 S.E. 2d 198 (1972)). Some states and localities, however, do exempt such equipment by statute or ordinance.

The NEC itself, also provides for certain exemptions (Article 90-2). It does not cover installations in ships, aircraft or vehicles, including mobile homes. Installations in mines and to power railways are also not covered. Installations which are under the exclusive control of electric utilities are not within the scope of the code, as are "installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations." Note however, that most of these installations are covered by other codes, regulations or by standards used by utilities when acquiring equipment.

In summary, electrical equipment and devices other than those in exempted installations are acceptable only if approved, and approved means they have to be acceptable to the authority having jurisdiction. The authority having jurisdiction could be a state or local official and it is estimated that there are more than 2,700 of these in the United States. It is up to the authority having jurisdiction to determine whether most devices and equipment types have to be listed, and who can do the listing.

In order to illustrate the importance of Code, and the variety of ways in which the states have provided for its enforcement, we will take an in depth look at the laws of four states, Oregon, Washington, North Carolina and California.

To scope out all the laws that apply in these particular jurisdiction, we have looked at three types of statutes. *Commercial or business statutes* govern the sale of electrical equipment in a state or locality. *Building or fire codes,* which include electrical codes, provide standards for the installation of electrical equipment. *Labor codes* set standards that employers must follow to ensure a safe workplace. Some states combine all three of these into a single statute, others have separate and sometimes conflicting statutes governing the sale, installation or utilization of electrical equipment. Some jurisdictions also have special codes governing sensitive areas such as public schools, hospitals, day care centers or prisons. (Prison codes, for example, may provide for ways to ensure that cordage is only used as intended.)

Some states preempt local rules and bar any changes to state laws by local jurisdictions. Others permit local jurisdictions to write their own local laws, or to amend the state laws for use locally. Some states require electrical utilization equipment, that is equipment which utilizes electricity (i.e. personal computers, telephones, faxes, etc.) to be listed, other jurisdictions don't.

In all jurisdictions, however, the NEC must be adopted through some official action of government before it has legal effect. The NEC itself cannot be used as binding authority until it is adopted by a state or locality through the passage of a state statute or local ordinance.

Oregon

In many ways the State of Oregon could serve as a model for other states. Statutes and regulations are concise and laboratories purporting to certify electrical products are monitored. In reviewing the law in this and the other jurisdictions, we will start first with the state *statutes,* which are adopted by the legislature, and work our way through state *regulations* which are adopted by state agencies working under the authority given them by the state legislature.

Title 38 of the Oregon Revised Statues ("ORS") §§ 479.510 to 479.495 comprises Oregon's Electrical Safety Law. It effectively combines provisions of the building, labor and commercial codes under one law. Section 479.520 states its purpose, protection of the health and safety of the people of Oregon and their property from the hazards of electricity. The law is administered and enforced by the Department of Consumer and Business Services and the Electrical and Elevator Board of the State of Oregon.

Oregon preempts efforts by cities and counties to regulate electrical safety (479.525). "No municipality shall enact or enforce any ordinance, rule or regulation relating to the same matters encompassed by the Electrical Safety Law." The law requires most types of electrical products sold or installed in the state to be certified by an approved testing laboratory, defined in 479.530 as one which meets the criteria established by the Director of the Department of Consumer and Business Services. The Electrical Safety Law governs not only "electrical installations," that is those things which make up the wiring or are permanently attached to the electrical grid, but "electrical products" which include devices "operated" by electrical current. Exempted from the provisions of the Electrical Safety Law is telephone equipment governed by Federal Communication Commission rules in Part 68 (47 C.F.R. Part 68).[1] Also exempted is testing equipment used in laboratories or hospitals, commercial electrical air conditioning equipment and "industrial electrical

[1] The exemption of telephone devices such as modems, answering machines, telephones, etc., seems to reflect some confusion on the part of the State of Oregon regarding the scope of the FCC rules and federal preemption. FCC rules do not set standards aimed at protection of the user (other than the hearing impaired), but are aimed instead at limiting dangers that such equipment presents to the telephone network. As such, seems inappropriate to exempt such devices from the scope of the law. Note that telephone equipment is explicitly required to be listed under the National Electrical Code.

equipment" defined as devices "designed to service or produce a product and that is used directly in the production of the service or product."

The law bars the sale or disposition of an electrical product which has not been certified (479.610). The law lends to the Department of Consumer and Business Services power to adopt regulations relating to the procedure for certifying products (479.730). The law also draws a distinction between certification and "field evaluation". Some types of products are too large to be evaluated at a laboratory or are customized devices uniquely installed at a particular user's site. Such devices are impractical to certify and must be evaluated at the user's site. The Oregon law has specific provisions relating to field evaluation.

Administration and enforcement of the law is left to the Electrical and Elevator Board (479.810). Cities and counties which wish to administer and enforce the law in their own jurisdictions must apply to the Department of Consumer and Business Services for permission to do so (479.855).

In order to aid in the administration of the law, the Department of Consumer and Business Services has adopted regulations which can be found in the code of Oregon Administrative Regulations ("OAR"). For example, OAR, Chapter 918, Division 306, prohibits an approved testing laboratory from being engaged in the design of products being evaluated (918-306-0120) and requires products to be certified to the "latest effective version of applicable safety standards" (918-306-0130).

Authorities in Oregon can supply a list of approved testing laboratories together with the categories for which they are approved.

Washington

Though they are neighbors, the state of Washington has a completely different regulatory scheme from that of Oregon. Washington's statutes specify electrical wiring and equipment requirements in Section 19.28.010. While it requires that all electrical wiring and equipment (other than communications equipment) *conform* to the National Electrical Code, 1993 Edition, it does not require products to be listed or certified unless specifically required to be listed or certified by the 1993 NEC. Cities and counties are permitted to adopt their own electrical requirements as long as they set an equal or higher standard than the state's.

State regulations, written by state agencies to administer the law, can be found in the Washington Administrative Code ("WAC"). As with many states, there are separate requirements under Washington's *labor regulations* and its *building codes.* As noted above, the Washington Building Code makes no specific reference to the need for listing or certification of electrical equipment (296-46-090). The Labor Code, however, is different, and appears to be well coordinated with the rules of the federal Occupational Safety and Health Administration. As such, it requires most electrical products used in the workplace to be certified by an OSHA accredited Nationally Recognized Testing Laboratory (see 296-24-58503, definition of "approved").

Like Oregon, Washington maintains a comprehensive scheme for the recognition of laboratories. These regulations can be found in the Washington Administrative Code (296-402-000).

North Carolina

Like Oregon, the State of North Carolina has *commercial statutes* prohibiting the sale of electrical goods which have not been certified (Chapter 66, Commerce and Business Regulations of the State of North Carolina, §§ 66-23 through 66-27 A). The Commissioner of Insurance, through the Engineering Division of the Department of Insurance, approves testing laboratories under these statutes (66-25). Unlike Oregon, North Carolina has separate statutes governing *building standards* (Chapter 143, North Carolina State Building Code, § 138). Both the commercial and building codes have statewide application. Political subdivisions of the state can adopt their own codes only with the state's permission.

California

The State of California has no commercial code prohibiting the sale of uncertified electrical equipment generally, but it does have a statewide building code. (Annotated Codes of California, Health and Safety Code, Section 18901). The purpose of the statewide code was less to harmonize conflicting building and electrical standards than just to put all those standards in one place.

In 1987 the Governor of California established a task force on building design and construction policy. It recommended the creation of a compilation known as the State Building Code so that the regulations of the seventeen state agencies which, in one way or another, had been writing their own building and electrical standards could be found in one place.

The "California Electrical Code" (CEC) is Part III of the California Building Standards Code, and is the result. It adopts the National Electrical Code, 1993 edition, but makes numerous amendments. Further, the CEC tabulates *separately* amendments to the National Electrical Code which have been put forth by seventeen

different state agencies. Therefore, in California, there are slightly different electrical codes being enforced by such agencies as the California Department of Food and Agriculture, the Board of Corrections, the Department of Health Services, the Department of Education, the Division of Occupational Safety and Health and the Office of the State Fire Marshal, among others. The introductory section of the California Electrical Code attempts to define the places over which these various agencies have jurisdiction, but the areas of jurisdiction do not appear to be mutually exclusive.

The California Electrical Code also does not define recognized testing laboratories. It leaves language in the National Electrical Code unchanged. It is therefore up to the "authority having jurisdiction" to determine which laboratories can test which kinds of products. That means there are seventeen different agencies at the state level to which a laboratory may have to apply to become accredited.

And that's not all. Despite the existence of a statewide code, California permits localities to adopt their own differing regulations (California Health and Safety Code, Section 18941.5). The City of Los Angeles has done so, promulgating the "Los Angeles Electrical Code" (LAEC) which can be found in Chapter 9, Article 3 of the Los Angeles Municipal Code. The scope of the LAEC includes "all electrical wiring and electrical equipment installed, used, maintained, rented, leased or offered for sale or distributed for use in the City of Los Angeles..." (Section 93.0103). Regarding electrical equipment, Section 93.0402 states that "no person shall sell, offer for sale, advertise or display for sale, dispose of by way of gift, loan, rent, lease or premium, or install or use any 'equipment,' as defined in Article 100 of the [1990] NEC unless such equipment has been approved by the Department." Exempted from the prohibition of Section 93.0402 is "equipment listed by an approved laboratory, provided the label, symbol, or other identifying mark of the approved laboratory is affixed to the equipment and further provided that the equipment is installed and used in conformance with its listing and this Code."

Chapter 9, Article 8 of the Los Angeles Municipal Code contains the provisions relating to the approval of laboratories in the City of Los Angeles (Section 98.0503). It states that "the Superintendent shall establish rules and regulations setting forth conditions and provisions precedent to the issuance of any such approval [of a testing agency] and for the conduct of any person or agency so approved." (The General Manager of the Department of Building and Safety of the City of Los Angeles is the "Superintendent" for the purpose of this section. See 98.0103.) The Los Angeles Municipal Code also states that the Superintendent may revoke an approval "upon evidence of failure of an agency or person so approved to properly conduct any test or certify any material or assembly of material in a matter required by [the Los Angeles Electrical Code] or for any reason set forth in this article." (98.0503(c)) Laboratory approvals have to be renewed each year.

The most recent guidelines for the recognition of testing agencies are contained in Memorandum of General Distribution No. 93 dated April 8, 1991. The rules are comprehensive. The application also must show that the laboratory is "nationally recognized," a requirement that can be met by showing approval by the federal Occupational Health and Safety Administration, though that approval alone is not sufficient for recognition by the City of Los Angeles.

An applicant must supply detailed information on its personnel. "Indicate all the engineers that are professionally registered.... There shall be at least one registered engineer in the appropriate discipline for each general area of testing..."

The City of Los Angeles also prohibits certain conflicts of interest. "The [testing] agency shall have a policy of not acting as an advocate or consultant for a client whose products or materials are under review.... The [testing] agency's role must be limited to third-party safety testing in the field for which recognition is requested."

A listing of the organizations currently recognized by the City of Los Angeles is available from the Department of Building and Safety.

Summary

These four states illustrate well the complexities involved in understanding the legal requirements applicable to electrical products. Though the laws differ, certain fundamental themes can be discerned. First, nearly all jurisdictions base their codes substantially on the NEC. Second, the NEC does not require all equipment types to be listed, nor does it prevent states and localities from requiring listing. For the most part, it leaves the determination as to what kinds of equipment have to be listed, and by whom, to the states and local authorities (to the extent the latter are authorized by the state.)

Finally, as complex as these laws appear to be, there is little doubt that they are serving the public well. Electrocutions in the US have fallen by about one third in the last ten years. While product designers may sometimes look upon product safety standards as a necessary burden, they can take some pride in the fact that they are playing a part in a system that works, and saves lives. ■