

Chapter 3: General Regulations

General Comments

A fundamental principle of the code is its dependence on the listing and labeling method of approval for appliances and equipment. Section 301.4 prohibits the installation of unlisted appliances except where approved in accordance with Section 105.

Purpose

Chapter 3 contains requirements for the safe and proper installation of mechanical equipment and appliances to ensure protection of life and property

SECTION 301 GENERAL

301.1 Scope. This chapter shall govern the approval and installation of all *equipment* and appliances that comprise parts of the building mechanical systems regulated by this code in accordance with Section 101.2.

❖ This section states that this chapter governs the approval and installation of all mechanical equipment and appliances that are regulated by the code. Section 101.2 establishes the scope of application of the code (see commentary, Section 101.2).

301.2 Energy utilization. Heating, ventilating and air-conditioning systems of all structures shall be designed and installed for efficient utilization of energy in accordance with the *International Energy Conservation Code*.

❖ Appliances and equipment that use depletable energy sources must be designed and installed to use energy efficiently. The *International Energy Conservation Code*[®] (IECC[®]) is the applicable document for regulating the efficiency and performance of the appliances and heating, ventilating and air-conditioning (HVAC) systems. Special applications such as process heating or cooling should be designed for the maximum energy efficiency attainable.

301.3 Identification. Each length of pipe and tubing and each pipe fitting utilized in a mechanical system shall bear the identification of the manufacturer.

❖ The manufacturer is given the option of determining the type of marking for the material. If there is no applicable standard or the applicable standard does not require that a material be identified, identification of the manufacturer is still required by the code. Where the code indicates compliance with an approved standard, the manufacturer must comply with the requirements for marking in accordance with the applicable standard.

301.4 Plastic pipe, fittings and components. Plastic pipe, fittings and components shall be *third-party certified* as conforming to NSF 14.

❖ Plastic piping, fittings and plastic pipe-related components, including solvent cements, primers, tapes, lubricants and seals used in mechanical systems, must be tested and certified as conforming to NSF 14. This includes all piping and fittings and plastic piping system components, including but not limited to pipes, fittings, valves, joining materials, gaskets and appurtenances. This section does not apply to components that only include plastic parts such as brass valves with a plastic stem.

301.5 Third-party testing and certification. Piping, tubing and fittings shall comply with the applicable referenced standards, specifications and performance criteria of this code and shall be identified in accordance with Section 301.3. Piping, tubing and fittings shall either be tested by an approved third-party testing agency or certified by an approved *third-party certification agency*.

❖ The term “third party” refers to an outside organization with no financial or other interest in the outcome. The term “tested” means that the product or material was initially tested, a report or documentation was developed, but retesting at a later date is not performed. The term “certified” means that the product or material was initially tested and a program of periodic testing ensures that the product or material continues to meet the specified requirements.

301.6 Fuel gas appliances and equipment. The approval and installation of fuel gas distribution piping and *equipment*, fuel gas-fired appliances and fuel gas-fired *appliance* venting systems shall be in accordance with the *International Fuel Gas Code*.

❖ Editions of the code prior to the year 2000 addressed installation requirements that were exclusively fuel-gas-related. Starting with the 2000 edition of the code, the provisions that exclusively addressed fuel-gas installations were deleted from the code as the

first edition of the *International Fuel Gas Code*[®] (IFGC[®]) was developed in 1997. The creation of the IFGC was the result of an agreement between the International Code Council[®] (ICC[®]) and the American Gas Association (AGA) to develop and maintain a stand-alone fuel gas code for the family of *International Codes*[®] (I-Codes[®]). With the support and input of the fuel gas industry, the IFGC is kept current with new developments and technology in the fuel gas industry. Any code provision that addressed only a fuel-gas-related subject was removed from the code. Code provisions that could apply to other types of fuel (oil, kerosene, wood, coal, pellets, etc.) as well as fuel gas were modified to no longer refer to fuel-gas-related subjects. The IFGC is an inseparable partner to the IMC. Together, they cover all currently used fuels with the most up-to-date text possible.

301.7 Listed and labeled. Appliances regulated by this code shall be *listed* and *labeled* for the application in which they are installed and used, unless otherwise *approved* in accordance with Section 105.

Exception: Listing and labeling of *equipment* and appliances used for refrigeration shall be in accordance with Section 1101.2.

❖ Mechanical appliances must be listed and labeled by an approved agency to show that they comply with the applicable national standards. The code requires listing and labeling for appliances such as boilers, furnaces, space heaters, direct-fired heaters, cooking appliances, clothes dryers, rooftop HVAC units, etc. The code also requires listing for system components as specifically stated in the text addressing those components. The label is the primary, if not the only, assurance to the installer, the inspector and the end-user that a similar appliance has been tested and evaluated by an approved agency and has been determined to perform safely and efficiently when installed and operated in compliance with its listing.

The presence of a label is part of the information that the code official is to consider in the approval of appliances. The only exception to the labeling requirement is when the code official approves the use of a specific appliance with the authority granted in Section 105. The requirement that appliances are to be used only in accordance with their listing is intended to prevent the use of products that have a listing for a particular application but are being used in an application for which they have not been tested. An example would be a fan that is listed for use as a bathroom exhaust fan but is installed for use as an in-line restaurant power ventilator. Another potential misapplication could be duct wrap that has been tested and listed for small ducts but is installed on a much larger diameter duct. Such misapplication has the potential to create hazardous life safety situations.

Caution should be exercised when considering the approval of unlisted and unlabeled appliances.

Approval of unlabeled appliances must be based on documentation that demonstrates compliance with applicable standards or, where no product standards exist, the appliance is appropriate for the intended use and will provide the same level of performance as would listed and labeled appliances. A fundamental principle of the code is the reliance on the listing and labeling process to ensure appliance performance; approvals granted in accordance with Section 105 must be well justified with supporting documentation. To the code official, the installer and the end-user, very little is known about the performance of an appliance that is not tested and built to an appliance standard.

301.8 Labeling. Labeling shall be in accordance with the procedures set forth in Sections 301.8.1 through 301.8.2.3.

❖ As the commentary for Section 301.4 states, the product label is the primary, if not the only, assurance to the code official that the appliance is safe for installation. The labeling of an appliance ensures that testing in compliance with an applicable standard has been performed and that the product will perform acceptably when installed and operated in accordance with the appliance's listing. Before an appliance or other component can be labeled, the code requires specific actions by qualified agencies and personnel. Sections 301.8.1 through 301.8.2.3 describe the requirements that must be complied with before a label can be issued for the appliance or equipment.

301.8.1 Testing. An *approved* agency shall test a representative sample of the mechanical *equipment* and appliances being *labeled* to the relevant standard or standards. The *approved* agency shall maintain a record of all of the tests performed. The record shall provide sufficient detail to verify compliance with the test standard.

❖ An approved agency is one that complies with the requirements of Sections 301.8.2.1 through 301.8.2.3 and is approved by the code official (see commentary, Section 301.8.2.1). The only way that an approved agency can verify that equipment and appliances meet the requirements of the relevant standard(s) is by testing of the appliance or equipment under controlled conditions in a testing laboratory. For mass-produced identical products, the approved agency rarely tests each product. Typically, a representative random sample of a "production run" of products is tested. For example, a test protocol might require that three units out of 1,000 units produced be tested. As long as the design and manufacturing processes for identically produced products do not change, the established sampling and testing frequency provides a high level of assurance that each produced product would pass the test, if actually tested.

The approved agency is responsible for maintaining a record of specific information concerning the product tested, as well as the results of the tests per-

formed. The test standards detail what information is important to record. The records provide proof that the testing was actually performed and that appliance or equipment met or exceeded the minimum requirements of the applicable product standards.

There are numerous standards, not all of which are specifically referenced in the code, applicable to various appliances and equipment. For this reason, the approved agency determines the standards to be used for testing and then, in turn, as the basis for labeling. Each standard contains safety requirements for a given appliance or piece of equipment and specifies tests that must be performed. The labeling agency must maintain sufficient detailed documentation to demonstrate compliance with the test standard. The code official may require that copies of the test reports be submitted to determine the validity of the label.

Examples of standards that are used as a basis for testing and labeling include:

- UL 641—Low-Temperature Venting Systems, Type L;
- UL 727—Oil-Fired Central Furnaces; and
- UL 1482—Room Heaters, Solid-Fuel Type.

The basis for a label is the requirement for testing a representative, perhaps identical, sample of the appliance to indicate conformance to a required standard. For this reason, the appliance must meet the requirements of the standard (see commentary, Section 304.1).

301.8.2 Inspection and identification. The *approved* agency shall periodically perform an inspection, which shall be in-plant if necessary, of the mechanical *equipment* and appliances to be *labeled*. The inspection shall verify that the *labeled* mechanical *equipment* and appliances are representative of the mechanical *equipment* and appliances tested.

- ❖ The approved agency whose identification insignia appears on the label is required to perform periodic in-plant inspections to verify that the manufactured product is equivalent to the sample that was tested. Because the label is good only for the products that were tested, the in-plant inspections are intended to discover any design changes or production quality control problems. If any discrepancies are found, the labeling agency would discontinue labeling of the particular product and the manufacturer would be required to resolve the problem and, if necessary, have the revised product retested before the labeling process is resumed. The code official may require copies of the periodic inspection reports to determine that the in-plant inspections are being performed in compliance with the requirements for a labeled product.

Because appliances and equipment are tested under specific conditions of installation and operation in accordance with the manufacturer's instructions, the issuance of a label requires that these instructions be provided to the installer and end-user to

ensure that the product is not misapplied or improperly installed. Because the code requires that the labeled appliances and equipment be installed and operated in accordance with the manufacturer's instructions, the instructions must be attached to or shipped with each appliance. In-plant inspections by the approved agency ensures that the instructions are being shipped with the product, that the design of the product has not substantially changed and that any change in manufacturing processes will not require a change in the testing protocol.

301.8.2.1 Independent. The agency to be *approved* shall be objective and competent. To confirm its objectivity, the agency shall disclose all possible conflicts of interest.

- ❖ As a part of the basis for a code official's approval of a particular labeling agency, the agency must demonstrate its independence from the manufacturer of the product as well as competence to perform the required tests. The judgment of objectivity is linked to the financial and fiduciary independence of the agency. The competence of the agency is judged by its experience and organization, and the experience of its personnel. As a hypothetical example, the Acme Inspection Agency is testing oil-fired furnaces for the Real Hot Furnace Company. After some investigation, it is discovered that both Acme and Real Hot are subsidiaries of the same parent company. The inspection agency and manufacturer clearly have a relationship that is inappropriate from the standpoint of conflict of interest, and the objectivity of the inspection agency is sufficiently questionable for the code official to justify not approving Acme as a testing and labeling agency for equipment produced by the Real Hot Furnace Company.

While code officials could do their own investigations of testing agencies, many rely upon accredited third-party evaluation services to perform such investigations. One such service is the International Code Council's Evaluation Service (ICC-ES). ICC-ES evaluation reports are public documents, available free of charge on the worldwide Web, not only to building regulators and manufacturers, but also to contractors, specifiers, architects, engineers, and anyone else with an interest in the building industry.

301.8.2.2 Equipment. An *approved* agency shall have adequate *equipment* to perform all required tests. The *equipment* shall be periodically calibrated.

- ❖ An agency must have proper equipment to perform the specific tests and inspections as required by the product and test standards. Referring to the example in the commentary for Section 301.8.2.1, if the Acme Inspection Agency had the facilities to test only fire doors, they would not be the appropriate agency for testing of an oil-fired furnace. Although this example is oversimplified, the point is that the inspection agency must have all of the necessary equipment to perform the testing required by the applicable standard.