



Frequently Asked Questions on Health Effects of PEX Tubing

The use of cross-linked polyethylene (PEX) tubing is increasing in new construction across North America, for plumbing, hot-water heating and other applications.

NSF testing and certification on PEX plumbing tubing and associated fitting systems to NSF/ANSI Standard 61 helps to ensure that these components will not contribute harmful levels of contaminants to the drinking water. Below are some of the frequently asked questions about health effects of PEX tubing.

What is NSF/ANSI Standard 61?

NSF/ANSI Standard 61 is entitled Drinking Water System Components-Health Effects. This is the American National Standard for health effects of drinking water system components. It establishes the health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components and materials used in drinking water systems.

The standard is maintained by a Joint Committee with equal representation from regulators (such as EPA, Health Canada, and state drinking water officials), users (such as water purveyors, utilities, and engineers) and manufacturers. The NSF/ANSI Standard 61 is accredited by the American National Standards Institute, which ensures the standard is developed and maintained using an open, consensus process and has representation by all stakeholders.

How is PEX tubing tested?

First, a formulation review is performed on the material to determine what possible contaminants could leach out into drinking water and determines what type of chemical extraction testing is necessary.

PEX tubing is tested by exposing the tubing to formulated exposure waters, and then analyzing the exposure waters for contaminants. Three separate formulated waters are used during the product exposure. A pH 5.0 and 10.0 exposure water are separately used for exposures as these waters are aggressive toward extraction of metallic contaminants. A pH 8.0 water is used during the exposure for organic based contaminants. The tubing samples containing water are heated to 140°F (60°C), for domestic hot water systems or 180°F (82°C) for commercial hot systems.

Tubing is conditioned by exposure to the formulated waters for 14 days with water being changed on 10 of those days. The water collected from the final 16-hour exposure period is then analyzed for contaminants. Any contaminants found must be below EPA or Health Canada levels for regulated contaminants. For non-regulated contaminants found, NSF/ANSI Standard 61 sets health based pass/fail levels based on review of available toxicity data using the risk assessment procedures in annex A of the standard.



What types of analysis are performed on PEX tubing?

Water exposed to PEX tubing and associated fitting systems are tested for the following contaminants as required by NSF/ANSI Standard 61:

- VOCs (Volatile Organic Compounds)
- Semi-volatile compounds (base neutral acid scan by Gas Chromatography/Mass Spectroscopy)
- Phenolics
- Regulated Metals scan including antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, selenium, and thallium
- Methanol
- Tertiary butyl alcohol
- MTBE (methyl tertiary butyl ether)
- Any other potential contaminant identified during the formulation review.

These test methods are capable of detecting contaminants in water as low as 4 parts per billion (4 ppb) and lower, equivalent to 0.0000004% concentration.

How do I know if PEX tubing meets this requirement?

PEX tubing meeting the health effects requirements of NSF/ANSI Standard 61 will bear either the NSF-61 Mark or the NSF pw (potable water) Mark on the print string. The NSF pw Mark indicates the product meets the health requirements of NSF-61 as well as performance, long term strength and quality control requirements as required by NSF/ANSI Standard 14- Plastic Piping Components are Related Materials.

If a product has only a NSF rfh mark, this indicates the product has only been evaluated for radiant floor heating applications.

Where Can I find NSF Listed Products?

Currently there are 27 companies listed for 140 PEX tubing products listed for potable water applications. NSF certified products can be found on our website http://www.nsf.org/business/search_listings/

What ensures the product consistently meets these requirements?

For PEX tubing listed for potable water applications, NSF performs at least three unannounced audits of each production facility annually. During the audit, NSF verifies there are no modifications to the product formulation and processing. In addition, NSF verifies quality control tests being done by the manufacturer. NSF also collects samples for laboratory retesting of each product family on an annual basis.



Who can I contact for questions?

If you have questions about the testing and certification of any NSF Certified product, you may contact our Consumer and Regulatory Affairs Hotline at 1-877-867-3435

Who is NSF?

NSF International, The Public Health and Safety Company™, a not-for-profit, non-governmental organization, is the world leader in standards development, product certification, education, and risk-management for public health and safety. For 60 years, NSF has been committed to public health, safety, and protection of the environment. While focusing on food, water, indoor air, and the environment, NSF develops national standards, provides learning opportunities through its Center for Public Health Education, and provides third-party conformity assessment services while representing the interests of all stakeholders. The primary stakeholder groups include industry, the regulatory community, and the public at large. NSF's certification program is accredited by the American National Standards Institute, Standards Council of Canada and the International Accreditation Service.