THE
BUILDING & PLUMBING
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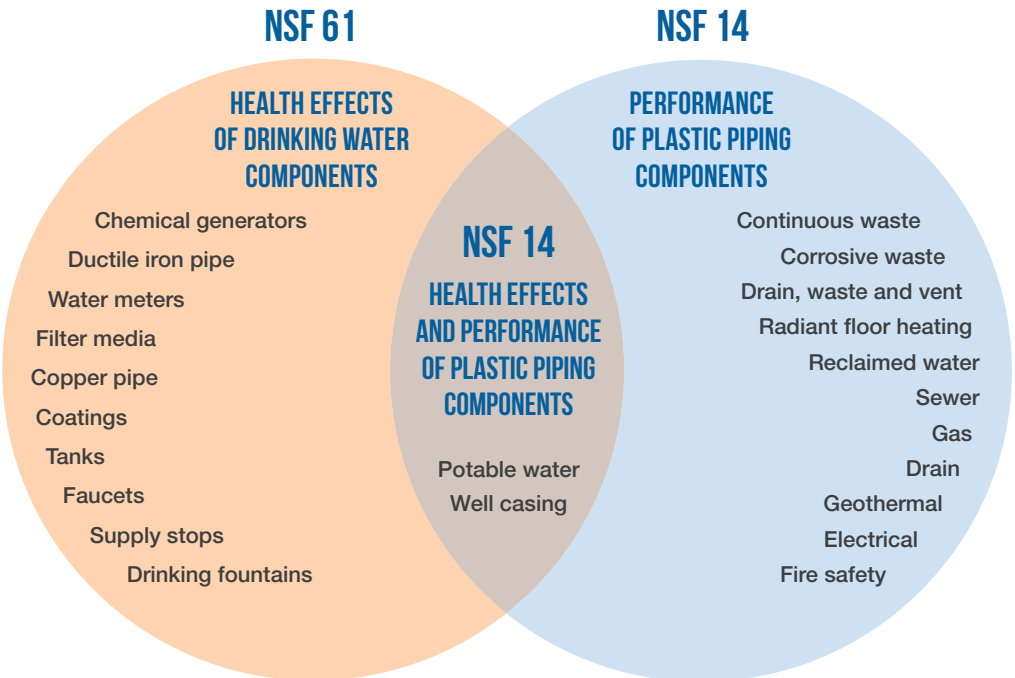
NSF/ANSI 61 vs. NSF/ANSI 14 – How Do They Differ?

NSF/ANSI 61: ***Drinking Water System Components – Health Effects*** establishes minimum health effects requirements for the chemical contaminants that are directly imparted to drinking water from products, components and materials used in drinking water systems. NSF/ANSI 61 addresses material safety only and does not include a performance evaluation. Examples of products covered by the scope of NSF/ANSI 61 are faucets, water meters, chemical generators and copper pipe.

NSF/ANSI 14: ***Plastics Piping System Components and Related Materials*** establishes minimum physical, performance and health effects requirements for plastic piping system components and related materials. The scope of NSF/ANSI 14 is thermoplastic and thermoset plastic piping system components, including pipes, fittings, valves, joining materials, gaskets and appurtenances. NSF/ANSI 14 covers both potable water applications and non-potable water applications, such as radiant floor heating, geothermal, and drain, waste and vent (DWV). All products evaluated to NSF/ANSI 14 must comply with the requirements of an applicable performance standard, such as ASTM, CSA or AWWA. For potable water applications, products must also comply with the health effects requirements of NSF/ANSI 61.

NSF/ANSI 14 also includes requirements for an in-plant quality control program to ensure that products conform to the applicable requirements of the standard on a continuous basis.

Comparison by Liz Kelley, Senior Account Manager, Plumbing.



Piping Materials and NSF/ANSI 61: Metallic vs. Plastic

Which materials are safe for use in water supply and distribution systems? NSF International is repeatedly asked this question because **NSF/ANSI 61: *Drinking Water System Components - Health Effects*** is the legally recognized national standard in the United States for the human health effects of drinking water contact materials, components and devices. NSF/ANSI 61 also requires products to comply with the U.S. Safe Drinking Water Act "Lead Free" requirement. This requires products that convey or dispense drinking water to have a weighted average lead content of 0.25% or less. NSF/ANSI 61 therefore requires these products to be evaluated to **NSF/ANSI 372: *Drinking Water System Components – Lead Content.***

The fact is, virtually any material has the potential to leach contaminants into drinking water. The question is whether the type and quantity of contaminants are safe for drinking. There is no ranking system of good, better and best and the decision is not made wholly based on material type, but based on the finished product. Individual products that are certified to meet the requirements of the standard are approved for use in drinking water applications.

Plumbing codes and state drinking water regulations require products to conform to NSF/ANSI 61, and to be certified as such by an independent third-party certifier. Third-party test laboratories and certifiers are accredited by agencies like the American National Standards Institute (ANSI).

The certification process requires a disclosure by the manufacturer of all water contact materials in the product, and a disclosure by the manufacturer's material suppliers of all chemical ingredients in the materials. The certifier performs a formulation review of each water contact material to determine any possible ingredients, contaminants or reaction by-products that may potentially leach from the material into drinking water. This formulation review then determines which chemical analyses will be performed.

NSF/ANSI 61 has a standard battery of chemical tests per a given material that has been developed based on years of experience of formulation reviews. The table below shows the chemical tests performed for the most common types of piping. As you can see, the concerns are different for each material. Pipes with integral gaskets are also tested for the contaminants associated with those gaskets.

Pipe Materials	Chemical Tests
Asphaltic lined ductile iron	Polynuclear aromatics, VOCs, semi-volatiles, regulated metals, molybdenum, vanadium, manganese
Cement lined ductile iron	Dioxins and furans, radionuclides, semi-volatiles, ethanolamines, regulated metals
Copper alloy	Regulated metals
Polyethylene	VOCs, semi-volatiles, regulated metals
Polyethylene (crosslinked)	VOCs, semi-volatiles, regulated metals, methanol, tert-butyl alcohol
Polyvinyl chloride	VOCs, semi-volatiles, regulated metals, vinyl chloride monomer, tin, antimony

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Pipes are tested by exposing them to different formulated exposure waters: pH 5, pH 6.5 (copper), pH 8 and pH 10. The exposure testing involves a regimented dump and fill process over the course of 17 days where final water samples are analyzed following a 16-hour dwell. The exposure waters are then analyzed for contaminants. The three formulated waters are each aggressive toward various contaminants of concern. Products are exposed to water at 73° F (23° C), 140° F (60° C) or 180° F (82° C), depending on the temperature range and end use of the product.

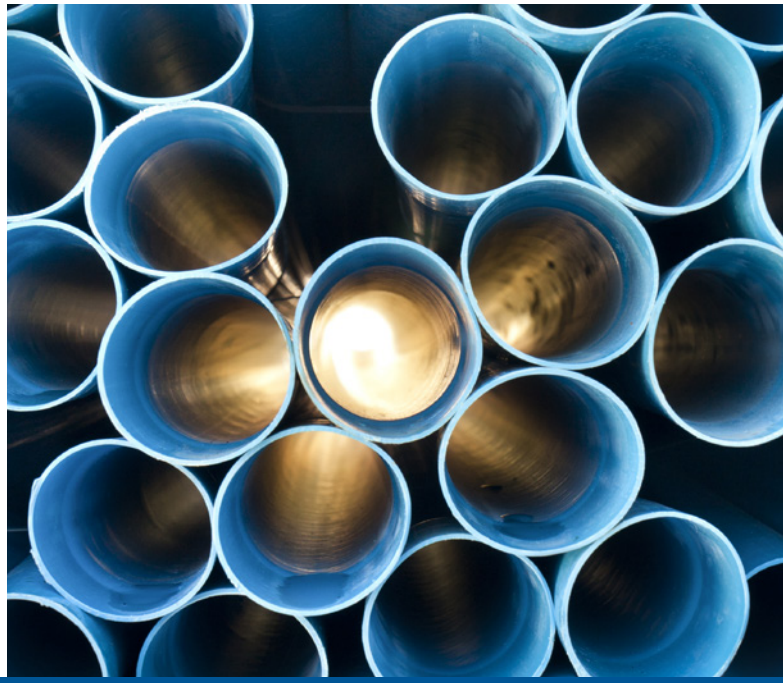
Any regulated contaminants found must be below U.S. EPA and Health Canada levels for regulated contaminants. For non-regulated contaminants found, NSF/ANSI 61 sets health-based pass/fail levels based on review of available toxicity data using the risk assessment procedures in Annex A of the standard. The toxicological evaluation criteria are based on lifetime exposure to the concentration of contaminants in drinking water.

The discovery of emerging contaminants and the toxicology of chemicals require constant updates to the standard. Once a health risk level has been established for a new contaminant, the risk assessment is sent for external peer review by the NSF Health Advisory Board (HAB). This panel consists of toxicologists from the U.S. EPA, state regulatory agencies, Health Canada, academia, consultants and chemical manufacturers. Following the external review by the HAB, the document then is submitted to the NSF Drinking Water Additives Joint Committee (with equal representation of regulators, manufacturers and users) for approval. The joint committee's recommendation is then reviewed and approved by the NSF Council of Public Health Consultants (public health officials from the U.S. and Canadian federal governments, states and provinces). The risk assessment values then are published in NSF/ANSI 61.

Certifiers require initial and annual inspections of production facilities to verify the product formulation and production process and to ensure adequate quality control procedures are in place to prevent the use of unauthorized materials. Product samples are often collected during the annual inspections and sent to laboratories to be tested. Manufacturers with offshore production locations are subject to the same formulation review, testing and inspection requirements as those located in North America.

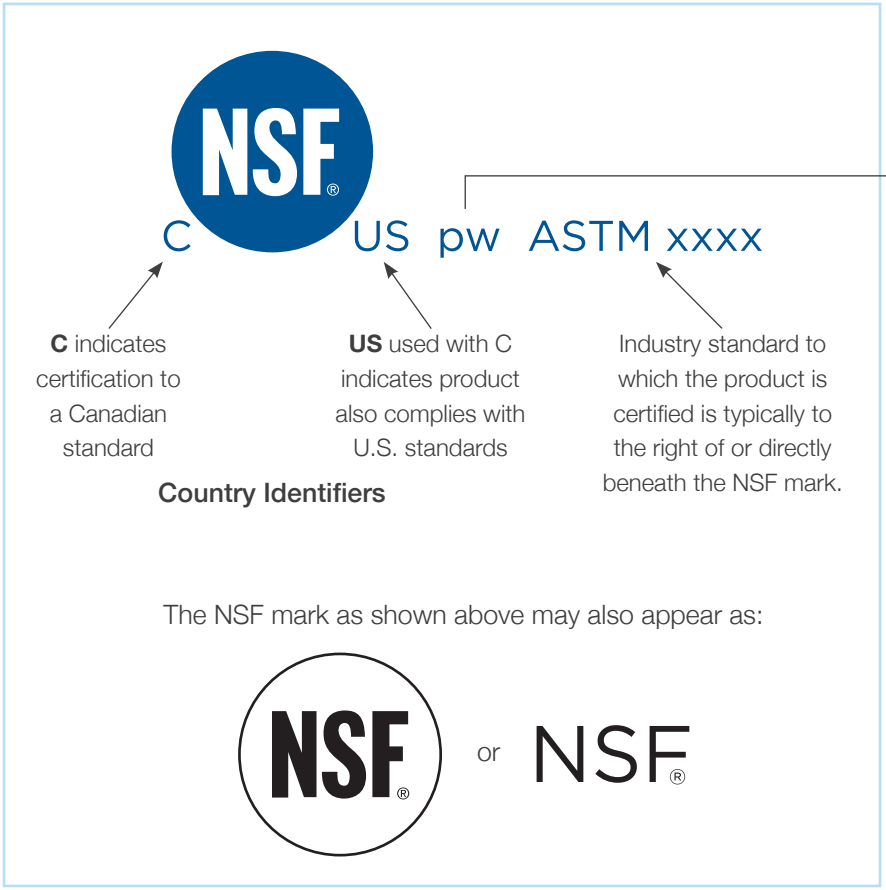
Which materials are safe for use in water supply and distribution systems? The answer is those that have been tested and certified to NSF/ANSI 61. Product certification by NSF can always be verified on the official certification listings for this standard. Scan this QR code or visit www.nsf.org and go to the listings page in the top right corner.

Article by Jeremy Brown, Senior Technical Reviewer, Plastics.



NSF Marks Guide for Inspectors, Regulators and Code Officials

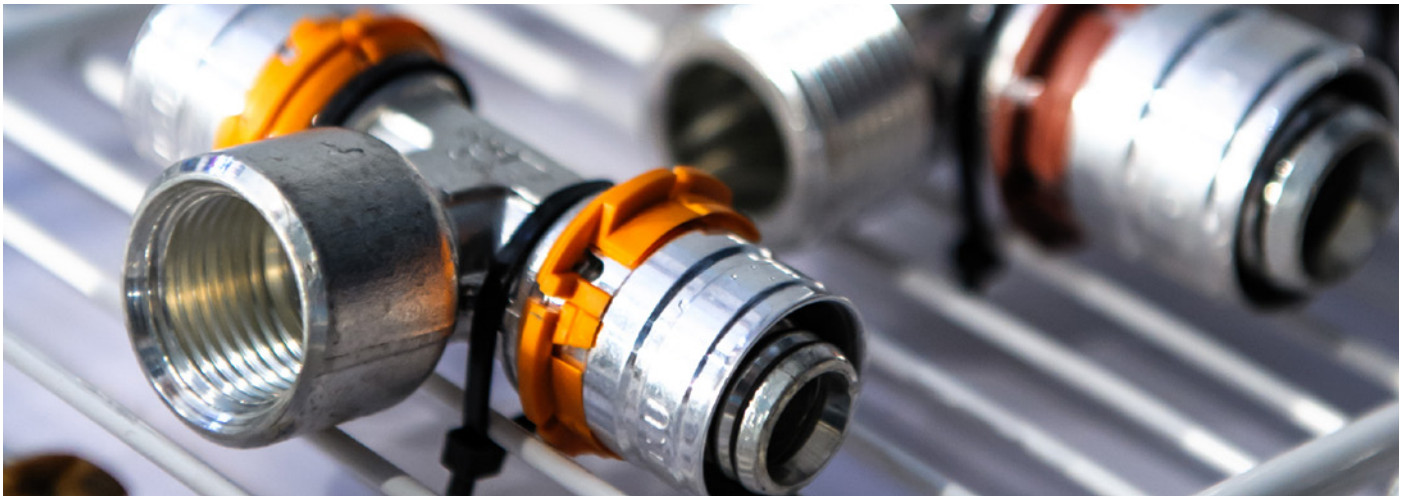
Plumbing products certified to plumbing performance standards are marked as shown below.



END USE DESIGNATIONS FOR NSF-14 PLASTIC PIPING SYSTEMS ONLY:

pw	potable water
dwv	drain, waste, vent
wc	well casing
tubular	continuous waste
sewer	sewer
rfh	radiant floor heating
rw	reclaimed water
gas	gas
geo	geothermal
NRTL	electrical
fs	fire safety
U.P.Code	Uniform Plumbing Code

NOTE: pw and wc marks also demonstrate compliance with NSF/ANSI 61.



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Drinking water system components certified for health effects or lead content use one of the following marks.

NSF Standard Blue Mark	NSF Standard Text Mark (for Products with Size/Design Constraints)	Description and Use Requirements
Certified to NSF/ANSI 61	NSF - 61	Drinking water treatment system components that are certified by NSF International against the criteria of NSF/ANSI 61 may identify that compliance by utilizing this mark.
Certified to NSF/ANSI 61-G	NSF-61-G	Products certified by NSF International against the requirements of NSF/ANSI 61 and NSF/ANSI 372 may identify that compliance by utilizing this mark.
Certified to NSF/ANSI 372	NSF-372	Products certified by NSF International against the criteria of NSF/ANSI 372 may identify that compliance by utilizing this mark.
pw	NSF pw	Products certified by NSF International against NSF/ANSI 14 and complying with NSF/ANSI 61 may identify that compliance by utilizing this mark.
pw-G	NSF pw-G	Products certified by NSF International against NSF/ANSI 14 and complying with NSF/ANSI 61 and Annex G lead content requirements may identify that compliance by using this mark.

HOW TO VERIFY IF PRODUCTS MEET THE LEAD-FREE REQUIREMENTS*

Prior to 2014, the 0.25 percent weighted average lead content test was optional under NSF/ANSI 61. Therefore, products manufactured before this date required additional certification marking to show compliance with the current law. These products display either the "Certified to NSF/ANSI 61-G" or "Certified to NSF/ANSI 61 and 372" mark. Many plastic piping products used the NSF pw-G mark.

For states like California where the law requires third party certification for lead-fee compliance, companies can get certified to NSF/ANSI 372 and display either the NSF/ANSI 372, NSF/ANSI 61-G and 372 certification mark on their product in order to avoid confusion in the marketplace.

*Always check the NSF official certification listings to verify a product's certification status: www.nsf.org.

FOG Prevention: The Big Picture

In the plumbing testing and certification field, there are few plumbing categories as contentious as devices designed to keep fat, oil and grease (FOG) out of sewers. With the wide range of manufacturers and devices, it is no surprise that there is much debate about the best way to combat FOG. FOG prevention needs to be addressed as a whole, taking into account manufacturers and installers, third-party testing/ certification bodies, municipalities and business owners. When changes are made without proper consideration of all parties, unforeseen barriers and loopholes eventually come to light.

Manufacturers and Installers

Manufacturers of FOG prevention devices bear the burden of designing an efficient product while staying competitive on price. There is no doubt that over the years, plumbing professionals have learned to recognize what works and what doesn't work. However, manufacturers can only create the device and supply maintenance and operation instructions. Once the device leaves the production facility, it is up to installers and business owners to make sure it is set up to function properly.

There are many variations of these devices in different materials, sizes, internal baffles, flow control devices, etc. Generally speaking, a quality product, no matter what the material, will be able to withstand the ASME A112.14.3 (2000) test. By having a consensus performance standard, quality manufacturers can separate themselves from their competition with truly scientifically proven results. Hydromechanical grease interceptors and grease removal devices have clear performance standards; however gravity interceptors at this time do not.

Third-Party Testing/ Certification Bodies

Independent third-party testing and certification organizations can both physically test these units as well as determine if they meet the requirements of performance standards, upon which they will be issued a certification. This process allows all manufacturers to play on a level playing field and have their units tested and certified without bias. In theory, all certification bodies should test to the same standard and interpret the standard in the same manner. The difference in some certification bodies is their policies. When taking into consideration the overall issues associated with FOG, independent third-party testing and certification bodies play a vital role for both manufacturers and municipalities.

Municipalities

FOG threatens plumbing infrastructures and it is well documented that prevention methods that are executed properly can lead to fewer sewer clogs and backups. Unchecked FOG flow into sewers can lead to not only a significant public health risk, but also poses a substantial economic threat due to the high costs associated with repairs. Another often overlooked consequence of FOG in sewer systems is the impact it can have on water treatment plants. This is the reason that plumbing codes and regulations throughout the United States have required commercial kitchens to install a FOG prevention device. Cities across the country have taken different approaches to making sure these devices are maintained correctly and have implemented audit and tracking systems to ensure proper maintenance. There are even fines issued for damage to sewer

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infrastructures that can be proven to be caused by a particular business. The major challenge for municipalities is to ensure the public safety and the structural integrity of their infrastructure are maintained while making sure to not place too much of an economic and regulation burden on business owners.

Business Owners

Currently, the cost associated with installing and maintaining FOG prevention devices falls on the business owner. Business owners have the potential to feel overwhelmed by the requirements put in place to prevent FOG discharge into sewers. In addition to the cost associated with purchasing the FOG prevention device, the business owner must also pay to have the unit installed. This cost can be a huge barrier for a business, particularly if the new device needs to be buried. Maintenance of these FOG prevention products is also paramount. A restaurant can have the most efficient FOG prevention device in the world, but if it is full of grease and not maintained properly, it serves little to no purpose and FOG can still freely flow into the sewer. It is up to the business owner to maintain the unit and ensure that it is emptied when needed. This obviously costs money and therefore may not always happen in a timely manner.

The perspective of a business owner is often overlooked when dealing with the issue of FOG. Quality products can be produced by manufacturers, performance standards can be used to ensure quality and regulations can ensure proper installation and maintenance, but if average business owners are unable to reasonably accommodate all of these factors from a financial perspective, there is a larger issue that may result.

Future State: What Is the FOG Forecast?

When viewing the FOG prevention issue from multiple perspectives, it is without a doubt a complex system. However, we seem to have all of the basic fundamental concepts in place, and we just need to "connect the dots." We need to bring all four parties together at once when making critical industry decisions. Is there a way to incentivize business owners to keep the sewers free of FOG other than fining them for violations? Are there incentives in place for manufacturers to produce efficient, highly performing products? These are the questions that need answers in order to bring effective FOG prevention programs to major cities throughout the United States.

Article by Sam McLeod, Business Unit Manager, Mechanical Plumbing.

Water Filters That Reduce Lead: The Highlights

Lead in drinking water has been a hot topic over the last few years, gaining significant media attention in various areas as lead has been detected in water distribution systems. This information can be very concerning to consumers who fear for their health and especially the health of their children. Part of the media attention has focused on water filters that reduce lead. Unfortunately this subject of lead contamination and water filters is more complicated than many may wish.

Lead exists in two main forms when it is found in water distribution systems – soluble and particulate. Soluble lead is dissolved, similar to what happens when salt is stirred into water. Particulate lead is not dissolved and exists as tiny pieces of lead, similar to when sand is stirred into water. Soluble lead can exist in different forms depending on the pH of the water.

Considering all of these issues, it is not surprising that not all water filters reduce lead in drinking water. Effective lead reduction requires a filter that is specifically designed for this purpose. These filters must be able to handle particulate lead, and

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Water Filters That Reduce Lead: The Highlights — con't

soluble lead at both low and high pH, which is why the NSF/ANSI drinking water treatment unit standards for lead reduction incorporate these requirements. By far the best way to be sure that water filters meet these requirements is third-party certification. You can identify these third party certifications by the certification mark on the product, and by verifying on the official listings page. For example, NSF certified water filters feature the NSF mark on the packaging and on the filter itself.

However, not all certified water filters are certified to reduce lead. There are many other potential contaminants in drinking water which many of the filters are certified to reduce. When searching for a water filter to reduce lead, people should make sure that the filter is not only certified by a third party, but also is certified specifically to reduce lead.

Fortunately, NSF has prepared some resources to help with consumer education and identification of NSF certified water filters. In fact, NSF has created a webpage specifically for this purpose:

This page has information to help consumers understand the issue of lead in drinking water, including information on how they can find out if they have lead contamination in their drinking water, information about how water filters work and a video describing how water filters are tested.

Also there is a link to NSF's Consumer Guide – NSF Certified Product Listings for Lead Reduction:

It is NSF's intention for this information to help guide consumers through a complicated and very important issue related to their health and their family's health. Hopefully this information can also be helpful to you, to help increase your understanding, and also to have a reference that you can use as a referral for people who may be asking you about lead in drinking water.

Article by Rick Andrew, Global Business Development Director, Water Systems.

QUESTIONS? CALL THE NSF HOTLINE

The NSF Regulatory and Consumer Information Hotline is a valuable resource for plumbing officials, inspectors, consumers and manufacturers who have questions about product certification. The hotline, which fields more than 15,000 inquires each year, can help with your questions about NSF certification marks, the certification process and where to find certified products. When you have a question or comment, call us at **+1.800.673.8010** or email **brown@nsf.org.**

NSF STANDARDS AVAILABLE FOR REVIEW

Contact us for a complimentary version of any NSF water-related standard.

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