

Summer 2019



BUILDING & PLUMBING BULLETIN



Withstanding the Tests of Time:

The Value of Monitor Testing

NSF International requires periodic retesting for all NSF/ANSI/CAN 61 certified products. For most product types, this testing occurs annually for as long as the product is certified.



Testing and Certification

of HDPE Conduit for the Canadian Market

NSF International has been testing and certifying PVC electrical conduit pipe for decades, but as the conduit market diversifies and grows, so does the need for certification and regulatory compliance.



NSF/ANSI 61

Becomes a National Standard of Canada

The American National Standard for drinking water system components, NSF/ANSI 61, has been updated with Canadian requirements and designated as a National Standard of Canada by the Standards Council of Canada (SCC).



Plastic Piping Standards

The Differences Between NSF/ANSI 14 and NSF/ANSI/CAN 61

While both industry standards are important and serve a purpose, it's important to understand the differences when it comes to product acceptance and regulatory compliance.





Withstanding the Tests of Time: The Value of Monitor Testing



**Article by
Scott Randall**
Technical Operations
Manager,
NSF International

NSF International requires periodic retesting for all NSF/ANSI/CAN 61 certified products. For most product types, this testing occurs annually for as long as the product is certified. Product types such as faucets, faucet components and some coatings are tested every three or five years. Because these cycles of periodic retesting vary by product type, this testing is sometimes referred to as monitor testing. Testing is conducted on a representative model from a family of similar products, in the same manner as qualification testing during initial certification. Likewise, the testing is performed using the same protocols and methods for the same leachates.

But why is it so important to repeat this testing once a product is certified? After all, qualification testing has already demonstrated the product's compliance with the health and safety requirements outlined in NSF/ANSI/CAN 61. Every year, about 15% of products fail qualification testing, meaning that not all products are built or formulated to a quality level that can meet the stringent health effects requirements of NSF/ANSI/CAN 61. Once a manufacturer has found a formulation that complies with NSF/ANSI/CAN 61, that manufacturer often maintains that same formulation for many years.

However, NSF's extensive records of monitor tests shows that products do not perform the same year over year. As shown in the table here, 6% of monitor tests in 2017 did not meet the health and safety requirements of NSF/ANSI/CAN 61. These tests can be split into product categories that differ by quantity tested and product materials used. When comparing specific categories, a sizable difference in compliance rates is apparent. Coatings and other barrier materials have a very high rate of failure in large part due to the materials used in their manufacturing. Many contain high concentrations of solvents and may contain reactive components that polymerize as they are applied on a surface. Variations in solvent evaporation or reaction rates of multi-component coatings are two important factors that increase their risk of noncompliance.



Other Articles in this Bulletin

[Monitor Testing](#)[HDPE Conduit](#)[Updates to NSF-61](#)[NSF-61 vs. NSF-14](#)

Plumbing Bulletin | Summer 2019

2017 MONITOR TESTING FAILURE RATES BY PRODUCT TYPE

Product Type	2017 Failure Rates
O-rings, gaskets and adhesives	5%
Plastic materials	5%
Valves, meters and other mechanical devices	5%
Faucets, stop valves and supply hoses	13%
Pipes	6%
Coatings, paints and barrier materials	13%
Filtration and oxidative media	2%
All categories	6%

For NSF/ANSI/CAN 61 testing as a whole, the average 6% rate of noncompliance is consistent over the past five years. That is likely due to quality issues continuously being introduced into the supply chain for certified products. If the testing frequency for pipes, fittings and gaskets were reduced from one to five years, it would be expected that those manufacturing changes would compound each year with fewer corrections. This would result in a higher noncompliance rate and a larger number of noncompliant products being sold in the marketplace.

The state of California was concerned enough about monitor testing that it now requires annual testing for all NSF/ANSI/CAN 60 certified drinking water treatment chemicals.

When a monitor test is noncompliant with the requirements of NSF/ANSI/CAN 61, NSF requires a root cause investigation and corrective action from the manufacturer of the certified product. Over many years of reviewing these investigations, NSF has seen repeating themes as the causes for these failures:

- **Raw material quality** is one cause of differing leaching results. Either the supplier is providing a lower quality material to the manufacturer, or the manufacturer has switched to a lower quality supplier.
- **Changes to manufacturing processes** is another cause of noncompliance, as changes in mixing times, processing temperatures or manufacturing equipment can affect how the finished product performs in a leaching test.

Audits of the manufacturing facility provide some protection against supply chain changes. However, the ability of an audit to detect these changes is limited to the manufacturing information documented for the product. The documents used to verify compliant manufacturing of the product may not include all details of the manufacturing process, and may not include impurity criteria for each ingredient in a formula. The manufacturer's documentation may only identify the trade name of a purchased assembly, while the component materials can vary. Critically, there are many impactful variables under the control of material and ingredient suppliers that are not visible to the manufacturing facility. However, these issues can be discovered and addressed through annual retesting. ■



Testing and Certification of HDPE Conduit for the Canadian Market

NSF International has been testing and certifying PVC electrical conduit pipe for decades, but as the conduit market diversifies and grows, so does the need for certification and regulatory compliance.

High-density polyethylene (HDPE) conduit pipe is a product type on the rise in the conduit market, and IPEX is the first company to gain NSF certification to CSA C22.2 No. 327: *HDPE conduit, conductors-in-conduit, and fittings*. The need for certification to this standard stems from updated regulations in Canada for this specific product type.

To be certified to this standard, manufacturers must apply for certification and have their product tested to the requirements of the standard, which may include:

- Dimensional measurements
- Impact resistance
- Crush resistance
- Joint tightness
- Stiffness
- Pullout test
- Chemical resistance
- Coefficient of friction
- Material properties

As part of the certification process, NSF conducts an initial audit of the manufacturing facility that includes verification the manufacturer is following the appropriate quality control requirements of frequent in-plant QC testing. In addition, we evaluate the materials used to produce the conduit to verify that they meet the requirements of the standard, and conduct ongoing annual audits and product monitoring testing.

Products certified by NSF International to CSA C22.2 No. 327 for electrical conduit end use in Canada carry the cNSF mark.

Products certified by NSF for electrical conduit end use are easily searchable and verifiable as they appear in NSF's online listings. ■



Electrical CSA C22.2 No. 327



Article by
Angela Beach

Sr. Account Manager,
NSF International



Other Articles in this Bulletin

Monitor Testing

HDPE Conduit

Updates to NSF-61

NSF-61 vs. NSF-14

Plumbing Bulletin | Summer 2019

NSF/ANSI 61 Becomes a National Standard of Canada



**Article by
Jeremy Brown**
Sr. Technical Reviewer,
NSF International



The American National Standard for drinking water system components, NSF/ANSI 61, has been updated with Canadian requirements and designated as a National Standard of Canada by the Standards Council of Canada (SCC).

The standard has been renamed NSF/ANSI/CAN 61: *Drinking Water System Components - Health Effects*.

NSF International's Standards group facilitated development of this consensus standard by a balanced committee of stakeholders representing both U.S. and Canadian public health officials, regulators, industry, product certifiers and various user groups.

While the standard was only recently designated as a National Standard of Canada, the previously published versions have been widely recognized in Canada for years. Eleven of 13 provinces/territories require drinking water system components to comply with the requirements of NSF/ANSI 61 for either well components or municipal systems. Canadian standards for drinking water components currently reference NSF/ANSI 61.

NSF/ANSI/CAN 61 IN FUTURE PLUMBING CODES

There is also a proposal at the U.S. National Plumbing Code level to require NSF/ANSI/CAN 61 which is expected to be sent out for public comment late in 2019 as a potential addition to the 2020 National Plumbing Code. The proposal is being considered because while some product standards referenced in the plumbing code require NSF/ANSI 61, not all do. In addition, not all products installed have product standards in the code. This leaves a gap in the requirements for health effects in the code. Reference to the NSF/ANSI/CAN 61 would close this gap and ensure protection for all drinking water system components.

NSF certified products will continue to be marked with NSF®pw or NSF®-61 in most cases. Manufacturers do have the option to change the marking to NSF/ANSI/CAN 61 when used in conjunction with the NSF circular mark.

Furthermore, when NSF certifies products to Canadian standards such as the CSA B137 series (plastic piping systems) or the CSA B125 series (harmonized with ASME) or other standards required in Canada, a cNSF mark will be used demonstrate compliance with relevant Canadian requirements. ■

Other Articles in this Bulletin

[Monitor Testing](#)
[HDPE Conduit](#)
[Updates to NSF-61](#)
[NSF-61 vs. NSF-14](#)

Plumbing Bulletin | Summer 2019

Plastic Piping Standards

The Differences Between NSF/ANSI 14 and NSF/ANSI/CAN 61



Article
by **Nasrin Kashefi**
General Manager,
NSF International



NSF/ANSI/CAN 61: Drinking Water System Components – Health Effects establishes the benchmark criteria for evaluating health effects of many drinking water system components, including plastic piping.

NSF/ANSI 14: Plastics Piping System Components and Related Materials establishes the minimum physical, performance and health effects requirements for plastics piping system components and related materials. This standard covers plastic piping systems used in potable as well as non-potable water applications such as drain, waste, vent, sewer, gas, hydronics, fire safety, etc.

IMPORTANT SIMILARITIES AND DIFFERENCES

Certification includes:	NSF/ANSI 14	NSF/ANSI/CAN 61
NSF/ANSI/CAN 61 health effects testing to ensure pipe is suitable for drinking water	✓	✓
Testing to product standards such as ASTM for dimensions, burst, sustained pressure, crush, extrusion quality, etc.	✓	
Annual monitoring testing to verify continuous compliance	✓	✓
Verification of the pipe material's long-term strength rating	✓	
Material physical properties (cell class)	✓	
Regular, unannounced inspections of the manufacturing location	✓	✓
Use of the globally accepted and respected NSF mark		

In the U.S., model plumbing codes require potable water plastic piping to meet both these standards. Some plastic pipe products have listings to NSF/ANSI/CAN 61 only, which may limit their acceptance in the marketplace for service line or hot and cold water distribution systems. Ensuring products meet both health and performance requirements is important for full product acceptance. ■

Other Articles in this Bulletin

- Monitor Testing
- HDPE Conduit
- Updates to NSF-61
- NSF-61 vs. NSF-14

NSF MARKS GUIDE

for Inspectors, Regulators and Code Officials

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

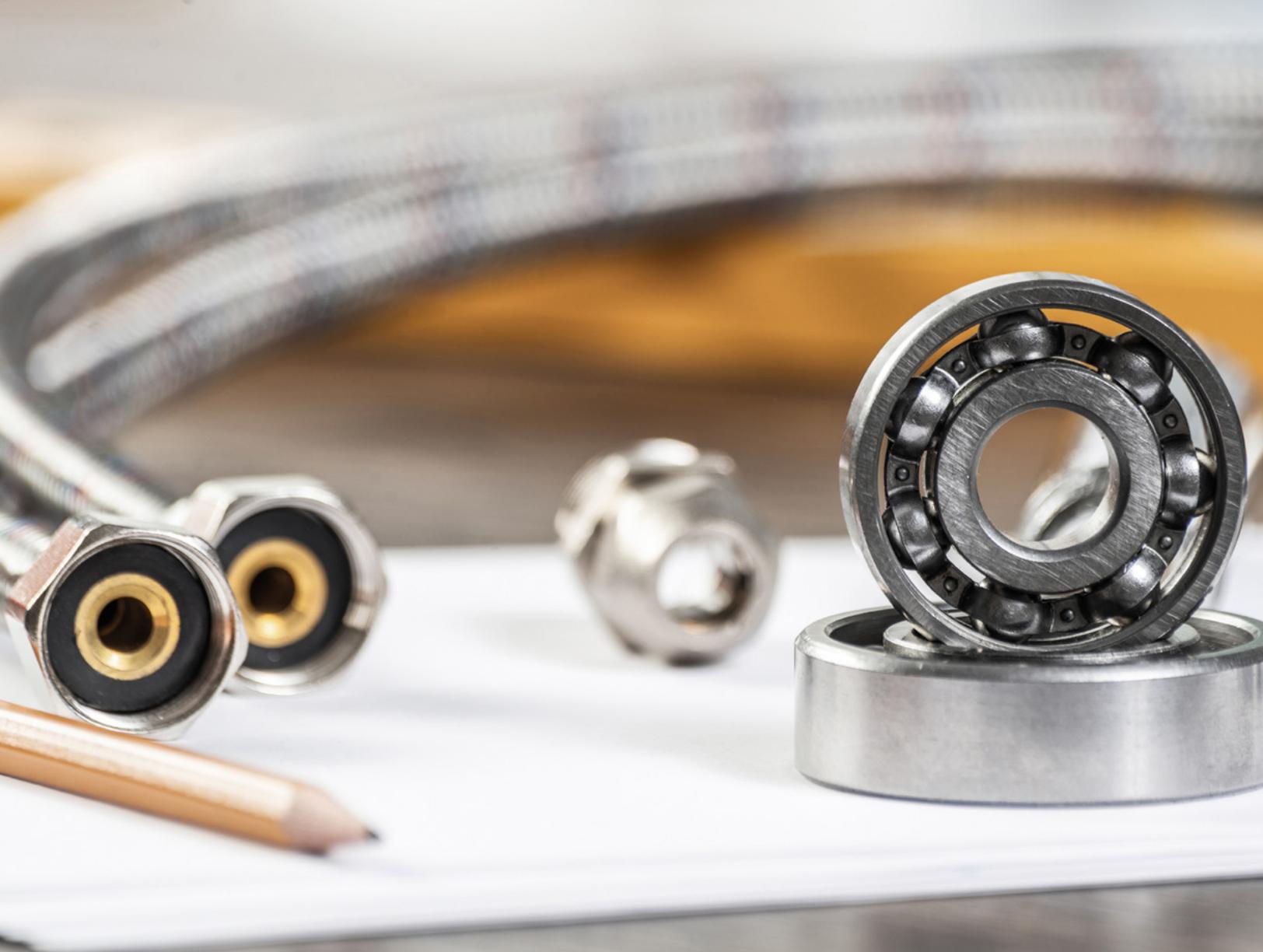


END USE DESIGNATIONS FOR NSF-14 PLASTIC PIPING SYSTEMS ONLY:

pw	potable water
dww	drain, waste, vent
wc	well casing
tubular	continuous waste
sewer	sewer
rfl	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.





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 inquiries each year, can help with your questions about NSF certification marks, the certification process and where to find certified products. If you have a question or comment, call us at **+1.800.673.8010** or info@nsf.org.

NSF STANDARDS AVAILABLE FOR REVIEW

Contact us for a complimentary version of an NSF standard.

