



WITHSTANDING THE TESTS OF TIME: THE VALUE OF ANNUAL TESTING

NSF International requires periodic retesting for all NSF/ANSI 61 certified products. For most product types, this testing occurs on an annual basis, 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 61. Every year, about 15 percent 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 61. Once a manufacturer has found a formulation that complies with NSF/ANSI 61, that manufacturer often maintains the 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 to the right, 6 percent of monitor tests in 2017 did not meet the health and safety requirements of NSF/ANSI 61. When looking at specific categories, a sizable difference in compliance rates is apparent. For example, coatings and other barrier materials have a high rate of failure in large part due to the materials used in their manufacture. Some 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.

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 61 testing as a whole, the average 6 percent 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 plausible that those quality issues could compound each year with fewer corrections. This could 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 60 certified drinking water treatment chemicals.

When a monitor test is noncompliant with the requirements of NSF/ANSI 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 noncompliances:

- > **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. Changes in mixing times, processing temperatures or the 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.

MONITOR TESTING CASE STUDY

Consider, for example, the use of plasticizers in flexible plastics. There is a wide spectrum of plasticizer chemicals that have differing toxicological profiles, some with greater health risk than others. Furthermore, it is difficult



to manufacture a 100-percent pure plasticizer chemical. If the plasticizer manufacturer selling di(2-ethylhexyl) adipate changes its manufacturing process, then the plasticizer impurities will change. However, this change will not be readily visible to the tubing manufacturer who is buying 95-percent di(2-ethylhexyl) adipate. Even though the ingredient trade name is unchanged, the heptanol content has tripled. Testing can illuminate these risks, but an audit cannot. For the faucet manufacturer, these changes are even less visible. The manufacturer may purchase the same hose for years, but the ingredients change from year to year. These types of changes at the supply chain level only become evident from monitor testing.

Monitor testing can shed light on unaddressed risk and liability for manufacturers of certified products and provides feedback regarding the quality of their products and raw material supplies. Manufacturers can use this information to improve the quality of their products. In some cases, it may be that the manufacturer's supplier has substituted materials or ingredients without the consequences being understood. This allows manufacturers to avoid unwanted surprises and to provide the highest quality product to their customers.



Water utilities, regulatory bodies and manufacturers concerned about the safety of their products understand the importance of this rigorous annual monitoring requirement for the quality of the potable water being delivered to homes across the world. Continued compliance of a product to the standard can only be confirmed via frequent empirical testing of the product.

The benefit of NSF/ANSI 61 certification backed by annual monitoring testing is clear: **safe drinking water**. Annual testing of products in contact with potable water allows utilities and consumers to be confident that a certified product meets health and safety requirements whether the product was originally certified one or seven years ago, and allows product manufacturers to confirm the quality of their supply chain and manufacturing process. Annual monitoring testing of certified products is a critical component of the water industry's common goal to keep our potable water safe.

