The Role of NSF 61-Certified Packing & Gaskets

Exploring public health protection and regulatory compliance in water management systems.

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The materials used in industrial and municipal water systems are coming under increased scrutiny as the demand for safe, clean drinking water continues to rise. In addition to providing system performance and dependability, utilities, municipalities and OEMs are responsible for ensuring that federal and state health regulations are followed. The sealing elements—the packing and gaskets that prevent leaks in pumps, valves and piping—are among the most critical components of these systems.

Many manufacturers seek National Sanitation Foundation (NSF)/American National Standards Institute (ANSI)/CAN 61 certification, which specifies health effects requirements for materials and components used in drinking water systems to ensure sealing products do not degrade water quality. Almost all U.S. states and Canadian provinces require these regulations. The standard defines specific contaminants—with allowable limits—that can leach into potable water from system components. Although NSF 61 applies to a broad range of products, including coatings, valves and pipe linings, this article focuses on sealing materials and explains why using compression packing and gaskets that have earned NSF 61 certification is crucial for both public health protection and regulatory compliance in water management systems.

Compliance With NSF/ANSI/CAN 61

To obtain NSF/ANSI/CAN 61 certification, packing and gaskets must go through the following process.

- *Product evaluation:* An initial review of the product's materials and claims is conducted to assess cleanability, Food and Drug Administration (FDA) compliance (if applicable) and overall performance.
- *Testing:* Products are tested in NSF-accredited laboratories for specific contaminants to verify they meet the requirements set forth in the standard.
- *Manufacturing facility inspection:* Inspectors may visit the facility to evaluate the production process and ensure sanitary and compliant conditions are met.

NSF certification is not permanent, as it requires annual retesting and facility inspections to maintain the certification. Unannounced plant visits may also be conducted to verify ongoing compliance. These steps help continue adherence to expectations and support long-term product security and quality.

Industry Challenges

Packing and gaskets are crucial components in potable water systems, as they prevent leaks and help maintain system reliability. Leakage can present significant challenges for plant operators, including the following:

- *Water loss:* Millions of gallons of treated water may be lost annually without proper sealing, leading to efficiency reductions and revenue loss from unbilled water. Additional financial impacts can be seen in the operational expenses for treating and pumping more water, as well as in the maintenance and repair costs related to premature packing or gasket failure.
- *Infrastructure damage:* Persistent leaks can damage infrastructure, potentially leading to blowouts, corrosion and the need for major repairs or replacements.
- *Public health risks:* Leaks can compromise water quality by allowing contaminants to enter the water supply.

IMAGE 1: The role of NSF 61 certified packing and gaskets (Image courtesy of the Fluid Sealing Association)

It is important to consult with the packing and gasket OEM regarding application-specific constraints. Pressure, temperature, chemical compatibility and proper installation procedures all need to be reviewed when selecting sealing materials to ensure leaks are minimized and long-term performance is achieved.

Standard & Regulatory Updates

Currently, 49 out of 50 U.S. states and 13 provinces/territories in Canada require some form of NSF/ANSI/CAN 61 certification for components used in drinking water systems. It is also referenced in a number of countries around the globe. This standard defines types of contaminants for various components in drinking water systems. These contaminants fall into the following categories.

- ***Metals, specifically components in these materials:*** Antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, zinc and others
- ***Organics:*** Includes volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PNAs), phenols, nitrosamines, per- and polyfluoroalkyl substances (PFAS) and residual monomers
- ***Radionuclides:*** Includes alpha and beta radioactivity, potassium-40 and other beta emitting radioisotopes
- ***Residual vinyl chloride monomer (RVCM):*** Found in polyvinyl chloride (PVC) and chlorinated polyvinyl chloride (CPVC) products
- ***Solvents:*** Includes acetone, tetrahydrofuran, cyclohexanone, toluene, xylene, methyl ethyl ketone (MEK) and others
- ***Other materials*** such as formaldehyde, phthalates and other metals or organics specific to certain materials

The most recent version of NSF/ANSI/CAN 61 was updated to include PFAS testing criteria for seven nonpolymeric PFAS compounds: perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), perfluorobutanesulfonic acid (PFBS), GenX and perfluorohexanoic acid (PFHxA). The testing applies to components made of polytetrafluoroethylene (PTFE), ethylene tetrafluoroethylene (ETFE), polyvinylidene fluoride (PVDF), lubricants, plastics and fluoroelastomer materials.

There is a companion reference standard to NSF/ASNSI/CAN 61 that defines the risk assessment procedures and pass/fail criteria for the identified contaminants while also defining acceptable standard materials for specific equipment. This reference standard is NSF/ANSI/CAN 600, Health Effects Evaluation and Criteria for Chemicals in Drinking Water. Products are certified to the NSF/ANSI/CAN 61 standard, not the NSF/ANSI/CAN 600 standard.

Of those seven compounds, five are directly regulated by the Environmental Protection Agency (EPA). The current requirements establish maximum reporting limits for the nonpolymeric PFAS. There are limits set for PFOA and PFOS in the document currently, and on Jan. 1, 2028, the requirements will be to those defined in NSF/ANSI/CAN 600. The remaining five nonpolymeric PFAS will be tested for, but detections do not preclude the use of the component in which it may be found until after Jan. 1, 2028, when the compliance to the limits in NSF/ANSI/CAN 600 become a requirement.

As PFAS regulations continue to evolve, utilities and OEMs must now consider not only performance and durability but also the chemical composition of sealing materials, particularly those that may contain fluorinated polymers.

To verify that water is acceptable for consumption and usage, it is important to first recognize the necessary procedures to ensure safe drinking water and the resources available to combat hazards while adhering to policies. Industry obstacles may pose challenges to achieving successfully healthy water, and packing and gaskets are a staple to meet these expectations. To continue and expand on the efforts put into place, the following are recommended:

- Stay up to date with the latest regulatory news and updates.
- Review alignment of these standards with one's own company or industry.
- Consult with experts in the field and ask necessary questions.

To reduce risks to public health and water systems, it is critical to continue working toward a common goal and discovering new methods of combatting contaminant threats. Exploring avenues of safety and innovative technology can further the mission to keep water guarded from impurities while adhering to regulations. ■

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We invite your suggestions for article topics as well as questions on sealing issues so we can better respond to the needs of the industry. Please direct your suggestions and questions to sealingsensequestions@fluidsealing.com.

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