Get the Lead Out

How NSF 61 Helps Engineers Conform with New Lead Laws

BY WILLIAM “SKIP” ROBERTS

“Get the lead out.” When I first saw this phrase, I immediately thought about my days as a youth. My coaches and teachers told me to “get the lead out” all the time. Today, the meaning is quite different. California, Vermont, Washington, D.C., and Chicago are leading the way in mandating less lead in their potable water streams, and President Obama recently signed the “Reduction of Lead in Drinking Water Act,” which sets a federal standard for the level of permissible lead in plumbing fixtures that carry drinking water, with the allowable lead content going from the past federal level of as much as 8 percent to 0.25 percent. This legislation (to take effect January 4, 2014) now makes the federal law consistent with the California lead-free legislation (AB 1953) passed in 2006, amends the definition of “lead-free” in the Safe Drinking Water Act (SDWA), and makes the federal requirement consistent with the lead content requirements of NSF 61: Drinking Water System Components.

However, a surprising fact is that 36 states already require products in the potable water stream to be certified to NSF 61, and 10 others mention this standard in their administrative codes. Many of these states have had this mandate in place since the early 1990s due to the passing of the SDWA, which mandates the removal of harmful materials such as lead and chemicals from our drinking water.

NSF INTERNATIONAL BACKGROUND

You may ask: What is NSF? Why are its standards important? The National Sanitation Foundation was founded
at the School of Public Health, University of Michigan, in 1944, and issued its first food safety standards in 1952. The organization is dedicated to public health, public safety, and environmental protection through testing and the issuance of standards focused on food, water, indoor air, and the environment.

In response to the passing of the Safe Drinking Water Act, NSF created a water treatment and distribution systems program. The SDWA covers all products that come in contact with drinking water from source to tap.

What Does “Source to Tap” Mean?
Let’s define this before moving forward. To a municipality, “source to tap” means the water system from the treatment plant to the water meter in front of any building, whether it is a home, office building, or manufacturing plant. To a plumbing engineer designing the potable water system in any of these buildings, “source to tap” means the system from the water meter to the furthest fixture in the building.

NSF 61 certification covers all of the components found in the potable water stream.

NSF Standards Development
NSF certification standards are developed by a group of organizations including NSF, the American Water Works Association (AWWA), Water Research Foundation, U.S. Environmental Protection Agency (EPA), and Health Canada. The group establishes balanced committees of participants to set standards for both the United States and Canada. Committee members include government officials, utility district officials, inspectors, and manufacturers. NSF standards are re-evaluated on an annual basis, and most certifying agencies are inspected on a quarterly or semiannual basis.

Drinking Water Standards
The NSF drinking water standards cover products and materials that come into contact with drinking water (NSF 61) and drinking water treatment chemicals (NSF 60). This article discusses plumbing materials (governed by NSF 61), including pipes and fittings, joining and sealing materials, paints and coatings, process media, endpoint devices (e.g., drinking fountains and faucets), and mechanical devices such as process equipment, water meters, valves, and booster systems.

The acceptance criteria for the above items are based on regulated contaminants, with the most prominent being lead, and more than 600 unregulated potential risk values have been identified. Components containing these contaminants, when part of the potable water stream, can leach chemicals into the drinking water and cause health problems.

CONFORMANCE RESPONSIBILITY
The Safe Drinking Water Act was originally passed in 1974 and then amended in 1986 and 1996. This act sets the basic minimum requirements for drinking water quality and the monitoring of that water, and each state is responsible for enforcing the requirements. As of this writing, 46 states have legislation responding to the SDWA.

Each state has its own special way of ensuring conformance to the SDWA. Most states pass the responsibility to cities, municipal utility districts, and others responsible for local enforcement. Cities and counties either have their own plumbing codes or use nationally recognized standards as published by the International Plumbing Code (IPC) and the Uniform Plumbing Code (UPC). Some states, such as Kansas and Mississippi, adopted the SDWA in its original form and mandate the use of the IPC. Many others vary the legal language, but require NSF 61-Certified products in the potable water stream. Texas is the only state that specifies pump stations in its administrative language. California has gone the extra mile and requires another certification by an independent third party.

What Is an Independent Third Party?
In 29 CFR, the U.S. Occupational Health and Safety Administration (OSHA) defines a third-party certifier, or a nationally recognized testing laboratory, as “an organization which is recognized by OSHA ... and which tests for safety, and lists or labels or accepts, equipment or materials.” Some of the parties that can certify to NSF standards are the American National Standards Institute (ANSI), NSF, International Association of Plumbing and Mechanical Officials (IAPMO), Underwriters Laboratories (UL), and Canadian Standards Association (CSA). Other organizations offer similar certificates.

WHY NSF 61?
Why is NSF 61 certification necessary for products utilized for potable water?
• It ensures that the products meet water utility requirements.
• It forms the basis for regulatory acceptance.
• It signifies testing and evaluation by an independent third-party agency that certifies to NSF standards.
• It simplifies and unifies requirements.
• It evaluates products to the most current regulatory requirements as regulations change.
• It adds credibility in the marketplace for plumbing equipment.

FOCUS ON BOOSTER SYSTEMS
A booster system (see Figure 1) must be certified as a complete system, with all passageway components assessed and certified to the NSF 61 standard. The components include coatings, pipes, valves, pumps, gaskets, headers, and fittings.

Booster Components
Many coating materials by different manufacturers are certified to NSF 61 and must have a label attesting to that certification. The coating thickness is determined by the pipe diameter.

Pipes must have documentation as to the suitability of the metallurgy, but they don’t necessarily need a label. The most
commonly used pipe for boosters is 304 stainless steel, but 316 and 316L stainless steel are acceptable for applications below 120°F. Also, any steel pipe with an approved NSF 61 coating material is acceptable. Type L and Type K copper pipe are acceptable, but Type M is not.

The valves used on booster systems are wafer check valves, butterfly valves, pressure-regulating valves, and ball valves. If they have a label certifying them as NSF 61, then they are acceptable.

Pumps are a very interesting part of this equipment. Many pump companies advertise that they are NSF acceptable; however, some of their products are certified to NSF 50: Recreational Water Facility Components. The difference is that NSF 50 regulates swimming pool and spa components, while NSF 61 governs potable water system components. While the water in swimming pools may not be toxic, most people do not intentionally drink it. Thus, pumps for drinking water must be certified to NSF 61, not NSF 50.

The most interesting component is the smallest: the gasket. Booster system manufacturers can use only three acceptable gasket materials: EDPM (ethylene propylene diene monomer rubber), NBR (nitrile butadiene rubber), and SBR (styrene butadiene rubber). Buna and PTFE (polytetrafluoroethylene) are not acceptable. The bladder tank can be made of buna, but buna cannot be used as the gasket material. Manufacturers also must buy the gasket material in sheet form. Pre-cut gaskets cannot be used.

HOW TO FIND LABELED PRODUCTS

The label (see Figure 2) is the key element. If a product does not have an NSF 61 label, it is not certified for drinking water systems. The manufacturing facilities for labeled products and systems have been inspected and approved, and the products and systems themselves have been tested and evaluated. The components used in the test become frozen and cannot be changed due to product availability problems unless another test is performed and the new component is accepted for use by the certifying agency.

A common problem every engineer faces is finding suppliers that carry this label. NSF and some certifying agencies offer a product listing search on their websites, but you must know the manufacturer’s name first. The best way to ensure certification is to ask the supplier to provide a current copy of their certificate. If they have a current certificate, they are certified.

While the NSF 61 certificate is the only requirement in most states, California now requires an additional certificate commonly known as “AB 1953” or, officially, “California Health and Safety Code Section 116875,” which certifies that the product will not impart more than 0.25 percent lead by volume into the potable water stream.

This requirement also is mandated by the “Reduction of Lead in Drinking Water Act” as well as the “Assistance, Quality, and Affordability Act of 2010,” which was passed last spring. However, NSF 61 limits the weighted average of lead content in plumbing products to 0.25 percent, so products that are NSF 61 Certified already conform to the new law.
KNOWLEDGE SETS YOU FREE
Now that you have read this, you should be more knowledgeable about NSF 61 and can start writing specifications requiring NSF 61 for potable water. Unfortunately, while I have presented this same information to many state government officials and city inspectors, only one of them expressed interest in enforcing the low-lead requirement. One state representative told me that most specifications already have a requirement to meet state and federal guidelines, but many state guidelines use old plumbing codes that do not have an NSF 61 requirement. When was the last time one of your jobs was red-tagged due to valves or pipes without an NSF 61 label?

We all want drinking water that will not harm the drinker. Remember “sick” buildings in the 1980s and 1990s? At that time, California discovered water wells with high concentrations of lead, as well as brass and bronze pipes with lead-based parts that were in drinking water systems. Changes were made throughout the industry because of those discoveries. However, while many states have a low-lead requirement on their books, they do not strictly enforce it. Plumbing inspectors have not been looking for NSF 61 equipment under Section 6 in either the IPC or the UPC. The UPC did not mention NSF 61 valves until the 2009 version.

Safe drinking water has been on the federal government’s agenda since 1974. While most states attempted to follow the SDWA and adopted rules for its residents to follow, most manufacturers did not get involved until California mandated NSF 61 and “lead free” with AB 1953. Once that law was in place and enforcement was on the horizon, a trickle-down effect started to occur. To remain competitive, most manufacturers of drinking water system components reworked their products to conform to the lead-free requirement.

Now, however, we have federal legislation requiring NSF 61 and lead-free plumbing products, so we can start ridding our cities of all old potable water system components. The legislation affects new and replacement equipment, so, for instance, if a building needs additional pressure or flow for its drinking water supply, a new NSF 61 booster system should be installed, even if it will be placed in an old pipe scheme.

If you want to find out if your state currently requires NSF 61-Certified products in the potable water stream, look under NSF or National Sanitation Foundation in the state administrative code.

Why Should Engineers Specify NSF 61?
That question is on every plumbing engineer’s lips or at least in their mind. The answer is: It’s the law! More importantly, we want our families and friends to be able to drink from the tap without fear of harm.

ACKNOWLEDGEMENT
Thanks to the Association of State Drinking Water Administrators (ASDWA), I have a list of most of the state rules regarding drinking water systems. Please contact me at the e-mail in my bio for a copy. 

HELPFUL LINKS
NSF International: nsf.org
American Water Works Association: awwa.org
Water Research Foundation: waterresearchfoundation.org
U.S. Environmental Protection Agency, water.epa.gov/drink/
Safe Drinking Water Act: water.epa.gov/lawsregs/rulesregs/sdwa/index.cfm
Occupational Health and Safety Administration: osha.gov
American National Standards Institute: ansi.org
International Code Council: iccsafe.org
International Association of Plumbing and Mechanical Officials: iapmo.org
Underwriters Laboratories: ul.com
Canadian Standards Association: csa.ca
Association of State Drinking Water Administrators: asdwa.org

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