Plumbing Contractor News

Your Source for Plumbing News

NSF/ANSI 61 Certification Proves Viability of CPVC for Potable Water Systems

Setting the Record Straight Regarding CPVC and Leaching

By Arthur L. Backman, Ph.D.
The Lubrizol Corporation

Regardless of whether you're a proponent of CPVC or copper, few people would disagree that the United States has one of the safest potable water supplies in the world. This is a result of a long history of governmental rules and regulations.

In 1974, Congress passed the Safe Drinking Water Act (SDWA). The purpose of the SDWA is to protect public health by regulating the nation's public drinking water supply. The SDWA authorized the United States Environmental Protection Agency (U.S. EPA) to set national health-based standards for contaminants in public drinking water systems. These contaminants include those that are both man-made and naturally occurring. Working conjointly, the U.S. EPA, state agencies and municipalities ensure that these standards are met on an ongoing basis.

In addition, NSF International (NSF), an independent, private, not-for-profit, third-party certification organization founded in 1944, has developed numerous health-based certification programs and consensus standards including those that relate to drinking water. The purpose of its certification program is to promote public health and enrich the quality of life. Through its Council of Public Health and Health Advisory Board, which includes EPA health professionals, it obtains guidance in developing and maintaining programs and standards. NSF also partners with code councils to ensure ongoing compliance with plumbing codes.

For a product to become certified and maintain its NSF certification, it must go through an extensive review of its chemistry, testing and risk assessment. Manufacturing facilities receive initial and annual inspections and periodic retesting.

In 1985, the U.S. EPA established a cooperative agreement with NSF for a Drinking Water Additives Program. This agreement led to the development of voluntary third-party consensus standards and a certification program for direct and indirect drinking water additives. It also laid the foundation for a consortium that includes the EPA, NSF, the American Water Works Association Research Foundation (AWWARF), the American Water Works Association (AWWA), the Association of State Drinking Water Administrators (ASDWA) and the Conference of State Health and Environmental Managers (COSHEM). Two standards were developed for additive products. These included NSF/ANSI 60 - Drinking Water Treatment Chemicals - Health Effects and NSF/ANSI 61 - Drinking Water System Components - Health Effects. NSF/ANSI 60 specifically covers direct additives to systems, such as drinking water chemicals. NSF/ANSI 61 sets requirements for indirect additives, products and materials.

It is NSF/ANSI 61 which establishes minimum drinking water specifications for the control of potentially adverse human health effects from products that contact drinking water. The materials and products covered in this standard can include (but are not limited to) pipe and related products (pipes, tanks, valves, fittings, etc.), joining and sealing materials (solvent cements, welding materials, gaskets, etc.), protective materials (coatings, linings, liners, etc.) and mechanical plumbing devices (faucets, endpoint control valves, etc.).

This standard covers all pipe, fittings and plumbing system components, whether they are fabricated from chlorinated poly(vinyl chloride) (CPVC), cross-linked polyethylene (PEX), copper, poly(vinyl chloride) (PVC) or polyethylene (PE). As a result, NSF testing and certification is recognized by every plumbing code in North America.

The potential for leaching from plumbing system components is clearly covered by NSF/ANSI 61. This standard has established a well-defined protocol for testing.

First, material formulations must be submitted to NSF for review. During the review process, the selection of required testing is determined based upon such factors as high water solubility of the substance, known or suspected toxicity of the substance or its by-product(s), high probability of extraction of a substance or its by-product(s) at toxicologically significant concentrations, extraction or migration information for the substances provided by the manufacturer and monomer(s) of polymeric ingredients. If necessary, other selection criteria can be included.

Next, the materials are tested while in contact with water typically at elevated temperatures. Water extracts are then taken at various time intervals and tested to see if specific components exceed acceptable levels (U.S. EPA Maximum Contaminant Level or MCL, Health Canada Maximum Allowable Level, or International peer-reviewed drinking water criteria). If there are no established MCLs, NSF develops Total Allowable Concentration (TAC) and Single Product Allowable Concentrations (SPAC) based on U.S. EPA risk assessment procedures. CPVC pipe, fittings and system components manufactured from TempRite® CPVC compounds that carry the

NSF potable water certification mark (NSF-PW) or NSF-61 certification mark (NSF-61) have been tested and certified by NSF as meeting the requirements of NSF/ANSI Standard 61. All of these compound certifications are listed on the NSF website (www.nsf.org) for viewing by the general public. This certification, coupled with the fact that these TempRite® CPVC compounds have been successfully used in hot and cold water plumbing systems in North America for more than 45 years, should instill confidence regarding their use and put to rest any questions or misperceptions regarding the safe use of CPVC pipe and fittings.

A.L. Backman is the Technical Manager for the FBC Building Solutions Plumbing Products Group at Lubrizol. During his 20 years at Lubrizol, he has developed several new commercial products and has been granted more than 15 United States Patents in the area of CPVC and PEX processes, formulations and products. He received his B.S. degree in Chemical Engineering from Carnegie-Mellon University, as well as his M.S. and Ph.D. in Chemical Engineering from the University of Illinois at Urbana-Champaign.