Great progress has been made in the technical revisions of ANSI/NSF Standard 55. The proposed revisions include ANSI formatting, structural integrity testing protocols and material safety requirements harmonization, the addition of a coliphage MS-2 as a surrogate test organism, and a Cryptosporidium and Giardia claim. The latest version of this standard was sent to ballot in late August 2001. NSF International expects adoption of the revised standard in late 2001. The proposed standard reads as follows:

ANSI/NSF Standard 55 Ultraviolet Microbiological Water Treatment Systems was initially adopted in 1991. Standard 55 covers two classes of devices: Class A and Class B.

Class A point-of-use/point-of-entry (POU/POE) devices are designed to inactivate and/or remove microorganisms, including bacteria and viruses, from contaminated water to a safe level. They are not intended for treatment of water that has an obvious contamination source, such as raw sewage; nor are systems intended to convert wastewater to drinking water. Class A POU or POE disinfection treatment devices are required to deliver a minimum UV dose of 38 milliJoules per square centimeter (mJ/cm²), or 38,000 microWatts per second per square centimeter (µW-sec/cm²), at the alarm set point as determined by inactivation of *Bacillus subtilis* spores and using a sensitivity calibration curve.

Meanwhile, Class B POU systems are designed for supplemental bactericidal treatment of treated and disinfected public drinking water or other drinking water tested and deemed acceptable for human consumption by the state or local health agency with jurisdiction. Class B systems aren't intended for disinfection of microbiologically unsafe water, but are designed to reduce only normally occurring nonpathogenic or nuisance microorganisms. Class B microbial reduction devices are required to deliver a minimum UV dose of 16 mJ/cm² (16,000 µW-sec/cm²) at either 70 percent of the UV lamp’s normal output or the alarm set point, as determined by inactivation of *Saccharomyces cerevisiae* cells and using a sensitivity calibration curve.

Revision of Standard

Standard 55 is in the process of undergoing a comprehensive revision due to advances in technology.

Material Safety Requirements and Structural Integrity

The revised standard proposes the addition of the same material safety requirements and structural integrity test procedures that are used in the other NSF family of drinking water treatment unit (DWTU) standards for hydrostatic, cyclic and burst pressure tests. Standard 55 is included in this harmonization and tables have been added to more clearly define testing requirements.

Use of Coliphage MS-2

Coliphage MS2 has been validated as a test surrogate to determine bacterial and viral pathogen disinfection efficiency of Class A POE and POU UV water treatment systems.

A study conducted by Wilson et al. (1992) shows a 99.5 percent reduction of coliphage MS2 after UV treatment is equivalent to or greater than a 99.999 percent reduction or a 5-log reduction of bacterial pathogens and a 99.99 percent reduction or a 4-log reduction of viral pathogens. The UV inactivation rate of coliphage MS2 was compared to common microbial contaminants and pathogens (*S. cerevisiae*, *B. subtilis*, *Vibrio cholerae*, *Salmonella typhi*, *Escherichia coli* O157:H7, *Shigella dysenteriae*, *Yersinia enterocolitica*, *Campylobacter jejuni*, *Aeromonas hydrophila*, *Legionella pneumophila*, Hepatitis A, Rotavirus SA-11, and Polivirus type 1). Of all these organisms, coliphage MS2 was found to be the most resistant to UV radiation.

Additional benefits of using coliphage MS2 include: 1) linear response over a wide range of UV dose levels, 2) highly reproducible UV inactivation results, 3) low cost, 4) it’s easily grown and propagated to high titers or culture concentration and, 5) it is non-pathogenic to humans.
Cryptosporidium and Giardia Claim

Currently, a manufacturer wanting to make a cyst reduction claim on a Class A device is required to have a prefilter that complies with ANSI/NSF Standard 53 for cyst reduction upstream of the UV device. With data now showing UV light does inactivate Cryptosporidium oocysts and Giardia cysts, an additional technology for Cryptosporidium oocysts and Giardia cysts reduction/inactivation won’t be needed when treating municipal chlorinated waters. Class A systems without a general cyst reduction device used for the treatment of untreated surface waters and/or ground water under the direct influence of surface waters must have a device found to be in conformance for cyst reduction under Standard 53 installed upstream of the system. Class B systems cannot make microbiological health claims and therefore will not be able to make individual or general cyst claims.

ANSI Formatting

In addition to the technical revisions, Standard 55 is being editorially updated to the American National Standards Institute or ANSI-recommended format for American national standards.

Future Revisions

Additional technical revisions to ANSI/NSF Standard 55 are currently being discussed which are long-term projects. These revisions include the performance qualifications of sensors, methods for material UV stability, and separating Class A and Class B requirements. Possible revisions include direct log reduction criteria to determine UV dose, Class A device performance specifications without sensors, and a Cryptosporidium and Giardia claim for Class B systems.

Conclusion

In conclusion, great progress has been made in the technical revisions of ANSI/NSF Standard 55. The proposed revisions include ANSI formatting, structural integrity testing protocols and material safety requirements harmonization, the addition of a coliphage MS-2 as a surrogate test organism, and a Cryptosporidium and Giardia claim. The standard was sent to ballot in late August 2001. NSF International expects adoption of the revised standard in late 2001.