



ANSI/NSF Standard Revisions Improve Real World Application

By Rob Herman

The ANSI/NSF drinking water treatment unit (DWTU) standards are living documents that change as market and certification needs mature and develop. NSF *International* has published four standards that have had significant revisions to address changes in regulatory requirements, improvements in test methods and clearer literature requirements. Some of the changes are common throughout the standards, but each standard has changes unique to the products they cover.

Conditions on conditioners

For instance, the ANSI/NSF Standard 44 for residential cation exchange water softeners has had two major changes to make it much more useful and applicable to the water softener industry. The performance requirements and test methods have been harmonized completely with the Water Quality Association's (WQA) S-100 1998 standard. The equivalence of performance requirements allows manufacturers to take advantage of the two-way data exchange between NSF and WQA under Standards S-100 and 44. Softeners tested under the WQA S-100 standard can qualify for use as data to achieve certification from NSF. This greatly reduces the financial burden of certification for those companies who have completed

verification. This is extremely important since the International Association of Plumbing and Mechanical Officials (IAPMO) voted in September 2000 to retain ANSI/NSF Standard 44 as the official standard recognized by the Uniform Plumbing Code (UPC) for water softeners and eliminating the WQA S-100 from their list of recognized standards.

The only difference between the two standards is the material safety requirements under ANSI/NSF Standard 44 that require formulation information and a link to extraction test data ensuring materials are safe for drinking water. This link to extraction test data can be provided to system manufacturers by the component manufacturers who test their components for material safety under ANSI/NSF Standard 44. The key components of a softener—where certification for material safety may be easily transferred to system manufacturers—are valve head assemblies and

bypass valves. Component certification of tanks, ion exchange resin and distribution components may allow a system manufacturer to completely eliminate extraction testing. If material safety cannot be completely satisfied with component certification, frequently one test will qualify a large family of softeners.

As states have begun to require softeners to demonstrate efficient operation, the requirements under ANSI/NSF Standard 44 have chang-

Table 1. Chemical reduction requirements

Substance	Influent Concentration (mg/L)	Maximum Effluent Concentration (mg/L)
benzene	0.015 ± 10%	0.005
carbon tetrachloride	0.015 ± 10%	0.005
p-dichlorobenzene	0.225 ± 10%	0.075
1,2-dichloroethane	0.015 ± 10%	0.005
1,1-dichloroethylene	0.021 ± 10%	0.007
1,2-dichloropropane	0.015 ± 10%	0.005
dinoseb	0.021 ± 10%	0.007
endrin	0.006 ± 10%	0.002
ethylbenzene	2.1 ± 10%	0.7
hexachlorocyclopentadiene	0.15 ± 10%	0.05
pentachlorophenol	0.01 ± 10%	0.001
simazine	0.012 ± 10%	0.004
tetrachloroethylene	0.015 ± 10%	0.005
toluene	3.0 ± 10%	1.0
1,2,4-trichlorobenzene	0.21 ± 10%	0.07
1,1,1-trichloroethane	0.6 ± 10%	0.2
1,1,2-trichloroethane	0.015 ± 10%	0.005

ed allowing softeners to have both efficiency and non-efficiency rated salt settings. The previous version of Standard 44 required that an efficiency rated softener couldn't have salt settings above the maximum that was qualified as efficient. That requirement has been removed from the standard, and improved customer information has been included. The required customer information includes that, when an efficiency rating was claimed, the salt setting, resultant capacity and standard are stated. When a softener capacity is claimed, the salt setting required for that capacity is also stated. The intent of the DWTU Joint Committee was to minimize confusion and educate consumers so they could operate a softener at the efficiency setting desired.

Aesthetics, health and RO

Several changes are common among the newly published ANSI/NSF Standard 42—esthetic effects-2000a, Standard 53—health effects-2000a, and Standard 58—reverse osmosis systems-2000a. Several of these changes include improving the laboratory-to-laboratory consistency of testing so data generated in one laboratory will match better with data generated in another. This is an ongoing effort by the NSF Standards department to better define testing to maximize the reproducibility of testing.

Each of the standards has also changed the requirements of the Performance Data Sheet (PDS). The PDS is designed to inform the purchaser of the details of certification with information on testing and use limitations. The previous versions of the standards required the PDS to contain a summary of test results. This caused problems when products were re-tested and slight changes in reduction percentages occurred, so system manufacturers had to take the costly step of printing new literature. The 2000a versions of the standards require the PDS to contain the minimum requirements of the standard and, if a manufacturer wishes, they may include the actual data and percent reductions obtained in testing.

Chloramines

The 2000a revision of Standard 42-esthetic effects includes chloramine reduction with an option to use the data from the chloramine test to qualify a chlorine reduction test. The chloramine test requires a system to reduce an influent of 3 milligrams per liter (mg/L) monochloramine to less than 0.5 mg/L throughout the system's life. Several manufacturers have already taken advantage of this claim and have certified systems on the market.

Chemical reductions

Changes in ANSI/NSF Standard 53-health effects are centered on updates in Table 1 for chemical reduction requirements.

Additions—Seventeen substances have been added to this table to expand the number of possible claims for chemical reduction to 50. These substances and their test parameters are listed in Table 1. Many of these substances were available as claims under the volatile organic compound (VOC) surrogate test program that qualifies 47 substances as a group. This inclusion here allows these substances to be claimed individually.

Changes—Nine substances previously in the table had influent and/or maximum effluent concentrations changed. Changes to influent values were due to occurrence data becoming available, or the effluent value was changed and the influent was set at three times the maximum effluent value. Effluent values were changed to harmonized values agreed upon by both the U.S. Environmental Protection Agency and Health Canada. A summary of the nine, updated substances are shown in Table 2.

Table 2. Nine substances with concentrations changed

Substance	New Influent Concentration (mg/L)	Previous Effluent Concentration (mg/L)	New Max. Effluent Concentration (mg/L)	Previous Max. Effluent Concentration (mg/L)
chromium (hex)*	0.3 ± 10%	0.15 ± 10%	0.1	0.05
chromium (tri)*	0.3 ± 10%	0.15 ± 10%	0.1	0.05
2,4-D	0.210 ± 10%	0.30 ± 10%	0.07	0.1
o-dichlorobenzene	1.8 ± 10%	1.2 ± 10%	0.6	0.06
fluoride	8.0 ± 10%	8.0 ± 10%	1.5	2.0
lead	0.15 ± 10%	0.15 ± 10%	0.010	0.015
lindane	0.002 ± 10%	0.0006 ± 10%	0.0002	0.0002
methoxychlor**	0.12	0.30 ± 10%	0.04	0.04
2,4,5—TP (Silvex)	0.15 ± 10%	0.03 ± 10%	0.05	0.005

Re-testing—Three substances that will require re-testing of all certified claims are o-dichlorobenzene, lindane and 2,4,5-TP (Silvex). The changes that occurred in these substances cannot be qualified by testing based on previous requirements. Several of the substances had changes that could be qualified by previous testing if test results don't exceed the new, lower maximum effluent values. These substances include 2,4-D, fluoride, lead and methoxychlor. The changes to chromium will not require re-testing since all certified customers prior to this standard's version had to claim both types of chromium and were tested in combination.

RO

ANSI/NSF Standard 58 had the chemical reduction table updated with no additional substances with changes to chromium, fluoride and lead as made in Standard 53. Systems that don't exceed the revised maximum effluents for fluoride and lead will not be re-tested. Trivalent and hexavalent chromium will be treated in the same manner as in Standard 53.

Conclusion

All of these standards had significant changes that will improve their application to the industry and regulators. Further updates and changes in the works include arsenic, personal water bottles, ceramic fil-

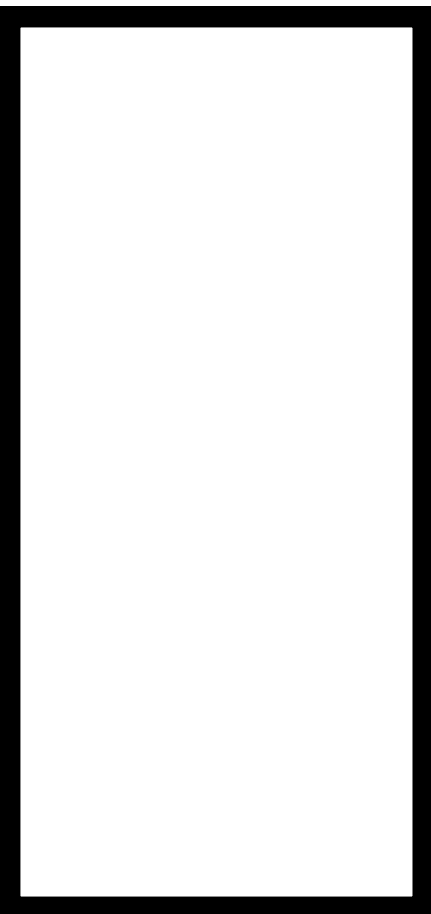
ters, test reproducibility improvements, absolute particle reduction, filtration capacity, extraction test harmonization with Standard 61 and reverse osmosis data transfers. New standards that are being developed include the massive microbiological purifier standard, ozone treatment systems and shower filters. Standard 62-distillation systems is just completing a major revision and will be going to ballot early this year. □

About the author

S Rob Herman is technical manager of the NSF International's Drinking Water Treatment Unit program and has been with NSF since 1985. He holds a bachelor's degree in chemistry from Lawrence Technological University in Southfield, Mich., and is currently in the environmental sciences graduate program at the University of Michigan. NSF has administered the standard development process and tested against ANSI/NSF Standard 58 since its inception. Herman can be reached at (734) 769-5349, (734) 769-0109 (fax) or herman@nsf.org

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