**NSF International**

*MEMORANDUM*

**TO:** Joint Committee on Drinking Water Additives – System Components

**FROM:** France Lemieux, Chairperson

**DATE:** November 19, 2013

**SUBJECT:** Proposed revision to NSF/ANSI 61 – *Drinking Water System Components – Health Effects* (61i109r1)

Draft 1 of NSF/ANSI 61 issue 109, is being forwarded to the Joint Committee on behalf of the Task Group on Table 3.1 for balloting. Please review the changes proposed to these standards and **submit your ballot by December 10, 2013** via the NSF Online Workspace.

**Purpose**

The proposed revision will add material-specific analyses for additional materials to Table 3.1 under NSF/ANSI 61. The material names will also be listed in alphabetical order.

**Background**

At the 2012 annual DWA-SC JC meeting, additions to the minimum test batteries under Table 3.1 of NSF/ANSI 61 were proposed. NSF/ANSI 61 currently requires formulation-specific testing, and those materials thought to be part of the product are identified via a formulation review. The proposed additions to this table will allow high-flow devices and certain section 8 and 9 products that have a low surface area (meeting the 2 sq inch clause) to be able to rely on Table 3.1 for the minimum test batteries instead of requiring formulation information from manufacturer. During the discussion, the JC agreed that it would be a good idea to review some additional background on this via a task group. Concerns were specifically raised over the addition of analytes to concrete because the state of California includes NSF/ANSI 61 under its drinking water code. A task group was formed and the proposed additions were reviewed. Subsequently, the table was updated and the additional analyses for concrete and references to testing pigments were removed from the ballot at this time. NSF is compiling data on the additional analyses for concrete and this information will be shared with the task group and JC when available.

If you have any questions about the technical content of the ballot, you may contact me in care of:

Chairperson, Joint Committee
c/o Monica Leslie
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[Note – the changes are seen below using strikeout for removal of old text and gray highlights to show the suggested text. ONLY the highlighted text is within the scope of this ballot.]

# NSF/ANSI Standard
# for Drinking Water System Components – Health Effects

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**Table 3.1 – Material-specific analyses**

| Material type | Required analyses |
|---|---|
| **Pipe/fitting/device materials** | |
| Aluminum | regulated metals[2], aluminum |
| aAluminum oxide ceramics | regulated metals[2], aluminum |
| ~~zirconium oxide ceramics~~ | ~~regulated metals[2], zirconium~~ |
| ~~silicon carbide ceramics~~ | ~~regulated metals[2], silicon~~ |
| ~~Ruby or sapphire (natural and synthetic aluminum oxide gemstones)~~ | ~~regulated metals[2], aluminum~~ |
| ~~a~~Asphaltic-coated ductile iron | GC/MS base/neutral scan (specific for carbonyls and non-aromatic hydrocarbons)[1], volatile organic chemicals (VOCs), polynuclear aromatic hydrocarbons (PNAs), regulated metals[2], molybdenum, vanadium, manganese |
| Brass | regulated metals[2], zinc, nickel |
| Carbon graphite non-impregnated | GC/MS[1], VOCs, polynuclear hydrocarbons (PNAs), regulated metals[2], |
| Carbon graphite (phenol formaldehyde impregnated) | GC/MS[1], VOCs, polynuclear hydrocarbons (PNAs), formaldehyde, regulated metals[2], |
| Carbon Steel | regulated metals[2] |
| Cast Iron | regulated metals[2] |
| Chrome/nickel plating | regulated metals[2], nickel |
| ~~c~~Concrete | regulated metals[2] |
| Copper | regulated metals[2] |
| Ductile iron | regulated metals[2] |
| ~~g~~Galvanized steel | regulated metals[2], zinc, nickel |
| Magnets | Metals[14] |
| Nickel based alloys | regulated metals[2], nickel |
| Platinum | regulated metals[2], platinum |
| Quartz | regulated metals[2] |
| Ruby or sapphire (natural and synthetic aluminum oxide gemstones) | regulated metals[2], aluminum |
| Silicon carbide ceramics | regulated metals[2], silicon |
| Silver | regulated metals[2], silver |

**Table 3.1 – Material-specific analyses**

| Material type | Required analyses |
|---|---|
| ~~s~~Stainless steel | regulated metals[2], nickel |
| Titanium | regulated metals[2], titanium |
| Tungsten Carbide | regulated metals[2], tungsten |
| Zirconium oxide ceramics | regulated metals[2], zirconium |
| ~~Carbon graphite non-impregnated~~ | ~~GC/MS[1], VOCs, polynuclear hydrocarbons (PNAs), regulated metals[2]~~ ~~,~~ |
| ~~Carbon graphite (phenol formaldehyde impregnated)~~ | ~~GC/MS[1], VOCs, polynuclear hydrocarbons (PNAs), formaldehyde, regulated metals[2]~~ |
| | |
| **Plastic materials** | |
| ~~a~~Acetal (AC)/polyoxymethylene (POM) | formaldehyde, VOCs, regulated metals[2], phenolics (by GC/MS base/acid scan)[1], acetal oligomers (by GC/MS base/acid scan)[1] |
| Acrylonitrile-butadiene-styrene (ABS)<br>Acrylonitrile-styrene (SAN) | acrylonitrile, 1,3-butadiene, styrene, regulated metals[2], VOCs, phenolics (by GC/MS base/acid scan)[1] |
| ~~c~~Cross linked polyethylene (PEX) | GC/MS[1], VOCs, regulated metals[2], phenolics (by GC/MS base/acid scan)[1], methanol, *tert*-butyl alcohol[3] |
| ~~n~~Nylon 6 | caprolactam, nitrogen-containing extractants (by GC/MS base/neutral scan)[1], VOCs, regulated metals[2], phenolics (by GC/MS base/acid scan)[1] |
| ~~o~~Other nylons | nitrogen-containing extractants (by GC/MS base/neutral scan)[1], VOCs, regulated metals[2], phenolics (by GC/MS base/acid scan)[1], nylon monomers, |
| ~~p~~Polybutylene (PB) | VOCs, regulated metals[2], phenolics (by GC/MS base/acid scan)[1], |
| Polycarbonate (PC) | Bisphenol A, VOCs, regulated metals[2], phenolics (by GC/MS base/acid scan)[1], |
| ~~p~~Polyethylene (PE) | VOCs, regulated metals[2], phenolics (by GC/MS base/acid scan)[1], |
| ~~p~~Polyphenylene oxide (PPO) | dimethyl phenol, VOCs, regulated metals[2], phenolics (by GC/MS base/acid scan)[1] |
| ~~p~~Polyphthalamide (PPA) | hexamethylene diamine, terephthalic acid, isophthalic acid, VOCs, regulated metals[2] , phenolics (by GC/MS base/acid scan)[1] |
| ~~p~~Polypropylene (PP) | VOCs, regulated metals[2], phenolics (by GC/MS base/acid scan)[1], |
| pPolysulphone including poly[phenylene sulphone] (PPSU) | sulphone monomer, VOCs, regulated metals[2], phenolics (by GC/MS base/acid scan)[1], |
| ~~p~~Polyurethane (PUR) | GC/MS[1], VOCs, regulated metals[2] , phenolics (by GC/MS base/acid scan)[1], |
| ~~p~~Polyvinyl chloride (PVC) and chlorinated polyvinyl chloride (CPVC) | regulated metals[2], phenolics[1], VOCs, tin[4], antimony[5], residual vinyl chloride monomer (RVCM)[6], |
| ~~p~~Polyvinyl chloride (flexible) | VOCs, regulated metals[2], phenolics (by GC/MS base/acid scan)[1], phthalates[7], RVCM[6], tin[4], zinc[8], |
| **Joining and sealing materials** | |
| ~~c~~Chloroprene | GC/MS[1] , VOCs, and **2-chloro-1,3-butadiene,** |
| ~~e~~Ethylene-propylene-diene | GC/MS[1], VOCs, phenolics (by GC/MS base/acid scan)[1], phthalates[7], |

**Table 3.1 – Material-specific analyses**

| Material type | Required analyses |
|---|---|
| monomer (EPDM) | PNAs[1], Nitrosoamines[13] |
| ETFE (Ethylene tetrafluoroethylene) | GC/MS[1], VOCs, perfluorooctanoic acid |
| Flux | regulated metals[2], GC/MS[1], VOCs, PNAs[1] |
| fFluoroelastomer | GC/MS[1], VOCs, phthalates[7] |
| Isoprene | GC/MS[1], VOCs, phenolics (by GC/MS base/acid scan)[1], phthalates[7], PNAs[1], isoprene monomer |
| Neoprene | GC/MS[1], VOCs, phenolics (by GC/MS base/acid scan)[1], phthalates[7], PNAs[1], chloroprene, Nitrosoamines[13] |
| ~~n~~Nitrile-butadiene rubber (NBR, BUNA-N) | GC/MS[1], VOCs, phenolics (by GC/MS base/acid scan)[1], phthalates[7], PNAs[1], 1,3-butadiene, acrylonitrile, Nitrosoamines[13] |
| PTFE | GC/MS[1], VOCs, perfluorooctanoic acid |
| PVDF | GC/MS[1], VOCs, vinylidene fluoride, hexafluoropropene |
| Silicone | GC/MS[1], VOCs, 2,4-dichlorobenzoic acid |
| Solder | regulated metals[2], aluminum, bismuth, nickel, silver, strontium, zinc |
| Solvent cements | GC/MS (base/neutral/acid scan), VOCs, acetone, tetrahydrofuran, cyclohexanone, methyl ethyl ketone, dimethylformamide, methyl isobutyl ketone |
| ~~s~~Styrene-butadiene rubber (SBR) | GC/MS[1], VOCs, phenolics (by GC/MS base/acid scan)[1], phthalates[7], PNAs[1], 1,3-butadiene, styrene, Nitrosoamines[13] |
| **Barrier materials** | |
| ~~a~~Asphaltic coatings | regulated metals[2], molybdenum, vanadium, manganese, VOCs, GC/MS base/neutral scan (specific for carbonyls and non-aromatic hydrocarbons)[1], PNAs[1] |
| ~~e~~Epoxy coatings (liquid and powder) | GC/MS (base/neutral/acid scan), bisphenol A, bisphenol A-diglycidyl ether[9], bisphenol A-diglycideryl ether[9], bisphenol A-propoxylate[9], epichlorohydrin, VOCs, solvent and reactive diluent additives[10] |
| ~~p~~Polyester coatings | GC/MS (base/neutral/acid scan), VOCs, residual monomers[11] |
| ~~p~~Polyurethane coatings | GC/MS (base/neutral/acid scan), VOCs |
| Portland and hydraulic cements | GC/MS[1], regulated metals[2], dioxins and furans, radionuclides, glycols and ethanolamines[12] |

[1] see annex B, section B.7

[2] antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, selenium, thallium.

[3] *tert*-Butyl alcohol analysis is required for PEX materials except those crosslinked via e-beam methodology.

[4] The analysis for tin is required when tin-based stabilizers are used.

[5] The analysis for antimony is required when antimony-based stabilizers are used.

[6] The level of RVCM within the walls of PVC or CPVC products and materials shall be directly determined (annex B, section B.7).

[7] The analysis for phthalates is required when phthalate ester plasticizers are used. Analysis shall be for the specific phthalate ester(s) used in the formulation.

**Table 3.1 – Material-specific analyses**

| Material type | Required analyses |
|---|---|

[8] The analysis for zinc is required when zinc-based stablilizers are used.

[9] Analysis shall be performed using liquid chromatography with ultraviolet detection (LC/UV).

[10] Analysis shall be performed for the specific solvent and reactive diluent additives used in the individual product formulation, such as benzyl alcohol.

[11] Analysis shall be performed for residual concentrations of the specific ester monomers used in the individual product formulation.

[12] Glycol and ethanolamine analyses shall be performed on cements containing these compounds as grinding aids.
[13] Analysis for N-Nitrosodimethylamine, N-Nitrosomethylethylamine, N-Nitrosodiethylamine, N-Nitrosodi-n-propylamine, N-Nitrosopyrrolidine, N-Nitrosomorpholine, N-Nitrosopiperidine, N-Nitrosodi-n-butylamine and N-Nitrosodiphenylamine are erquired when material is sulfur cured. Analysis shall be in accordance with USEPA Method 521 (USEPA-600/R-05/054).
[14] Aluminum, antimony, arsenic, barium, beryllium, bismuth, cadmium, cerium, cobalt, chromium, cesium, copper, dysprosium, erbium, europium, gallium, gadolinium, germanium, hafnium, indium, lanthanum, lead, lithium, lutetium, manganese, mercury, molybdenum, niobium, neodymium, nickel, palladium, praseodymium, platinum, rubidium, rhenium, rhodium, ruthenium, samarium, selenium, silver, strontium, tantalum, tellurium, thallium, tin, titanium, tungsten, uranium, vanadium, tungsten, ytterbium, zinc, zirconium.

– concluded –

***Reason:*** ***NSF/ANSI 61 currently requires formulation-specific testing, and those materials thought to be part of the product are identified via a formulation review. The proposed additions to this table (highlighted) will allow high-flow devices and certain section 8 and 9 products that have a low surface area (meeting the 2 sq inch clause) to be able to rely on Table 3.1 for the minimum test batteries instead of requiring formulation information from manufacturer. Per discussion at the 2012 annual DWA JC meeting (November 29, 2012), a task group was formed and reviewed the proposed additions. Subsequently, the table was updated and the concrete and references to testing pigments were removed from the ballot at this time.*** **NSF has collected data on the additional analyses for concrete and this information will be shared with the JC when available.**