NSF Standard(s) Impacted: NSF/ANSI/CAN Standard 60

**Background:**

Biological treatment under anaerobic conditions is an important tool to reduce nitrate found in ground water sources. This is particularly true in smaller water treatment systems which often depend on ground water and lack the financial resources of larger systems.

Durable media are colonized with bacteria in water tanks, typically under pressurized conditions. The bacteria reduce the nitrate and release nitrogen gas as harmless end product. This biological process operates under anaerobic conditions and requires an electron donor food source for the bacteria. The most effective and widely used compound for this purpose is acetic acid – vinegar.

Several suppliers have been certified by NSF for use in water treatment to support biological treatment of nitrate. These compounds have been approved at an MUL of 150 mg/L. They include glacial acetic acid, and several dilutions from 99.5% (glacial) down to 50%.

The global supply of acetic acid is split between 25% produced via biological processes and 75% produced via industrial processes. The primary industrial process consist of carbonylation of methanol using a metal catalyst and iodomethane intermediate. Because the supply may include these industrial sources, contaminant testing is warranted for acetone. Additionally, metals testing will be required because acetic acid may pull metal ions from storage vessels, shipment containers, or dispensing fixtures (e.g. volumetric meters & valves).

**Recommendation:**

7.1 **Coverage**

This section covers those chemicals, chemical compounds, blends, and mixtures intended for use in a variety of drinking water applications. These uses include fluoridation, defluoridation, algae control, dechlorination, antioxidants, dyes, biological substrate, and tracers. These products are generally applied directly to the water supply. Residuals of chemicals used for fluoridation, algae control, dyes, and tracers are likely to persist in the finished drinking water. Chemicals used for dechlorination, defluoridation, and antioxidant, and biological substrate are intended to be consumed by reaction, and residuals of these products are not likely to be found in the finished drinking water.

7.2 **Definitions**

...  
7.2.6 fluoridation: The process of adding fluoride to drinking water at a beneficial concentration as a means of reducing the incidence of dental caries in the population consuming the water.

7.2.7 biological substrate: a product added to the water treatment process to serve as an electron donor for reduction reactions in biological treatment systems.

7.3 **General requirements**

...
### Table 7.1

<table>
<thead>
<tr>
<th>Chemical type (primary use)</th>
<th>Synonyms</th>
<th>Formula (CAS number)</th>
<th>Molecular weight (g)</th>
<th>Preparation method</th>
<th>Typical use level (mg/L)</th>
<th>Minimum test batteries of chemistry-specific analyses</th>
</tr>
</thead>
<tbody>
<tr>
<td>acetic acid (biological substrate)</td>
<td>vinegar</td>
<td>C₂H₄O₂ (64-19-7)</td>
<td>60.0</td>
<td>Method A, Annex B, Section B.3.2</td>
<td>200</td>
<td>acetone, metals⁴</td>
</tr>
<tr>
<td>ammonium hexafluorosilicate (fluoridation)</td>
<td>ammonium silico-fluoride, ammonium fluosilicate</td>
<td>(NH₄)₂SiF₆ (16819-19-0)</td>
<td>178.14</td>
<td>Method B, Annex B, Section B.3.3</td>
<td>1.2⁵</td>
<td>metals⁴ radionuclides</td>
</tr>
<tr>
<td>calcium fluoride (fluoridation)</td>
<td>fluor spar, fluorite</td>
<td>CaF₂ (1789-75-5)</td>
<td>78.08</td>
<td>Method B, Annex B, Section B.3.3</td>
<td>1.2⁵</td>
<td>metals⁴ radionuclides</td>
</tr>
<tr>
<td>copper ethanamine complexes (algicide)</td>
<td>Cu(NH₂C₂H₄OH)₄⁺⁺ variable</td>
<td>Method A, Annex B, Section B.3.2</td>
<td>1.0⁵</td>
<td>metals⁴ formulation dependent organics</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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