**Section 611.385 Treatment Technique for Control of Disinfection Byproduct (DBP) Precursors**

a) Applicability

1) A Subpart B system supplier using conventional filtration treatment (as defined in Section 611.101) must operate with enhanced coagulation or enhanced softening to achieve the TOC percent removal levels specified in subsection (b) unless the supplier meets at least one of the alternative compliance standards listed in subsection (a)(2) or (a)(3).

2) Alternative compliance standards for enhanced coagulation and enhanced softening systems. A Subpart B system supplier using conventional filtration treatment may use the alternative compliance standards in subsections (a)(2)(A) through (a)(2)(F) to comply with this Section in lieu of complying with subsection (b). A supplier must comply with monitoring requirements in Section 611.382(d).

A) The supplier's source water TOC level, measured according to Section 611.381(d)(3), is less than 2.0 mg/ℓ, calculated quarterly as a running annual average.

B) The supplier's treated water TOC level, measured according to Section 611.381(d)(3), is less than 2.0 mg/ℓ, calculated quarterly as a running annual average.

C) The supplier's source water TOC level, measured according to Section 611.381(d)(3), is less than 4.0 mg/ℓ, calculated quarterly as a running annual average; the source water alkalinity, measured according to Section 611.381(d)(1), is greater than 60 mg/ℓ (as CaCO3), calculated quarterly as a running annual average; and either the TTHM and HAA5 running annual averages are no greater than 0.040 mg/ℓ and 0.030 mg/ℓ, respectively; or prior to the effective date for compliance in Section 611.380(b), the system has made a clear and irrevocable financial commitment, not later than the effective date for compliance in Section 611.380(b), to use technologies that will limit the levels of TTHMs and HAA5 to no more than 0.040 mg/ℓ and 0.030 mg/ℓ, respectively. A supplier must submit evidence of a clear and irrevocable financial commitment, in addition to a schedule containing milestones and periodic progress reports for installation and operation of appropriate technologies, to the Agency for approval. Failure to install and operate these technologies by the date in the approved schedule will constitute a violation of an NPDWR.

D) The TTHM and HAA5 running annual averages are no greater than 0.040 mg/ℓ and 0.030 mg/ℓ, respectively, and the supplier uses only chlorine for primary disinfection and maintenance of a residual in the distribution system.

E) The supplier's source water SUVA, prior to any treatment and measured monthly according to Section 611.381(d)(4), is less than or equal to 2.0 ℓ/mg-m, calculated quarterly as a running annual average.

F) The supplier's finished water SUVA, measured monthly according to Section 611.381(d)(4), is less than or equal to 2.0ℓ/mg-m, calculated quarterly as a running annual average.

3) Additional Alternative Compliance Standards for Softening Systems. A supplier practicing enhanced softening that cannot achieve the TOC removals required by subsection (b)(2) may use the alternative compliance standards in subsections (a)(3)(A) and (a)(3)(B) in lieu of complying with subsection (b). A supplier must comply with monitoring requirements in Section 611.382(d). The alternative compliance standards are as follows:

A) The supplier may undertake softening that results in lowering the treated water alkalinity to less than 60 mg/ℓ (as CaCO3), measured monthly according to Section 611.381(d)(1) and calculated quarterly as a running annual average; and

B) The supplier may undertake softening that results in removing at least 10 mg/ℓ of magnesium hardness (as CaCO3), measured monthly according to Section 611.381(d)(6) and calculated quarterly as a running annual average.

b) Enhanced Coagulation and Enhanced Softening Performance Requirements

1) A supplier must achieve the percent reduction of TOC specified in subsection (b)(2) between the source water and the combined filter effluent, unless the Agency approves a supplier's request for alternate minimum TOC removal (Step 2) requirements under subsection (b)(3).

2) Required Step 1 TOC reductions, indicated in the following table, are based upon specified source water parameters measured in accordance with Section 611.381(d). A supplier practicing softening must meet the Step 1 TOC reductions in the far-right column (source water alkalinity greater than 120 mg/ℓ) for the following specified source water TOC:

Step 1 Required Removal of TOC by Enhanced Coagulation and Enhanced Softening for a Subpart B System Supplier Using Conventional

|  |  |  |  |
| --- | --- | --- | --- |
| Treatment1,2 | | | |
| Source-water  TOC, mg/ℓ | Source-water alkalinity, mg/ℓ as CaCO3 | | |
| 0-60 | > 60-120 | > 1203 |
| > 2.0-4.0 | 35.0% | 25.0% | 15.0% |
| > 4.0-8.0 | 45.0% | 35.0% | 25.0% |
| > 8.0 | 50.0% | 40.0% | 30.0% |
| 1 A supplier meeting at least one of the conditions in subsections (a)(2)(A) through (a)(2)(F) are not required to operate with enhanced coagulation. | | | |
| 2 A softening system that meets one of the alternative compliance standards in subsection (a)(3)is not required to operate with enhanced softening. | | | |
| 3 A supplier that practices softening must meet the TOC removal requirements in this column. | | | |

3) A Subpart B conventional treatment system supplier that cannot achieve the Step 1 TOC removals required by subsection (b)(2) due to water quality parameters or operational constraints must apply to the Agency, within three months after failure to achieve the TOC removals required by subsection (b)(2), for approval of alternative minimum TOC (Step 2) removal requirements submitted by the supplier. If the PWS cannot achieve the Step 1 TOC removal requirement due to water quality parameters or operational constraints, the Agency must approve the use of the Step 2 TOC removal requirement. If the Agency approves the alternative minimum TOC removal (Step 2) requirements, the Agency may make those requirements retroactive for the purposes of determining compliance. Until the Agency approves the alternative minimum TOC removal (Step 2) requirements, the supplier must meet the Step 1 TOC removals contained in subsection (b)(2).

4) Alternative Minimum TOC Removal (Step 2) Requirements. An application made to the Agency by an enhanced coagulation system supplier for approval of alternative minimum TOC removal (Step 2) requirements under subsection (b)(3) must include, at a minimum, results of bench- or pilot-scale testing conducted under subsection (b)(4)(B). The submitted bench- or pilot-scale testing must be used to determine the alternative enhanced coagulation level.

A) For the purposes of this Subpart I, "alternative enhanced coagulation level" is defined as coagulation at a coagulant dose and pH, as determined by the method described in subsections (b)(4)(A) through (b)(4)(E), such that an incremental addition of 10 mg/ℓ of alum (or equivalent amount of ferric salt) results in a TOC removal of less than or equal to 0.3 mg/ℓ. The percent removal of TOC at this point on the "TOC removal versus coagulant dose" curve is then defined as the minimum TOC removal required for the supplier. Once approved by the Agency, this minimum requirement supersedes the minimum TOC removal required by the table in subsection (b)(2). This requirement will be effective until such time as the Agency approves a new value based on the results of a new bench- and pilot-scale test. Failure to achieve alternative minimum TOC removal levels is a violation of National Primary Drinking Water Regulations.

B) Bench- or pilot-scale testing of enhanced coagulation must be conducted by using representative water samples and adding 10 mg/ℓ increments of alum (or equivalent amounts of ferric salt) until the pH is reduced to a level less than or equal to the enhanced coagulation Step 2 target pH shown in the following table:

|  |  |
| --- | --- |
| Enhanced Coagulation Step 2 Target pH | |
| Alkalinity (mg/ℓ as CaCO3) | Target pH |
| 0-60 | 5.5 |
| > 60-120 | 6.3 |
| > 120-240 | 7.0 |
| > 240 | 7.5 |

C) For waters with alkalinities of less than 60 mg/ℓ for which addition of small amounts of alum or equivalent addition of iron coagulant drives the pH below 5.5 before significant TOC removal occurs, the supplier must add necessary chemicals to maintain the pH between 5.3 and 5.7 in samples until the TOC removal of 0.3 mg/ℓ per 10 mg/ℓ alum added (or equivalent addition of iron coagulant) is reached.

D) The supplier may operate at any coagulant dose or pH necessary (consistent with other NPDWRs) to achieve the minimum TOC percent removal approved under subsection (b)(3).

E) If the TOC removal is consistently less than 0.3 mg/ℓ of TOC per 10 mg/ℓ of incremental alum dose at all dosages of alum (or equivalent addition of iron coagulant), the water is deemed to contain TOC not amenable to enhanced coagulation. The supplier may then apply to the Agency for a waiver of enhanced coagulation requirements. If the TOC removal is consistently less than 0.3 mg/ℓ of TOC per 10 mg/ℓ of incremental alum dose at all dosages of alum (or equivalent addition of iron coagulant), the Agency must grant the waiver of enhanced coagulation requirements.

c) Compliance Calculations

1) A Subpart B system supplier other than those identified in subsection (a)(2) or (a)(3) must comply with requirements contained in subsection (b)(2) or (b)(3). A supplier must calculate compliance quarterly, beginning after the supplier has collected 12 months of data, by determining an annual average using the following method:

A) Determine actual monthly TOC percent removal, equal to the following:



B) Determine the required monthly TOC percent removal.

C) Divide the value in subsection (c)(1)(A) by the value in subsection (c)(1)(B).

D) Add together the results of subsection (c)(1)(C) for the last 12 months and divide by 12.

E) If the value calculated in subsection (c)(1)(D) is less than 1.00, the supplier is not in compliance with the TOC percent removal requirements.

2) A supplier may use the provisions in subsections (c)(2)(A) through (c)(2)(E) in lieu of the calculations in subsection (c)(1)(A) through (c)(1)(E) to determine compliance with TOC percent removal requirements.

A) In any month that the supplier's treated or source water TOC level, measured according to Section 611.381(d)(3), is less than 2.0 mg/ℓ, the supplier may assign a monthly value of 1.0 (in lieu of the value calculated in subsection (c)(1)(C)) when calculating compliance under the provisions of subsection (c)(1).

B) In any month that a system practicing softening removes at least 10 mg/ℓ of magnesium hardness (as CaCO3), the supplier may assign a monthly value of 1.0 (in lieu of the value calculated in subsection (c)(1)(C)) when calculating compliance under the provisions of subsection (c)(1).

C) In any month that the system's source water SUVA, prior to any treatment and measured according to Section 611.381(d)(4), is less than or equal to 2.0 ℓ/mg-m, the supplier may assign a monthly value of 1.0 (in lieu of the value calculated in subsection (c)(1)(C)) when calculating compliance under the provisions of subsection (c)(1).

D) In any month that the system's finished water SUVA, measured according to Section 611.381(d)(4), is less than or equal to 2.0 ℓ/mg-m, the supplier may assign a monthly value of 1.0 (in lieu of the value calculated in subsection (c)(1)(C)) when calculating compliance under the provisions of subsection (c)(1).

E) In any month that a system practicing enhanced softening lowers alkalinity below 60 mg/ℓ (as CaCO3), the supplier may assign a monthly value of 1.0 (in lieu of the value calculated in subsection (c)(1)(C)) when calculating compliance under the provisions of subsection (c)(1).

3) A Subpart B system supplier using conventional treatment may also comply with the requirements of this Section by meeting the standards in subsection (a)(2) or (a)(3).

d) Treatment Technique Requirements for Disinfection Byproduct (DBP) Precursors. Treatment techniques to control the level of disinfection byproduct (DBP) precursors in drinking water treatment and distribution systems, for a Subpart B system supplier using conventional treatment, are enhanced coagulation or enhanced softening.

BOARD NOTE: Derived from 40 CFR 141.135.

(Source: Amended at 44 Ill. Reg. 6996, effective April 17, 2020)