



Designation: D 1291 – 89 (Reapproved1994)^{€1}

Standard Practice for Estimation of Chlorine Requirement or Demand of Water, or Both ¹

This standard is issued under the fixed designation D 1291; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (€) indicates an editorial change since the last revision or reapproval.

€¹ NOTE—Section 12, Keywords, was added editorially in April 1994.

1. Scope

1.1 This practice provides a means of estimating the quantity of chlorine required to be added to a unit volume of water to accomplish a predetermined treatment objective or to completely react with all chlorine reactable substances in the water, or both.

1.2 Temperature, pH, and initial chlorine dosage are all variables in estimating the optimum chlorination practice. The effects of these variables can be evaluated using this practice.

1.3 Chlorine residual is determined using Test Method D 1253.

1.4 This practice is applicable to all types of water in which the stated treatment objective can be evaluated or residual chlorine can be measured, or both.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For a specific hazard statement, see Note 1.

2. Referenced Documents

2.1 ASTM Standards:

D 1129 Terminology Relating to Water²

D 1193 Specification for Reagent Water²

D 1253 Test Method for Residual Chlorine in Water²

D 1293 Test Methods for pH of Water²

D 3370 Practices for Sampling Water from Closed Conduits²

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *chlorine demand*—the amount of chlorine that must be added to a unit volume of water under specified conditions of pH, temperature, and contact time to completely react with

all chlorine-reactable substances in the water. It is defined as the difference between the amount of chlorine applied and the amount of free chlorine remaining at the end of the contact period.

3.1.2 *chlorine requirement*—the amount of chlorine that must be added to a unit volume of water under specified conditions of pH, temperature, and contact time to achieve the objectives of chlorination.

3.2 *Definitions*—For definitions relating to this practice, see Terminology D 1129.

4. Summary of Practice

4.1 Known amounts of chlorine are added to a series of 500 mL aliquots of sample. The treated sample aliquots are permitted to stand for a specified contact time (or a variety of different specified contact times) under specified conditions of pH and temperature. At the end of the contact time, the sample aliquots are either analyzed for chlorine content by Test Method D 1253 or subjected to whatever evaluative technique is required to establish accomplishment of the treatment objective, or both.

5. Significance and Use

5.1 Chlorine is added to potable water, waste water, and industrial water for a variety of purposes. Some of these purposes are:

5.1.1 To eliminate or reduce the growth of microorganisms in water,

5.1.2 To destroy or modify decomposable organic substances so as to reduce the biochemical oxygen demand of the water,

5.1.3 To eliminate or reduce taste, odors, and color in the water,

5.1.4 To separate grease in waste water by eliminating the protective colloidal effect of proteins present, and

5.1.5 To destroy or modify substances in the waste water that react directly by oxidation, such as ammonia, cyanates, cyanides, ferrous iron, nitrites, phenol, phosphorus, sulfides, sulfites, thiocyanates, and other oxidizable constituents.

5.2 It is important to avoid over-chlorination in order to minimize chemical consumption, meet restrictions specified by

¹ This practice is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.03 on Sampling of Water and Water-Formed Deposits, Surveillance of Water, and Flow Measurement of Water.

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² *Annual Book of ASTM Standards*, Vol 11.01.