Presented below are water quality standards that are in effect for Clean Water Act purposes.

EPA is posting these standards as a convenience to users and has made a reasonable effort to assure their accuracy. Additionally, EPA has made a reasonable effort to identify parts of the standards that are not approved, disapproved, or are otherwise not in effect for Clean Water Act purposes.

ARTICLE 74:51

SURFACE WATER QUALITY

CHAPTER 74:51:01

SURFACE WATER QUALITY STANDARDS

74:51:01:01. Definitions. Words and phrases defined in SDCL 34A-2-2, have the same meaning when used in chapters 74:51:01 to 74:51:03, inclusive. Terms and abbreviations which are not specifically defined shall be construed in conformance with the context and in relation to the applicable section of the standards or the statute concerned. In addition, terms used in chapters 74:51:01 to 74:51:03, inclusive, are defined as follows:

(1) "Administrator," the administrator of the U.S. Environmental Protection Agency;

(2) "Affected community," the aquatic community where water quality will be improved or degraded;

(3) "Attainable beneficial uses," those beneficial uses which, at a minimum, can be achieved by the imposition of effluent limits required under §§ 74:51:01:07, 74:51:01:08, and 74:51:01:17 to 74:51:01:21, inclusive, and cost-effective and reasonable best management practices for nonpoint source control;

(4) "Aquatic life," an organism dependent on the water environment to either propagate or survive, or both;

(5) "Aquatic community," an association of interacting populations and stages of aquatic life in a given water body or habitat;

(6) "Best management practices," "BMPs," schedules of activities, prohibitions of practice, maintenance procedures, and other management practices to prevent or reduce the pollution of surface waters of the state on a voluntary basis, including treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge, waste disposal, or drainage from raw material storage;

(7) "Bioaccumulative pollutants," those pollutants which are taken up, retained, or accumulated in the bodies of organisms and are transferred by ingestion in increasing concentrations in the predator organisms to the point that one or more organisms in the food chain suffer significant harm;

(8) "Bioassay," a procedure in which the responses of organisms are used to detect or measure the presence or effect of one or more substances, wastes, effluents, or environmental factors, alone or in combination;

(9) "Biochemical oxygen demand," "BOD," a standardized laboratory test used to determine the relative oxygen requirements of waters and wastewaters;

(10) "Biological integrity," the ability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region;

(11) "Board," Water Management Board;

(12) "°C," degrees centigrade, a measure of temperature;

(13) "Coldwater aquatic life," aquatic life including fish of the family Salmonidae, for example, trout and salmon;

(14) "Coldwater marginal fish life propagation," a beneficial use assigned to surface waters of the state which support aquatic life and are suitable for stocked catchable-size coldwater fish during portions of the year, but which, because of critical natural conditions including low flows, siltation, or warm temperatures, are not suitable for a permanent coldwater fish population. Warmwater fish may also be present;

(15) "Coldwater permanent fish life propagation," a beneficial use assigned to surface waters of the state which are capable of supporting aquatic life and are suitable for supporting a permanent population of coldwater fish from natural reproduction or fingerling stocking. Warmwater fish may also be present;

(16) "Commerce and industry," a beneficial use assigned to surface waters of the state which are suitable for use as cooling water, industrial process water, navigation, and production of hydroelectric power;

(17) "Criterion," a designated concentration of a substance, measure of a physical factor, or narrative statement that, when not exceeded, will protect an organism, a biological community, or a prescribed beneficial use or water quality;

(18) "Designated beneficial uses," those beneficial uses specified in chapters 74:51:02 and 74:51:03 for each water body or segment whether or not they are being attained;

(19) "Domestic water supply," a beneficial use assigned to surface waters of the state which are suitable for human consumption, culinary or food processing purposes, and other household purposes after suitable conventional treatment;

(20) "Eight-hour composited sample," a sample composed of eight grab samples taken at one-hour intervals, the volume of each sample proportioned to flow, and physically mixed prior to analysis;

(21) "Effective concentration," the concentration of a toxicant effecting a specific response in a given time;

(22) "EPA methods," **Methods for Chemical Analysis of Waters and Wastes**, 1983, Environmental Protection Agency, Analytical Quality Control Laboratory;

(23) "Existing beneficial uses," those uses actually attained in surface waters of the state on March 27, 1973, whether or not they are so designated;

(24) "°F," degrees Fahrenheit, a measure of temperature;

(25) "Geometric mean," the nth root of a product of n factors;

(26) "Handbook 69," **Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure**, recommendations of the National Committee on Radiation Protection, **National Bureau of Standards Handbook 69**, (August 1963);

(27) "High-quality fishery waters," surface waters of the state designated for the beneficial use of coldwater permanent fish life propagation, coldwater marginal fish life propagation, or warmwater permanent fish life propagation;

(28) "Immersion recreation," a beneficial use assigned to surface waters of the state which are suitable for uses where the human body may come in direct contact with the water, to the point of complete submersion and where water may be accidentally ingested or where certain sensitive organs such as the eyes, ears, and nose may be exposed to water;

(29) "Impact," a man-induced change in the chemical, physical, or biological quality or condition of surface waters of the state;

(30) "Impairment," a detrimental effect on the aquatic community caused by an impact that prevents attainment of the designated use;

(31) "Irrigation," a beneficial use assigned to surface waters of the state which are suitable for irrigating farm lands, ranch lands, gardens, and recreational areas;

(32) "Lake," a pond, reservoir, or other body of water, created by either natural or artificial means, but not a pond or appurtenance that is used for the treatment and disposal of wastes and that is permitted for such uses;

(33) "Lethal concentration," the concentration of a toxicant producing death of a test organism in a given period of time;

(34) "Limited-contact recreation," a beneficial use assigned to surface waters of the state which are suitable for boating, fishing, and other water-related recreation other than immersion recreation where a person's water contact would be limited to the extent that infections of eyes, ears, respiratory or digestive systems, or urogenital areas would normally be avoided;

(35) "Median lethal concentration," the concentration of a toxicant which produces death of 50 percent of the test organisms in the specified period of time;

(36) "MF," membrane filter; a term used to signify that the number of bacteria was determined by means of the membrane filter technique;

(37) "mg/L," milligrams per liter, a measure of concentration;

(38) "micromhos/cm," micromhos per centimeter, a measure of electrical conductivity;

(39) "MPN," most probable number; a term used to signify that the number of bacteria was determined by means of the multiple-tube fermentation technique;

(40) "Nonpoint source," a source of pollution that is not defined as a point source;

(41) "Parameter," a chemical, physical, or biological characteristic which affects the use of surface waters of the state;

(42) "pCi/L," picocuries per liter, a measure of radioactive concentration;

(43) "Point source," a discernable, confined, and discrete conveyance, including a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, animal feeding operation, or vessel or other flowing craft, from which pollutants are or may be discharged;

(44) "Pollutant," dredged spoil, solid waste, incinerator residue, sewage, sewage sludge, garbage, trash, munitions, chemical waste, biological material, radioactive material, heat, wrecked or discarded equipment, rock, sand, or cellar dirt or any industrial, municipal, or agricultural waste discharged into waters of the state, but not sewage from water craft; water, gas, or other material which is injected into a well to facilitate production of oil or gas; or water derived in association with oil and gas production and disposed of in a well if the well used either to facilitate production or for disposal purposes is approved by authority of the state after it is determined that such injection or disposal will not result in the degradation of ground or surface resources;

(45) "Pollution," contamination or other alteration of the physical, chemical, or biological properties of any waters of the state that exceeds that permitted by state effluent or water quality standards, including change in temperature, taste, color, turbidity, or odor of the waters, or the discharge of a liquid, gaseous, solid, radioactive, or other substance into any waters of the state that will or is likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, safety, or welfare; to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; or to livestock, wild animals, birds, fish, or other aquatic life;

(46) "Pollution source," a source that causes alteration of the chemical, physical, biological, or radiological integrity of surface waters of the state;

(47) "Secretary," the secretary of the South Dakota Department of Environment and Natural Resources;

(48) "Segment," a continuous stretch of water found between two points in the bed of a stream;

(49) "Sodium adsorption ratio," a calculated value that evaluates the sodium hazard of irrigation water based on the Gapon equation and expressed by the mathematical expression:

$$\text{Sodium Adsorption Ratio} = \frac{Na^{+}}{\sqrt{\frac{Ca^{+2} + Mg^{+2}}{2}}}$$

where Na^{+}, Ca^{+2}, and Mg^{+2} are expressed as milliequivalents per liter;

(50) "Spawning bed," a place where fish spawn;

(51) "Standard methods," **Standard Methods for the Examination of Water and Wastewater**, Eighteenth edition, American Public Health Association, et al., (1992);

(52) "Stream," a river, creek, tributary, or other watercourse;

(53) "Surface water of the state," lakes, ponds, streams, rivers, wetlands, and any other body or accumulation of water on the land surface that is considered to be waters of the state, but not waste treatment systems, including treatment ponds, lagoons, leachate collection ponds, or stormwater retention ponds designed to meet the requirements of the CWA other than cooling ponds as defined in 40 C.F.R. § 423.11(m) (July 1, 1991);

(54) "Thirty-day average," the arithmetic mean of a minimum of 3 consecutive grab or composite samples taken on separate weeks in a 30-day period;

(55) "Toxic pollutant," a pollutant or combination of pollutants, including disease-causing agents, which, upon exposure, ingestion, inhalation, or assimilation into an organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available, cause death, disease, behaviorial abnormality, cancer, genetic mutation, physiological malfunctions including reproductive malfunction, or physical deformity, in an organism or its offspring;

(56) "Twenty-four-hour composited sample," a sample composed of 24 grab samples taken at one-hour intervals, the volume of each sample proportioned to flow, and physically mixed prior to analysis;

(57) "Warmwater aquatic life," aquatic life including the Ictaluridae, Centrarchidae, and Cyprinidae families of fish, for example, catfish, sunfish, and minnows, respectively;

(58) "Warmwater marginal fish life propagation," a beneficial use assigned to surface waters of the state which will support aquatic life and more tolerant species of warmwater fish naturally or by frequent stocking and intensive management but which suffer frequent fish kills because of critical natural conditions;

(59) "Warmwater permanent fish life propagation," a beneficial use assigned to surface waters of the state which support aquatic life and are suitable for the permanent propagation or maintenance, or both, of warmwater fish;

(60) "Warmwater semipermanent fish life propagation waters," a beneficial use assigned to surface waters of the state which support aquatic life and are suitable for the propagation or maintenance, or both, of warmwater fish but which may suffer occasional fish kills because of critical natural conditions;

(61) "Waters of the state," all waters within the jurisdiction of this state, including streams, lakes, ponds, impounding reservoirs, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, situated wholly or partly within or bordering on the state, but not waste treatment systems, including

treatment ponds or lagoons designed to meet the requirements of the CWA other than cooling ponds as defined in 40 C.F.R. § 423.11(m) (July 1, 1991);

(62) "Wetlands," those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions including swamps, marshes, bogs, and similar areas;

(63) "Fish and wildlife propagation, recreation, and stock watering," a beneficial use classification assigned to all surface waters of the state which may support recreation in and on the water and fish and aquatic life, when sufficient quantities of water are present for sufficient duration to support those uses; provide habitat for aquatic and semi-aquatic wild animals and fowl; provide natural food chain maintenance; and are of suitable quality for watering domestic and wild animals;

(64) "Zone of mixing," an area in a stream where an effluent or discharge mixes with the upstream water.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; 5 SDR 21, effective September 21, 1978; transferred from § 34:04:02:01, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:01, July 1, 1996; 24 SDR 10, effective July 20, 1997; 25 SDR 98, effective January 27, 1999.

General Authority: SDCL 34A-2-93.

Law Implemented: SDCL 34A-2-93.

Reference: Standard Methods for the Examination of Water and Wastewater, 18th edition, 1992, Library of Congress catalogue number: ISBN 0-87553-207-1, American Public Health Association, American Water Works Association and Water Environment Federation. Copies may be obtained from the publication office: American Public Health Association, 1015 Fifteenth Street N.W., Washington, DC 20005. The cost is $180.00.

74:51:01:02. Compliance with criteria for beneficial use. A person may not discharge or cause to be discharged into surface waters of the state pollutants which cause the receiving water to fail to meet the criteria for its existing or designated beneficial use or uses.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:02, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:02, July 1, 1996; 25 SDR 98, effective January 27, 1999.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:02.01. Beneficial use analysis required. Before renewing an existing or issuing a new individual surface water discharge permit under article 74:52, the secretary shall conduct an analysis of the water body that receives, or is proposed to receive, the discharge. This analysis is required for those water bodies that only have the fishery beneficial use classification of fish and wildlife propagation, recreation, and stock watering waters. Upon completion of the analysis, the secretary shall determine whether

the water body deserves a higher designation as listed in §§ 74:51:01:45 to 74:51:02:49, inclusive, based on the attainable use or uses identified during the analysis. If the secretary determines that a higher classification is warranted, the secretary shall include water quality-based limits in the renewed or new permit that are necessary to protect the attainable beneficial use as determined by the analysis. The secretary shall then include the water body in the next regularly scheduled triennial review for upgrading its beneficial use designation to reflect the attainable use or uses identified in the analysis. A review is required for any affected surface water discharge permit issued after March 31, 1999.

Source: 25 SDR 98, effective January 27, 1999.
General Authority: SDCL 34A-2-10, 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-10, 34A-2-11, 34A-2-93.

74:51:01:03. Restrictions for water with dual classifications. If waters have more than one designated beneficial use and criteria are established for a parameter that is common to two or more uses, such as coliform organisms or pH, the more restrictive criterion for the common parameter applies.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:03, effective July 1, 1979; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:03, July 1, 1996.
General Authority: SDCL 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:04. Application of criterion to contiguous water. If pollutants are discharged into a segment and the criteria for that segment's designated beneficial use are not exceeded, but the waters flow into another segment whose designated beneficial use requires a more stringent parameter criterion, the pollutants may not cause the more stringent criterion to be exceeded.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:04, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:04, July 1, 1996.
General Authority: SDCL 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:05. Materials causing pollutants to form in waters. Wastes discharged into surface waters of the state may not contain a parameter which violates the criterion for the waters' existing or designated beneficial use or impairs the aquatic community as it naturally occurs. Where the interaction of materials in the wastes and the waters causes the existence of such a parameter, the material is considered a pollutant and the discharge of such pollutants may not cause the criterion for this parameter to be violated or cause impairment to the aquatic community.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:11, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:11, July 1, 1996; 25 SDR 98, effective January 27, 1999.
General Authority: SDCL 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-7, 34A-2-11, 34A-2-21.

74:51:01:06. Visible pollutants prohibited. Raw or treated sewage, garbage, rubble, unpermitted fill materials, municipal wastes, industrial wastes, or agricultural wastes which produce floating solids, scum, oil slicks, material discoloration, visible gassing, sludge deposits, sediments, slimes, algal blooms, fungus growths, or other offensive effects may not be discharged or caused to be discharged into surface waters of the state.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:13, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:13, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:07. Acids and alkalis. No materials may be discharged or caused to be discharged which affect the pH of the receiving waters by more than 0.5 pH unit. This does not apply to pH fluctuations of more than 0.5 pH unit contributable to natural influences.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:25, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:25, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:08. Taste- and odor-producing materials. Materials which will impart undesirable tastes or undesirable odors to the receiving water may not be discharged or caused to be discharged into surface waters of the state in concentrations that impair a beneficial use.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:26, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 41, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:26, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:09. Nuisance aquatic life. Materials which produce nuisance aquatic life may not be discharged or caused to be discharged into surface waters of the state in concentrations that impair a beneficial use or create a human health problem.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:27, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:27, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:10. Petroleum products. A discharge of insoluble materials of petroleum derivation that imparts a visible film or sheen to the surface of the water or the adjoining shorelines is prohibited.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:29, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:29, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34-2-11.

74:51:01:11. Protection of wetlands as waters of the state. Wetlands are waters of the state and are allowed protection under the provisions of this chapter. The discharge of pollutants from any source, including indiscriminate use of fill material, may not cause destruction or impairment of wetlands except where authorized under § 402 or § 404 of the Federal Water Pollution Control Act as amended to February 4, 1987, or under 40 C.F.R. Parts 257 and 258, Solid Waste Disposal Facility Criteria; Final Rule, as amended to July 1, 1996. The provisions of §§ 74:51:01:06 to 74:51:01:10, inclusive, 74:51:01:12, 74:51:01:34 to 74:51:01:39, inclusive, 74:51:01:52, and 74:51:01:63 to 74:51:01:65, inclusive, apply to all wetlands. In addition, the department shall evaluate wetlands to determine the applicability of such wetlands to the toxic pollutant standards provided in § 74:51:01:55 and Appendix B at the end of this chapter.

Source: 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:58, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11, 34A-2-21.

Cross-Reference: Criteria for toxic pollutants, § 74:51:01:55.

74:51:01:12. Biological integrity of waters. All waters of the state must be free from substances, whether attributable to human-induced point source discharges or nonpoint source activities, in concentrations or combinations which will adversely impact the structure and function of indigenous or intentionally introduced aquatic communities.

Source: 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:59, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

Cross-Reference: Introduction of nonnative fish into state waters prohibited, § 41:07:01:11.

74:51:01:13. Total dissolved gas pressure. In waters protected as coldwater fisheries, discharges from impoundments or other sources may not cause the total dissolved gas pressure to exceed 110 percent of the saturation value.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:28, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; transferred from § 74:03:02:28, July 1, 1996.

General Authority: SDCL 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:14. Radioactive iodine, radium, strontium, and tritium concentrations established. The average dissolved concentrations including the naturally occurring or background concentrations of iodine-131, radium-226, strontium-89, strontium-90, and tritium may not exceed the following concentration limits: iodine-131, 5 pCi/L; radium-226, 5 pCi/L; strontium-89, 100 pCi/L; strontium-90, 10 pCi/L; and tritium, 300 pCi/L.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:17, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:17, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:15. Concentrations established for miscellaneous radionuclides. For all radionuclides not listed in § 74:51:01:14, the average dissolved concentration limits in surface waters of the state are 1/150 of the corresponding maximum permissible concentration in water for continuous occupational exposure for a 168-hour week as contained in pages 24 to 91, inclusive, of Handbook 69.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:18, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:18, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

Reference: Handbook 69, Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure, issued June 5, 1959, amended August 1963, AFP 160-6-7, 101 pages, U.S. Department of Commerce, National Bureau of Standards. Copies are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The price is $0.50.

74:51:01:16. Measuring mixtures of radionuclides. Where there is mixture of dissolved radionuclides in surface waters of the state, the following relationship must be satisfied:

$$\frac{C}{L}+\frac{C}{L}+\cdots+\frac{C}{L}=1.00$$

with C denoting the average concentration of the respective radionuclide and L denoting its concentration limit established in § 74:51:01:14 or 74:51:01:15.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:19, effective July 1, 1979; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:19, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:17. Analysis for dissolved gross beta radioactivity. Where alpha emitters, strontium-90, radium-228, iodine-129, iodine-130, and lead-210 are known to be a negligibly small fraction of the specific concentration limit in a lake or stream, analyses for dissolved gross beta radioactivity, excluding any potassium-40 contribution, may be employed to monitor and show compliance with §§ 74:51:01:14 to 74:51:01:16, inclusive, except for tritium, so long as the gross concentration does not exceed 100 pCi/L. When these conditions are not met, quantitative analyses of individual radionuclides shall be performed to show compliance. Except in cases where tritium from other than natural sources are known to be absent, tritium analyses shall be performed to show compliance.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:20, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:20, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:18. Suspended radionuclides. For radionuclides associated with suspended materials in the water, the average concentration limits are 1/150 of the corresponding maximum permissible concentration in water (insoluble form) for continuous occupational exposure for a 168-hour week as contained in pages 24 to 91, inclusive, of Handbook 69. Instream sedimentation of those materials may not produce solids beds and result in noncompliance, because of leaching, with the provisions of § 74:51:01:14, 74:51:01:15, or 74:51:01:16.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:21, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; transferred from § 74:03:02:21, July 1, 1996.

General Authority: SDCL 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

Reference: Handbook 69, Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure, issued June 5, 1959, amended August 1963, AFP 160-6-7, 101 pages, is published by the U.S. Department of Commerce, National Bureau of Standards. Copies are available from the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402. The price is $0.50.

74:51:01:19. Maximum concentration of radionuclides per sample. The maximum concentration for any one sample may not exceed three times the average concentration limits of radionuclides specified in §§ 74:51:01:14 to 74:51:01:18, inclusive.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:22, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; transferred from § 74:03:02:22, July 1, 1996.

General Authority: SDCL 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:20. Calculation of average radionuclide concentrations. Average concentrations of radionuclides shall be computed from monitoring data acquired during the previous ten months and reported as a rolling average.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:23, effective July 1, 1979; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:23, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:21. Variances from radioactive concentration criteria. Variances from concentration limits specified in §§ 74:51:01:14 to 74:51:01:20, inclusive, shall be permitted only if there is a natural, uncontrollable contributing source or sources of radionuclides, the best available treatment is provided for all man-made discharges, and the concentration of radionuclides which humans could be exposed to is within the dose limits established in pages 24 to 91, inclusive, of Handbook 69.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:24, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; transferred from § 74:03:02:24, July 1, 1996.

General Authority: SDCL 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

Reference: Handbook 69, Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure, issued June 5, 1959, amended August 1963, AFP 160-6-7, 101 pages, is published by the U.S. Department of Commerce, National Bureau of Standards. Copies are available from the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402. The price is $0.50.

74:51:01:22. Laboratory procedures for tests. Tests or analytical procedures to determine conformity with criteria are to be made in accordance with methods approved or references listed in 40 C.F.R. Part 136 (October 16, 1995), guidelines for establishing test procedures for the analysis of pollutants, unless other test procedures are required by the secretary. Un-ionized ammonia concentrations shall be determined by use of Appendix A at the end of this chapter.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; 5 SDR 21, effective September 21, 1978; transferred from § 34:04:02:05, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 11, 1993; transferred from § 74:03:02:05, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-7, 34A-2-11, 34A-2-44.

74:51:01:23. Bioassay methods. The toxicity of pollutants to aquatic life shall be based on bioassays which determine concentrations of a substance which at a defined period of exposure are toxic to aquatic life. Toxicity tests shall simulate expected receiving water conditions. Tests shall be conducted according to test procedures approved or methods given in the references listed in 40 C.F.R. Part 136 (October 16, 1995), guidelines for establishing test procedures for the analysis of pollutants.

The term acute means a stimulus severe enough to rapidly induce an effect. In aquatic toxicity tests, a deleterious response (e.g., mortality, disorientation, immobilization) to a stimulus observed in 96 hours or less is considered acute. When referring to aquatic toxicology or human health, an acute effect is not always measured in terms of lethality.

The term chronic means a stimulus of the lowest concentration of a constituent causing observable effects. In aquatic toxicity tests, observable effects may include lethality, reduced growth, or reduced reproduction, usually a four- to seven-day test.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:06, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:06, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:24. Modification of criteria for specific sites. Criteria established in §§ 74:51:01:31, 74:51:01:32, and 74:51:01:44 to 74:51:01:54, inclusive, and in § 74:51:01:56 or 74:51:01:57 may be modified to reflect local conditions through determination of site-specific criteria for toxic pollutants in a segment. Modification of criteria must incorporate analyses of physical, chemical, and biological conditions of the receiving waters to assure maintenance of the assigned beneficial use. Actual effluents or effluent simulations may be evaluated in a toxicity testing program conducted under environmental conditions similar to the discharge site in the receiving waters. Analytical procedures, calculation procedures used to measure or demonstrate the toxicological significance of a pollutant, and numerical criteria may be modified by the board after opportunity for public review and comment.

All data necessary to defend the proposed modification of criteria are the responsibility of the person or entity requesting the modification. Methods used to develop site-specific criteria must be approved by the secretary and shall include methods to evaluate effects of bioaccumulative pollutants where appropriate. The **Water Quality Standards Handbook**, 1983 and August 1994, may be used as guidance in developing methods.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:15, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:15, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

Reference: Water Quality Standards Handbook, December 1983 and August 1994, U.S. Environmental Protection Agency, Office of Water Regulations and Standards. Copies are available from the U.S. Environmental Protection Agency, Region VIII, Denver, Colorado 80203. There is no charge for this document.

Cross-Reference: Antidegradation requirements, §§ 74:51:01:34 to 74:51:01:39, inclusive.

74:51:01:25. Notification to Environmental Protection Agency of criteria changes. The board shall notify the administrator of the Environmental Protection Agency before waiving, changing, modifying, or otherwise altering criteria set forth in chapters 74:51:01 to 74:51:03, inclusive.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:12, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; transferred from § 74:03:02:12, July 1, 1996.
General Authority: SDCL 34A-2-93.
Law Implemented: SDCL 34A-2-7, 34A-2-11, 34A-2-17.

74:51:01:25.01. Application of criteria to protect attainable beneficial use. If the secretary determines that a water body is supporting a higher existing beneficial use than is currently designated for that water body, the secretary may apply the criteria found in §§ 74:51:01:31, 74:51:01:32, and 74:51:01:44 to 74:51:01:55, inclusive, that are necessary to protect that higher attainable beneficial use. In any case, for all waters that remain Class 9 following analysis or which are designated as Class 9, the secretary may apply the provisions of § 74:51:01:55 in controlling the discharge or presence of pollutants which could reasonably be expected to interfere with the uses included in Class 9 and as necessary to support those uses.

Source: 25 SDR 98, effective January 27, 1999.
General Authority: SDCL 34A-2-10, 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-10, 34A-2-11, 34A-2-93.

74:51:01:26. Zone of mixing for wastewater discharges to flowing waters. A zone of mixing is allowed for the discharge of wastewater to a flowing water. Each properly treated wastewater discharge to a flowing water must meet the chronic criterion established for the designated beneficial uses of the receiving water at the edge of its zone of mixing. Concentrations of substances in the discharge must not cause the acute criterion established for the designated beneficial uses of the receiving water to be exceeded. The water quality criteria set forth in §§ 74:51:01:06, 74:51:01:08, 74:51:01:09, and 74:51:01:10 apply within the zone of mixing.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:07, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:07, July 1, 1996; 24 SDR 10, effective July 20, 1997.
General Authority: SDCL 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-10, 34A-2-11.

Cross-References: Laboratory procedures for tests, § 74:51:01:22; Criteria for toxic pollutants, § 74:51:01:55.

74:51:01:27. Lakes not allowed a zone of mixing. No zone of mixing is allowed for lakes. Discharges to lakes must meet the water quality standards at the point of discharge. No discharge of pollutants is allowed which reaches a lake classified for the beneficial use of fish life propagation or causes impairment of an assigned beneficial use.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:08, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR

129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:08, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:28. Water quality-limited streams -- Compliance schedules allowed. Inclusion of schedules of compliance with water quality-based limits and requirements in permits is allowable only for existing discharges where a new or more stringent water quality standard or water quality-based effluent limit is applied. To ensure compliance with applicable water quality standards, schedules of compliance may contain interim limits and establish schedules and conditions by which compliance with final water quality-based effluent limits may be achieved. A date for final compliance is required to be as soon as possible based on reasonable, negotiated estimates of the time required to make the necessary changes (e.g., construction of additional treatment capacity) to the treatment facility. Facilities may also be required to evaluate the possibility of achieving water quality-based limits via nonconstruction changes (e.g., facility operation, best management practices, pollution prevention). Compliance schedules are subject to the certification requirements of §§ 74:51:01:63 to 74:51:01:65, inclusive, if the permit is issued by a federal authority. Compliance schedules may not be issued to a new discharge or a new source.

Source: 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:08.01, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:29. Flow rates for high quality fishery waters. A high-quality fishery water is defined as a stream classified for the beneficial use of coldwater permanent fish life propagation, coldwater marginal fish life propagation, or warmwater permanent fish life propagation. The design low flow for a high-quality fishery is the minimum 7-day average low flow that can be expected to occur once in every 25 years (7Q25). During these low flow periods, the water quality criteria set forth in §§ 74:51:01:45 to 74:51:01:47, inclusive, and in § 74:51:01:56 or 74:51:01:57 do not apply to the water but all surface water discharge permit limits remain in force.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:09, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:09, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11, 34A-2-31.

74:51:01:30. Flow rates for low quality fishery waters. A low-quality fishery water is defined as a stream classified for the beneficial use of warmwater semipermanent fish life propagation or warmwater marginal fish life propagation. The design low flow for a low-quality fishery is the minimum 7-day average low flow that can be expected to occur once in every five years (7Q5) or 1.0 cubic foot per second, whichever is greater. During these low flow periods, the water quality criteria set forth in §§ 74:51:01:48 and 74:51:01:49 do not apply to the water but all surface water discharge permit limits remain in force. If one cubic foot per second is greater than the flow expected to occur once every five years (7Q5), the toxic pollutant standards contained in Appendix B continue to apply to the water to the point where the flow in the stream drops to or below the 7Q5.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:10, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:10, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11, 34A-2-22.

74:51:01:31. Temperature change in fish life propagation waters. There may be no induced temperature change over spawning beds. No discharge or discharges may affect the temperature by more than 4°F in streams classified for the beneficial use of coldwater permanent, coldwater marginal, or warmwater permanent fish life propagation; by more than 5°F in streams classified for the beneficial use of warmwater semipermanent or warmwater marginal fish life propagation; or by more than 3°F in lakes or impoundments classified for the beneficial use of fish life propagation. Exceptions to this criterion may be granted by the board if the discharge will not impair the designated beneficial use of fish life propagation. In addition, the maximum incremental temperature may not exceed 2°F per hour.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:39, effective July 1, 1979; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:39, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:32. Effluent limitations for discharges to trout fishery waters. Effluents discharged from water pollution control facilities into waters classified for the beneficial use of coldwater permanent fish life propagation and coldwater marginal fish life propagation must be of high quality. In order to protect these uses, the effluent may not exceed 10 mg/L of suspended solids and 10 mg/L of 5-day biochemical oxygen demand. The limit for suspended solids must be met at all times based on the results of a 24-hour composited sample. The limit for 5-day biochemical oxygen demand must be met at all times based on the results of any one 24-hour composited sample of the effluent. Neither pollution characteristic may exceed 17.5 mg/L in any one grab sample collected during the sampling period. Facilities that applied for or were issued, before July 1, 1980, a national pollutant discharge elimination system permit to discharge to the reach of the Missouri River from the Big Bend Dam to the North Dakota border are exempt from this section.

Source: SL 1975, ch 16, § 1; 2 SDR 36, effective November 17, 1975; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:45, effective July 1, 1979; 7 SDR 48, effective November 24, 1980; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1989; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:45, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11, 34A-2-13.

74:51:01:33. Exemption of stream segments from fish life propagation categories. Repealed.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:46, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; transferred from § 74:03:02:46, July 1, 1996; repealed, 24 SDR 10, effective July 20, 1997.

74:51:01:34. Antidegradation of waters of the state. The antidegradation policy for this state is as follows:

(1) The existing beneficial uses of surface waters of the state and the level of water quality that is assigned by designated beneficial uses shall be maintained and protected;

(2) Surface waters of the state in which the existing water quality is better than the minimum levels prescribed by the designated beneficial use shall be maintained and protected at that higher quality level;

(3) The board, or secretary, may allow a lowering of the water quality to levels established under the designated beneficial use if it is necessary in order to accommodate important economic or social development in the area in which the waters are located;

(4) Surface waters of the state which do not meet the levels of water quality assigned to the designated beneficial use shall be improved as feasible to meet those levels;

(5) No further reduction of water quality may be allowed for surface waters of the state that do not meet the water quality levels assigned to their designated beneficial uses as a result of natural causes or conditions, and all new discharges must meet applicable water quality standards; and

(6) The secretary shall assure that regulatory requirements are achieved for all new and existing point sources and that nonpoint sources are controlled through cost effective and reasonable best management practices.

Source: 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:49, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-22, 34A-2-24, 34A-2-26.

74:51:01:35. Antidegradation of water quality review for existing point source discharges to waters of the state. All surface water discharge permits, at the time of renewal, shall undergo an antidegradation of water quality review by the secretary unless any one of the following situations applies:

(1) The existing facility is operating at or below design flows and pollutant loadings;

(2) The existing effluent quality is in compliance with all of the discharge permit limits;

(3) The existing discharge permittee was discharging to the current stream segment prior to March 27, 1973, and the quality and quantity of the discharge has not degraded the water quality of that segment as it existed on March 27, 1973;

(4) The existing discharge permittee, with department approval, has upgraded or built new wastewater treatment facilities between March 27, 1973, and July 1, 1988; or

(5) The existing discharge permittee discharges to a receiving water assigned only the beneficial uses of fish and wildlife propagation, recreation, and stock watering and irrigation and the discharge is not expected to contain toxic pollutants in concentrations that may cause an impact to the receiving stream. This exemption does not apply to discharges that will cause any adverse impacts to downstream segments that are of higher quality.

Source: 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:50, July 1, 1996; 24 SDR 10, effective July 20, 1997; 25 SDR 98, effective January 27, 1999.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-22.

74:51:01:36. Antidegradation of water quality review for new, potential point source discharges to waters of the state. New surface water discharge permit applications shall undergo an antidegradation of water quality review by the secretary prior to permit issuance. New surface water discharge permit applications are exempt from this section if the receiving water for the discharge is assigned only the beneficial uses of fish and wildlife propagation, recreation, and stock watering and irrigation and the discharge will not cause any adverse impacts to any downstream segment classified as a higher designated use.

Source: 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:51, July 1, 1996; 24 SDR 10, effective July 20, 1997; 25 SDR 98, effective January 27, 1999.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-22.

74:51:01:37. Antidegradation of water quality review for thermal discharges to waters of the state. In situations with potential for water quality impairment associated with a thermal discharge, any antidegradation water quality review must be consistent with § 316 of the Federal Water Pollution Control Act as amended to February 4, 1987.

Source: 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:52, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-22.

74:51:01:37.01. Antidegradation review public notice requirements. For any discharge for which an antidegradation review is required by this chapter, the secretary shall allow for intergovernmental coordination and public participation by providing a public notice of the secretary's recommendation and findings in a daily or weekly newspaper which serves the affected area. The public notice shall follow the requirements of § 74:52:05:13. If a petition in accordance with chapter 74:50:02 contesting the secretary's recommendation is received by the department, a contested case hearing shall be held before the board. If the recommendation is not contested, that recommendation shall become the final determination on the review.

Source: 24 SDR 10, effective July 20, 1997.
General Authority: SDCL 34A-2-11, 34A-2-93, 34A-2-113.
Law Implemented: SDCL 34A-2-22.

74:51:01:38. Antidegradation of water quality review for nonpoint source discharges to waters of the state. Nonpoint sources shall be reviewed as feasible by the board. Nonpoint source discharges shall be controlled utilizing cost-effective methods and reasonable best management practices.

Source: 14 SDR 86, effective December 24, 1987; transferred from § 74:03:02:53, July 1, 1996.
General Authority: SDCL 34A-2-93.
Law Implemented: SDCL 34A-2-22.

74:51:01:39. Outstanding state resource waters. Surface waters of the state that are of high quality or are of exceptional recreational or ecological significance may be designated by the board as outstanding state resource waters. If high quality waters constitute an outstanding state resource water, that water quality shall be maintained and protected. Anyone wishing to nominate outstanding state resource waters shall follow petition requirements outlined in SDCL 1-26-13.

Source: 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:54, July 1, 1996; 24 SDR 10, effective July 20, 1997.
General Authority: SDCL 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-11, 34A-2-22.

74:51:01:40. Variations allowed in parameters found in samples. Repealed

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:32, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:32, July 1, 1996; repealed, 24 SDR 10, effective July 20, 1997.

74:51:01:41. Application of chronic/acute criteria. Acute and chronic criteria established under § 74:51:01:55 and as translated by Appendix B at the end of this chapter shall be applied as follows:

(1) Compliance with the chronic criteria or criteria continuous concentration (CCC) is based on the results of a 30-day average. Compliance with CCC in a surface water discharge permit may be based on grab or composite samples;

(2) Compliance with the acute criteria or criteria maximum concentration (CMC) is based on the results of any one grab sample. However, compliance with CMC in a surface water discharge permit may be based on a composite sample.

Source: 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:32.01, July 1, 1996; 24 SDR 10, effective July 20, 1997.
General Authority: SDCL 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-7, 34A-2-11, 34A-2-21.

Cross-References: Criteria for toxic pollutants, § 74:51:01:55.

74:51:01:42. Beneficial uses of waters established. The beneficial use classifications of surface waters of the state established in this section do not limit the actual use of such waters. The classifications designate the minimum quality at which the surface waters of the state are to be maintained and protected. The following are the beneficial use classifications:

(1) Domestic water supply waters;
(2) Coldwater permanent fish life propagation waters;
(3) Coldwater marginal fish life propagation waters;
(4) Warmwater permanent fish life propagation waters;
(5) Warmwater semipermanent fish life propagation waters;
(6) Warmwater marginal fish life propagation waters;
(7) Immersion recreation waters;
(8) Limited contact recreation waters;
(9) Fish and wildlife propagation, recreation, and stock watering waters;
(10) Irrigation waters; and
(11) Commerce and industry waters.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:30, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:30, July 1, 1996; 25 SDR 98, effective January 27, 1999.
General Authority: SDCL 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-10, 34A-2-11.

Cross-References:
Beneficial uses of lakes indicated by listings, § 74:51:02:03.
Beneficial uses of streams indicated by listings, § 74:51:03:02.
Antidegradation standards, §§ 74:51:01:34 to 74:51:01:39, inclusive.

74:51:01:43. Missouri River impoundments classified as streams. For the purposes of chapters 74:51:01 to 74:51:03, inclusive, the Missouri River impoundments are classified as flowing streams and not as reservoirs.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:31, effective July 1, 1979; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:31, July 1, 1996.
General Authority: SDCL 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:44. Criteria for domestic water supply waters. The criteria of parameters for domestic water supply waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table:

Parameter	Criteria	Unit of Measure	Special Conditions
Total dissolved solids	≤1,000	mg/L	30-day average
	≤1,750	mg/L	daily maximum
Nitrates as N	≤10	mg/L	

pH	≥6.5 - ≤9.0	units	
Total Coliform	≤5,000	/100 mL	geometric mean of a minimum of 5 samples during separate 24-hour periods for a 30-day period and may not exceed this value in more than 20 percent of the samples examined in the same 30-day period
	≤20,000	/100 mL	in any one sample
Barium	≤1.0	mg/L	
Chloride	≤250	mg/L	30-day average
	≤438	mg/L	daily maximum
Fluoride	≤4.0	mg/L	
Sulfate	≤500	mg/L	30-day average
	≤875	mg/L	daily maximum
Total Petroleum Hydrocarbons	≤1.0	mg/L	

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:33, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:33, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:45. Criteria for coldwater permanent fish life propagation waters. The criteria of parameters for coldwater permanent fish life propagation waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table:

Parameter	Criteria	Unit of Measure	Special Conditions
Un-ionized ammonia nitrogen as N	≤0.02	mg/L	30-day average
	≤1.75 times the applicable criterion in Appendix A	mg/L	daily maximum
Chlorides	≤100	mg/L	30-day average
	≤175	mg/L	daily maximum
Dissolved oxygen	≥6.0	mg/L	
	≥7.0		in spawning areas during the spawning season
Undisassociated hydrogen sulfide	≤0.002	mg/L	
pH	≥6.6 - ≤8.6	units	see § 74:51:01:07
Total Suspended Solids	≤30	mg/L	30-day average
	≤53	mg/L	daily maximum
Temperature	≤65	°F	see § 74:51:01:31

For special effluent limitations related to coldwater fisheries, see § 74:51:01:32.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; 5 SDR 21, effective September 21, 1978; transferred from § 34:04:02:34, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:34, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:46. Criteria for coldwater marginal fish life propagation waters. The criteria of parameters for coldwater semipermanent fish life propagation waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table:

Parameter	Criteria	Unit of Measure	Special Conditions
Un-ionized ammonia nitrogen as N	≤0.02	mg/L	30-day average
	≤1.75 times the applicable criterion in Appendix A	mg/L	daily maximum
Dissolved oxygen	≥5.0	mg/L	
Undisassociated hydrogen sulfide	≤0.002	mg/L	
pH	≥6.5 - ≤8.8	units	see § 74:51:01:07
Total Suspended Solids	≤90	mg/L	30-day average
	≤158	mg/L	daily maximum
Temperature	≤75	°F	see § 74:51:01:31

For special effluent limitations related to coldwater fisheries, see § 74:51:01:32.

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; 5 SDR 21, effective September 21, 1978; transferred from § 34:04:02:35, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:35, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:47. Criteria for warmwater permanent fish life propagation waters. The criteria of parameters for warmwater permanent fish life propagation waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table:

Parameter	Criteria	Unit of Measure	Special Conditions
Un-ionized ammonia nitrogen as N	≤0.04	mg/L	30-day average
	≤1.75 times the applicable criterion in Appendix A	mg/L	daily maximum
Dissolved oxygen	>5.0	mg/L	
	≥6.0		in Big Stone Lake

			and Lake Traverse during April and May
Undisassociated hydrogen sulfide	≤0.002	mg/L	
pH	≥6.5 - ≤9.0	units	see § 74:51:01:07
Total Suspended Solids	≤90	mg/L	30-day average
	≤158	mg/L	daily maximum
Temperature	≤80	°F	see § 74:51:01:31

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; 5 SDR 21, effective September 21, 1978; transferred from § 34:04:02:36, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:36, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:48. Criteria for warmwater semipermanent fish life propagation waters. The criteria of parameters for warmwater semipermanent fish life propagation waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table:

Parameter	Criteria	Unit of Measure	Special Conditions
Un-ionized ammonia nitrogen as N	≤0.04	mg/L	30-day average
	≤1.75 times the applicable criterion in Appendix A	mg/L	daily maximum
Dissolved oxygen	≥5.0	mg/L	
Undisassociated hydrogen sulfide	≤0.002	mg/L	
pH	≥6.5 - ≤9.0	units	see § 74:51:01:07
Total Suspended Solids	≤90	mg/L	30-day average
	≤158	mg/L	daily maximum
Temperature	≤90	°F	see § 74:51:01:31

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; 5 SDR 21, effective September 21, 1978; transferred from § 34:04:02:37, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:37, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:49. Criteria for warmwater marginal fish life propagation waters. The criteria for warmwater marginal fish life propagation waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table:

Parameter	Criteria	Unit of Measure	Special Conditions
Un-ionized ammonia nitrogen as N	≤0.05	mg/L	30-day average
	≤1.75 times the applicable	mg/L	daily maximum

	criterion in Appendix A		
Dissolved oxygen	≥4.0	mg/L	
Undisassociated hydrogen sulfide	≤0.002	mg/L	
pH	≥6.0 - ≤9.0	units	see § 74:51:01:07
Total Suspended Solids	≤150	mg/L	30-day average
	≤263	mg/L	daily maximum
Temperature	≤90	°F	see § 74:51:01:31

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; 5 SDR 21, effective September 21, 1978; transferred from § 34:04:02:38, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:38, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:50. Criteria for immersion recreation waters. The criteria of parameters for immersion recreation waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table:

Parameter	Criteria	Unit of Measure	Special Conditions
Dissolved oxygen	≥5.0	mg/L	
Fecal coliform (May 1 – September 30)	≤200	/100 mL	geometric mean based on a minimum of 5 samples obtained during separate 24-hour periods for any 30-day period, and they may not exceed this value in more than 20 percent of the samples examined in this same 30-day period
	≤400		in any one sample

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:40, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:40, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:51. Criteria for limited contact recreation waters. The criteria of parameters for limited contact recreation waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table:

Parameter	Criteria	Unit of Measure	Special Conditions
Dissolved oxygen	≥5.0	mg/L	
Fecal coliform (May 1 – September 30)	≤1,000	/100 mL	geometric mean based on a minimum of 5 samples obtained during separate 24-hour periods

			for any 30-day period, and they may not exceed this value in more than 20 percent of the samples examined in this same 30-day period
	≤2,000		in any one sample

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:41, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:41, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:52. Criteria for fish and wildlife propagation, recreation, and stock watering waters. The criteria of parameters for fish and wildlife propagation, recreation, and stock watering waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table:

Parameter	Criteria	Unit of Measure	Special Conditions
Total alkalinity as calcium carbonate	≤750	mg/L	30-day average
	≤1313	mg/L	daily maximum
Total dissolved solids	≤2,500	mg/L	30-day average
	≤4,375	mg/L	daily maximum
Conductivity at 25°C	≤4,000	micromhos/cm	30-day average
	≤7,000	micromhos/cm	daily maximum
Nitrates as N	≤50	mg/L	30-day average
	≤88	mg/L	daily maximum
pH	≥6.0 - ≤9.5	units	see § 74:51:01:07
Total petroleum hydrocarbon	≤10	mg/L	see § 74:51:01:10
Oil and grease	≤10	mg/L	see § 74:51:01:10

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:42, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:42, July 1, 1996; 24 SDR 10, effective July 20, 1997; 25 SDR 98, effective January 27, 1999.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:53. Criteria for irrigation waters. The criteria of parameters for irrigation waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table:

Parameter	Criteria	Unit of Measure	Special Conditions
Conductivity at 25°C	≤2,500	micromhos/cm	30-day average
	≤4,375	micromhos/cm	daily maximum
Sodium adsorption ratio	≤10		see definition

Source: SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:43, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:43, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:54. Criteria for commerce and industry waters. The criteria of parameters for commerce and industry waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table:

Parameter	Criteria	Unit of Measure	Special Conditions
Total dissolved solids	≤2,000	mg/L	30-day average
	≤3,500	mg/L	daily maximum
pH	≥6.0 - ≤9.5	units	see § 74:51:01:07

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:44, effective July 1, 1979: 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:44, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:55. Criteria for toxic pollutants. Toxic pollutants at levels which are or may become injurious to public health, safety, or welfare; plant, aquatic, and animal life; or the existing or designated uses of waters may not be present in the surface waters of the state. The toxic pollutants to which this section applies are the priority pollutants and chemicals in 40 C.F.R. Part 131 (July 1, 1995) and any other toxic pollutants or substances determined by the secretary to be of concern at a specific site. Appendix B at the end of this chapter lists the priority pollutants and chemicals for which specific numerical criteria have been adopted by the board.

The levels of toxic pollutants allowed in surface waters shall be determined by the secretary in accordance with the chronic/acute criteria levels specified for human health and aquatic life in the **EPA-Quality Criteria for Water,** 1986 document, 40 C.F.R. Part 131 (July 1, 1995) and as translated in Appendix B. The secretary shall use a one-in-a-million (10^{-6}) risk level when determining applicable human health criteria.

Upon written request, the board may determine allowable levels of toxic pollutants in surface waters of the state in accordance with § 74:51:01:23 or 74:51:01:24, after opportunity for public review and comment. If a numerical criterion has been established for a toxic pollutant in §§ 74:51:01:31, 74:51:01:32, and 74:51:01:44 to 74:51:01:54, inclusive, and in § 74:51:01:56 or 74:51:01:57, the provisions of this section do not apply to that substance. Toxic pollutants identified in and allowed by §§ 74:51:01:58 and 74:51:01:59 for water resource enhancement or restoration projects are exempt from the provisions of this section.

Source: SL 1975, ch 16, § 1; transferred from § 34:04:02:14, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 16 SDR 196, effective May 23, 1990; 18

SDR 128, effective February 11, 1992; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:14, July 1, 1996; 24 SDR 10, effective July 20, 1997; 25 SDR 98, effective January 27, 1999.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

Reference: EPA-Quality Criteria for Water, 1986, Stock Number EPA 440/5-86-001, May 1987, U.S. Environmental Protection Agency. Copies are available from the U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20401. The cost is $23.

Cross-References: Toxic pollutant criteria, Appendix B, ch 74:51:01; Protection of wetlands as waters of the state, § 74:51:01:11.

74:51:01:56. Site-specific criteria for Whitewood Creek from Interstate 90 to its confluence with Gold Run Creek. In addition to the criteria of parameters for the beneficial uses assigned in § 74:51:03:10 to the segment of Whitewood Creek from Interstate 90 to its confluence with Gold Run Creek and their allowable variations as listed in § 74:51:01:55, Appendix B, § 74:51:01:46 and §§ 74:51:01:50 to 74:51:01:53, inclusive, the following site-specific criteria are established for this segment:

Parameter	30-day average (ug/L)
Cyanide - weak acid dissociable (WAD)	80
Cadmium, total recoverable	10
Copper, total recoverable	80
Lead, total recoverable	70
Mercury, total recoverable	0.8
Silver, total recoverable	20

For the Lead-Deadwood Sanitary District, as of July 1, 1988, effluent quality for total suspended solids may not exceed 18 mg/L as a 30-day average and effluent quality for 5-day biochemical oxygen demand may not exceed 10 mg/L as a 30-day average. For Homestake Mining Company, as of December 1, 1987, effluent quality for total suspended solids may not exceed 10 mg/L as a 30-day average. In accordance with the statements in this section, the existing national pollutant discharge elimination system permittees in this segment are exempt from the total suspended solids limits and 5-day biochemical oxygen demand limits contained in § 74:51:01:32.

Source: 14 SDR 86, effective December 24, 1987; 18 SDR 169, effective April 12, 1992; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:48, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

Cross-References: Modification of criteria for specific sites, § 74:51:01:24; Effluent limitations for discharges to trout fishery waters, § 74:51:01:32.

74:51:01:57. Site-specific criteria for Whitetail Creek from Whitewood Creek to the stream gauging station on the Kirk Power Plant road. In addition to the criteria of parameters for the beneficial uses assigned in § 74:51:03:10 to the segment of Whitetail Creek from Whitewood Creek to Section 18, T4N, R3E, and their allowable

variations as listed in § 74:51:01:45 and §§ 74:51:01:50 to 74:51:01:53, inclusive, the following site-specific criteria are established for the segment of Whitetail Creek from Whitewood Creek to the stream gauging station on the Kirk Power Plant road:

(1) Total recoverable silver may not exceed 0.0046 mg/L as a 30-day average;

(2) Total recoverable mercury may not exceed 0.0008 mg/L as a 30-day average; and

(3) For the Black Hills Power and Light Company, Kirk Power Plant, as of April 1, 1990, effluent quality for total suspended solids may not exceed 10 mg/L as a 30-day average and 30 mg/L as a daily maximum. The Black Hills Power and Light Company, Kirk Power Plant, is exempt from the total suspended solids limitations contained in § 74:51:01:32.

Source: 16 SDR 196, effective May 23, 1990; transferred from § 74:03:02:48.01, July 1, 1996.
General Authority: SDCL 34A-2-93.
Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:58. Water resource enhancement or restoration projects -- Use of toxic pollutants. Toxic pollutants established under §§ 74:51:01:32 and 74:51:01:44 to 74:51:01:55, inclusive, may be present in surface waters of the state for the purpose of water resource enhancement or restoration if the overall goals of the project justify the short-term detriment.

Source: 18 SDR 128, effective February 11, 1992; 19 SDR 111, effective January 31, 1993; requirements for use of EPA-registered pesticides transferred to § 74:03:02:47.01.01, 21 SDR 214, effective June 21, 1995; transferred from § 74:03:02:47.01, July 1, 1996.
General Authority: SDCL 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:59. Water resource enhancement or restoration projects -- Use of EPA-registered pesticides. The use of EPA-registered pesticides in accordance with the individual label requirements specifying handling and application to aquatic sites is presumed not to cause long-term damage to the environment. The application of all registered pesticides must comply with SDCL chapter 38-21, 7 U.S.C.A. § 136 et seq. (October 25, 1988), and §§ 74:51:01:03 and 74:51:01:60. This section does not exempt any person from the penalty provisions of SDCL 34A-2-75 if misapplication results in impairment of a designated beneficial use.

Source: Transferred from § 74:03:02:47.01, 21 SDR 214, effective June 21, 1995; transferred from § 74:03:02:47.01.01, July 1, 1996.
General Authority: SDCL 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:60. Water resource enhancement or restoration projects -- Department approval required. Projects designed to enhance or restore overall water quality or beneficial uses may include application of registered pesticides for elimination of nuisance aquatic life, including algae, weeds, and undesirable fish life; furtherance of fish and wildlife research projects; and removal of accumulated sediment. The secretary

may allow these projects after review and approval of a written project plan and after opportunity for public review and comment if this is required pursuant to § 74:51:01:61. The project plan shall be submitted on a form provided by the department and shall contain the following information:

(1) Name and address of responsible party;
(2) Project goals and purpose;
(3) Project description;
(4) Legal location of project;
(5) Bodies of water affected;
(6) Estimated date and duration of project;
(7) Methods implemented to minimize pollution;
(8) Other alternatives available and reasons for rejection;
(9) Name and label of product to be used;
(10) Application rates;
(11) Application methods; and
(12) Surfactant toxicity information, if available.

If applicable, the applicant shall provide the department proof of application to or authorization from the South Dakota Department of Game, Fish and Parks under the provisions of SDCL 41-13-1 and 41-13-2 and of 41-12-13. The applicant shall provide the department proof of notification to the local emergency planning committee for projects that include the use of a registered pesticide.

Source: 18 SDR 128, effective February 11, 1992; 19 SDR 111, effective January 31, 1993; 21 SDR 214, effective June 21, 1995; transferred from § 74:03:02:47.02, July 1, 1996; 24 SDR 10, effective July 20, 1997.
General Authority: SDCL 34A-2-11, 34A-2-93.
Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:61. Publication of notice of application for water resource enhancement or restoration projects -- Exception for registered pesticides. The applicant shall publish notice of application for approval of the proposed water resource enhancement or restoration project in one newspaper which serves the affected area. The secretary shall provide the notice and shall approve or select the official newspaper. The notice shall be published at least 10 days before the start of the proposed project. The notice shall include a summary of the proposed activity and the secretary's recommendation. If no comments are received within the 10-day notice period, the secretary shall approve or deny the plan in accordance with the secretary's recommendation as published in the notice. The cost of publication is the responsibility of the applicant.

A water restoration or enhancement project that includes the application of a registered pesticide only is not subject to the notice requirements of this section if all of the following criteria are met:

(1) The registered pesticide will not be applied within one-half mile of a well or surface intake used as a public water supply source;

(2) The registered pesticide will be applied only to surface waters of the state that are not designated for the beneficial use of immersion recreation and limited contact recreation; and

(3) The project will not affect more than 70 percent of the aquatic vegetation existing before the first application as approved by the secretary.

Source: 18 SDR 128, effective February 11, 1992; 21 SDR 214, effective June 21, 1996; transferred from § 74:03:02:47.03, July 1, 1996; 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

Cross-Reference: Legal newspapers and publication of notice, SDCL chapter 17-2.

74:51:01:62. Hearing procedure for water resource enhancement or restoration projects. If any water resource enhancement or restoration project that requires public notice is contested in writing, the board shall hold a hearing pursuant to chapter 74:50:02. Based on the record of the hearing, the board shall approve the project if the board determines the overall goals of the project justify any short-term detriments and it is in the public interest.

Source: 18 SDR 128, effective February 11, 1992; 21 SDR 214, effective June 21, 1995; transferred from § 74:03:02:47.04, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-93.

Law Implemented: SDCL 34A-2-10, 34A-2-11.

74:51:01:63. Application requirements for certification of compliance with water quality standards. An applicant for a federal permit or license to conduct an activity, including the construction or operation of facilities, which may result in a discharge of pollutants into surface waters of the state must receive certification of compliance with water quality standards from the secretary. A copy of the federal project application as submitted by the applicant or the responsible federal agency shall serve as request for certification. If the contents of the federal application do not provide adequate information to determine compliance with applicable water quality standards, the secretary may request any additional information required to determine compliance, including the following:

(1) The name and address of the applicant;

(2) A description of the activity to be performed, including the amount, duration, and potential impacts of any discharges to surface waters of the state;

(3) A description of the uses of the surface waters of the state within a one-quarter mile radius of the affected area;

(4) A description of any monitoring to be conducted prior to, during, and following the activity to assess impacts on water quality;

(5) A description of the present water quality in the affected area;

(6) A list and description of processes and operating procedures conducted by the permittee to reduce or eliminate impacts on water quality;

(7) The date or dates that the activity will begin and end, if known, and the date or dates that a discharge will occur; and

(8) A plan to avoid, minimize, or compensate for any adverse impacts directly attributable to the project, including changes in or reduction of:

(a) Channel length or width;
(b) Flood storage;
(c) Riparian habitat;
(d) Hydrology;
(e) Acreage; or
(f) Biological community.

Source: 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:55, July 1, 1996.
General Authority: SDCL 34A-2-11, 34A-2-33, 34A-2-34, 34A-2-93.
Law Implemented: SDCL 34A-2-33, 34A-2-34.

Cross-Reference: State certification of activities requiring a federal license or permit, 40 C.F.R. § 121 (July 1, 1995).

74:51:01:64. Notice requirements for certification of compliance with water quality standards for hydropower facilities. The secretary shall ensure that public notice of any proposed actions for water quality certification for hydropower facilities regulated by the Federal Energy Regulatory Commission is provided either by the responsible federal agency or by the department. The public notice for hydropower facilities will follow requirements in § 74:52:05:13 and shall be published in a daily or weekly newspaper which serves the affected area.

Source: 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; 21 SDR 18, effective August 8, 1994; transferred from § 74:03:02:56; July 1, 1996, 24 SDR 10, effective July 20, 1997.
General Authority: SDCL 34A-2-11, 34A-2-33, 34A-2-34, 34A-2-93.
Law Implemented: SDCL 34A-2-33, 34A-2-34.

Cross-Reference: State certification of activities requiring a federal license or permit, 40 C.F.R. § 121 (July 1, 1995).

74:51:01:64.01. Notice requirements for certification of compliance with water quality standards for dredge and fill permits. The secretary shall ensure that public notice of any proposed actions for water quality certification under § 404 of the Federal Water Pollution Control Act as amended to February 4, 1987, is provided either by the responsible federal agency or by the department. The public notice for dredge and fill activities must be distributed for posting in post offices or other public places in the county of the site of the proposed project. The public notice shall be sent to the applicant, to applicable city and county officials, to adjoining property owners, and to applicable state and federal agencies. Copies of the public notice shall be sent to all parties requesting copies.

Source: 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; 21 SDR 18, effective August 8, 1994; transferred from § 74:51:01:64, 24 SDR 10, effective July 20, 1997.

General Authority: SDCL 34A-2-11, 34A-2-33, 34A-2-34, 34A-2-93.
Law Implemented: SDCL 34A-2-33, 34A-2-34.

Cross-Reference: State certification of activities requiring a federal license or permit, 40 C.F.R. § 121 (July 1, 1995).

74:51:01:64.02. Notice requirements for certification of compliance with water quality standards for federal issued national pollutant discharge elimination system permits. The secretary shall ensure that public notice of any proposed actions for water quality certification for national pollutant discharge elimination system permits issued by the EPA, under § 402 of the Federal Water Pollution Control Act as amended to February 4, 1987, is provided either by the responsible federal agency or by the department. The public notice for federal issued national pollutant discharge elimination system permits shall follow requirements in § 74:52:05:13 and shall be published in a daily or weekly newspaper which serves the affected area.

Source: 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; 21 SDR 18, effective August 8, 1994; transferred from § 74:51:01:64, 24 SDR 10, effective July 20, 1997.
General Authority: SDCL 34A-2-11, 34A-2-33, 34A-2-34, 34A-2-93.
Law Implemented: SDCL 34A-2-33, 34A-2-34.

Cross-Reference: State certification of activities requiring a federal license or permit, 40 C.F.R. § 121 (July 1, 1995).

74:51:01:64.03. Contents of public notice for certification of compliance with water quality standards. At a minimum, the public notice required in §§ 74:51:01:64 to 74:51:01:64.02, inclusive, must include the following:

(1) A brief description of the proposed activity and a summary of the application information required in the application;

(2) A period of time, at least 15 days from the date of mailing, within which interested parties may express their views concerning the permit application; and

(3) A statement that any person may request, in writing, within the comment period specified in the notice, that a public hearing pursuant to chapter 74:50:02 be held to consider the application. Requests for public hearings must state the reasons for holding a public hearing.

Source: 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; 21 SDR 18, effective August 8, 1994; transferred from § 74:51:01:64, 24 SDR 10, effective July 20, 1997.
General Authority: SDCL 34A-2-11, 34A-2-33, 34A-2-34, 34A-2-93.
Law Implemented: SDCL 34A-2-33, 34A-2-34.

Cross-Reference: State certification of activities requiring a federal license or permit, 40 C.F.R. § 121 (July 1, 1995).

74:51:01:65. Secretary's certification of compliance with water quality standards. The certification of the secretary that water quality standards are protected shall include the conditions which are necessary to assure compliance with the provisions

of this chapter and a statement that there is a reasonable assurance that the activity will be conducted in a manner which will not violate applicable water quality standards. The secretary shall provide certification or denial of certification to the applicant within 60 working days after receipt of the complete application.

If the secretary fails to issue certification within the 60 working days after receipt of the application or fails to submit to the responsible federal agency a written request to allow an extension of time for a determination, the applicant may consider water quality certification to be waived. The secretary may expressly waive in writing the authority to act on the request for certification.

Source: 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 4:03:02:57, July 1, 1996.

General Authority: SDCL 34A-2-11, 34A-2-33, 34A-2-34, 34A-2-93.

Law Implemented: SDCL 34A-2-33, 34A-2-34.

Cross-Reference: State certification of activities requiring a federal license or permit, 40 C.F.R. § 121 (July 1, 1995).

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

WATER POLLUTION CONTROL PROGRAM

UN-IONIZED AMMONIA CRITERIA TABLES

Chapter 74:51:01

APPENDIX A

SEE: § 74:51:01:22

Source: Effective November 14, 1980; transferred from Chapter 74:03:02, Appendix A, July 1, 1996; transferred from Chapter 74:51:01, Appendix C, 24 SDR 10, effective July 20, 1997.

Instructions for use of this table to:

A. **Determine the amount of un-ionized ammonia in a sample.** Measure the pH, temperature in degrees centigrade, and total ammonia (as N) in mg/L as specified in Standard Methods. Find the temperature of the sample in the table and then the pH. Read the % un-ionized value from the line which contains both the temperature and pH of the sample and multiply that value times the total ammonia value from the sample. The number determined is the amount of un-ionized ammonia in the sample in mg/L (as N).

B. **Determine the amount of total ammonia which contains 0.02 mg/L un-ionized ammonia (as N).** Find the line in the table which contains both the temperature in degrees centigrade and the pH of the condition you are interested in. The number in the third column from the right of the same line is the amount of total ammonia (as N) in mg/L which contains 0.02 mg/L un-ionized ammonia (as N).

C. **Determine the amount of total ammonia which contains 0.04 mg/L un-ionized ammonia (as N).** Find the line in the table which contains both the temperature in degrees centigrade and the pH of the condition you are interested in. The number in the second column from the right of the same line is the amount of total ammonia (as N) in mg/L which contains 0.04 mg/L un-ionized ammonia (as N).

D. **Determine the amount of total ammonia which contains 0.05 mg/L un-ionized ammonia (as N).** Find the line in the table which contains both the temperature in degrees centigrade and the pH of the condition you are interested in. The number in the right hand column of the same line is the amount of total ammonia (as N) in mg/L which contains 0.05 mg/L un-ionized ammonia (as N).

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
0.0	5.0	0.000827	2490.16	4980.31	6225.38
0.0	5.1	0.001041	1978.01	3956.01	4945.01
0.0	5.2	0.001310	1571.19	3142.38	3927.98
0.0	5.3	0.001650	1248.05	2496.10	3120.12
0.0	5.4	0.002077	991.37	1982.73	2478.41
0.0	5.5	0.002615	787.48	1574.95	1968.69
0.0	5.6	0.003292	625.52	1251.04	1563.80
0.0	5.7	0.004144	496.87	993.74	1242.18
0.0	5.8	0.005217	394.69	789.37	986.71
0.0	5.9	0.006567	313.52	627.03	783.78
0.0	6.0	0.008268	249.04	498.07	622.59
0.0	6.1	0.010408	197.82	395.64	494.55
0.0	6.2	0.013103	157.14	314.28	392.85
0.0	6.3	0.016495	124.83	249.65	312.06
0.0	6.4	0.020765	99.16	198.31	247.89
0.0	6.5	0.026140	78.77	157.53	196.92
0.0	6.6	0.032906	62.57	125.14	156.43
0.0	6.7	0.041423	49.71	99.41	124.27
0.0	6.8	0.052143	39.49	78.98	98.72
0.0	6.9	0.065635	31.37	62.74	78.43
0.0	7.0	0.082616	24.93	49.85	62.31
0.0	7.1	0.103985	19.80	39.60	49.50
0.0	7.2	0.130874	15.74	31.47	39.33
0.0	7.3	0.164704	12.50	25.00	31.25
0.0	7.4	0.207262	9.94	19.87	24.84
0.0	7.5	0.260785	7.90	15.79	19.74
0.0	7.6	0.328089	6.28	12.55	15.69
0.0	7.7	0.412688	4.99	9.98	12.74
0.0	7.8	0.518988	3.97	7.93	9.92
0.0	7.9	0.652490	3.16	6.31	7.89
0.0	8.0	0.820050	2.51	5.02	6.28
0.0	8.1	1.030192	2.00	4.00	5.00
0.0	8.2	1.293483	1.59	3.18	3.98
0.0	8.3	1.622961	1.27	2.54	3.17
0.0	8.4	2.034634	1.01	2.02	2.53
0.0	8.5	2.548025	0.81	1.62	2.02
0.0	8.6	3.186747	0.65	1.29	1.62
0.0	8.7	3.979038	0.52	1.03	1.29
0.0	8.8	4.958222	0.42	0.83	1.04
0.0	8.9	6.162909	0.34	0.67	0.84
0.0	9.0	7.636765	0.27	0.54	0.67
0.0	9.1	9.427686	0.22	0.44	0.55
0.0	9.2	11.585917	0.18	0.36	0.44
0.0	9.3	14.160975	0.15	0.29	0.36
0.0	9.4	17.197037	0.12	0.24	0.30
0.0	9.5	20.726852	0.10	0.20	0.25
0.0	9.6	24.764496	0.09	0.17	0.21
0.0	9.7	29.297974	0.07	0.14	0.18
0.0	9.8	34.283218	0.06	0.12	0.15
0.0	9.9	39.641113	0.05	0.10	0.13
0.0	10.0	45.259674	0.05	0.09	0.11
0.0	10.1	51.001709	0.04	0.08	0.10

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
0.5	5.0	0.000862	2387.66	4775.31	5969.14
0.5	5.1	0.001085	1896.59	3793.18	4741.47
0.5	5.2	0.001367	1506.52	3013.04	3766.30
0.5	5.3	0.001721	1198.18	2396.36	2991.70
0.5	5.4	0.002166	950.57	1901.13	2376.40
0.5	5.5	0.002727	755.06	1510.12	1887.66
0.5	5.6	0.003433	599.77	1199.54	1499.43
0.5	5.7	0.004322	476.42	952.84	1191.05
0.5	5.8	0.005441	378.44	756.88	946.10
0.5	5.9	0.006849	300.61	601.22	751.52
0.5	6.0	0.008623	238.79	477.57	596.97
0.5	6.1	0.010855	189.68	379.36	474.20
0.5	6.2	0.013665	150.67	301.34	376.68
0.5	6.3	0.017203	119.69	239.37	299.22
0.5	6.4	0.021656	95.08	190.15	237.69
0.5	6.5	0.027262	75.53	151.05	188.81
0.5	6.6	0.034319	60.00	119.99	149.99
0.5	6.7	0.043201	47.66	95.32	119.15
0.5	6.8	0.054380	37.86	75.72	94.66
0.5	6.9	0.068451	30.08	60.16	75.20
0.5	7.0	0.086159	23.90	47.79	59.74
0.5	7.1	0.108444	18.99	37.97	47.47
0.5	7.2	0.136484	15.09	30.17	37.71
0.5	7.3	0.171762	11.99	23.97	29.97
0.5	7.4	0.216140	9.53	19.05	23.82
0.5	7.5	0.271951	7.57	15.14	18.93
0.5	7.6	0.342125	6.02	12.04	15.05
0.5	7.7	0.430328	4.79	9.57	11.96
0.5	7.8	0.541147	3.81	7.61	9.51
0.5	7.9	0.680310	3.03	6.05	7.57
0.5	8.0	0.844952	2.41	4.82	6.02
0.5	8.1	1.073941	1.92	3.83	4.79
0.5	8.2	1.348261	1.53	3.05	3.82
0.5	8.3	1.691453	1.22	2.43	3.04
0.5	8.4	2.120125	0.97	1.94	2.43
0.5	8.5	2.654503	0.78	1.55	1.94
0.5	8.6	3.319004	0.62	1.24	1.55
0.5	8.7	4.142772	0.50	0.99	1.24
0.5	8.8	5.160087	0.40	0.80	0.99
0.5	8.9	6.410506	0.32	0.64	0.80
0.5	9.0	7.938571	0.26	0.52	0.65
0.5	9.1	9.792766	0.21	0.42	0.53
0.5	9.2	12.022379	0.17	0.34	0.43
0.5	9.3	14.679641	0.14	0.28	0.35
0.5	9.4	17.803833	0.12	0.23	0.29
0.5	9.5	21.425964	0.10	0.19	0.24
0.5	9.6	25.555908	0.08	0.16	0.20
0.5	9.7	30.176147	0.07	0.14	0.17
0.5	9.8	35.236343	0.06	0.12	0.15
0.5	9.9	40.651062	0.05	0.10	0.13
0.5	10.0	46.302963	0.05	0.09	0.11
0.5	10.1	52.051498	0.04	0.08	0.10

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
1.0	5.0	0.000899	2289.73	4579.46	5724.32
1.0	5.1	0.001132	1818.81	3637.61	4547.01
1.0	5.2	0.001425	1444.74	2889.47	3611.84
1.0	5.3	0.001794	1147.60	2295.20	2869.00
1.0	5.4	0.002259	911.58	1823.15	2278.94
1.0	5.5	0.002844	724.10	1448.19	1810.24
1.0	5.6	0.003580	575.18	1150.35	1437.94
1.0	5.7	0.004507	456.88	913.76	1142.21
1.0	5.8	0.005673	362.92	725.84	907.30
1.0	5.9	0.007142	288.28	576.56	720.70
1.0	6.0	0.008991	229.00	457.99	572.49
1.0	6.1	0.011319	181.90	363.80	454.75
1.0	6.2	0.014250	144.50	288.99	361.23
1.0	6.3	0.017939	114.78	229.56	286.95
1.0	6.4	0.022582	91.18	182.35	227.94
1.0	6.5	0.028428	72.43	144.86	181.07
1.0	6.6	0.035785	57.54	115.07	143.84
1.0	6.7	0.045047	45.71	91.41	114.27
1.0	6.8	0.056705	36.31	72.62	90.78
1.0	6.9	0.071376	28.85	57.69	72.12
1.0	7.0	0.089841	22.92	45.84	57.30
1.0	7.1	0.113076	18.21	36.42	45.52
1.0	7.2	0.142313	14.47	28.94	36.17
1.0	7.3	0.179095	11.50	22.99	28.74
1.0	7.4	0.225363	9.14	18.27	22.84
1.0	7.5	0.283549	7.26	14.52	18.15
1.0	7.6	0.356705	5.77	11.54	14.43
1.0	7.7	0.448649	4.59	9.18	11.47
1.0	7.8	0.564160	3.65	7.30	9.12
1.0	7.9	0.709198	2.91	5.81	7.26
1.0	8.0	0.891190	2.31	4.62	5.78
1.0	8.1	1.119356	1.84	3.68	4.60
1.0	8.2	1.405112	1.47	2.93	3.66
1.0	8.3	1.762518	1.17	2.34	2.92
1.0	8.4	2.208795	0.93	1.86	2.33
1.0	8.5	2.764893	0.75	1.49	1.86
1.0	8.6	3.456045	0.60	1.19	1.49
1.0	8.7	4.312310	0.48	0.95	1.19
1.0	8.8	5.368920	0.39	0.77	0.96
1.0	8.9	6.666389	0.31	0.62	0.77
1.0	9.0	8.250071	0.25	0.50	0.62
1.0	9.1	10.168993	0.20	0.40	0.51
1.0	9.2	12.873557	0.17	0.33	0.41
1.0	9.3	15.211954	0.14	0.27	0.34
1.0	9.4	18.424973	0.11	0.22	0.28
1.0	9.5	22.139435	0.10	0.19	0.23
1.0	9.6	26.360748	0.08	0.16	0.20
1.0	9.7	31.065796	0.07	0.13	0.17
1.0	9.8	36.197830	0.06	0.11	0.14
1.0	9.9	41.665237	0.05	0.10	0.12
1.0	10.0	47.345642	0.05	0.09	0.11
1.0	10.1	53.095627	0.04	0.08	0.10

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
1.5	5.0	0.000938	2196.16	4392.31	5490.39
1.5	5.1	0.001180	1744.48	3488.95	4361.18
1.5	5.2	0.001486	1385.69	2771.38	3464.23
1.5	5.3	0.001871	1100.70	2201.40	2751.75
1.5	5.4	0.002355	874.32	1748.64	2185.81
1.5	5.5	0.002965	694.51	1389.01	1736.26
1.5	5.6	0.003732	551.67	1103.34	1379.17
1.5	5.7	0.004699	438.21	876.42	1095.53
1.5	5.8	0.005915	348.09	696.18	870.22
1.5	5.9	0.007447	276.50	553.00	691.25
1.5	6.0	0.009375	219.64	439.27	549.09
1.5	6.1	0.011802	174.47	348.94	436.17
1.5	6.2	0.014857	138.59	277.18	346.47
1.5	6.3	0.018703	110.09	220.18	275.23
1.5	6.4	0.023544	87.45	174.90	218.63
1.5	6.5	0.029639	69.47	138.94	173.67
1.5	6.6	0.037310	55.19	110.37	137.97
1.5	6.7	0.046966	43.84	87.68	109.60
1.5	6.8	0.059119	34.83	69.66	87.07
1.5	6.9	0.074415	27.67	55.34	69.17
1.5	7.0	0.093665	21.99	43.97	54.96
1.5	7.1	0.117889	17.47	34.93	43.66
1.5	7.2	0.148368	13.88	27.76	34.69
1.5	7.3	0.186712	11.03	22.06	27.57
1.5	7.4	0.234942	8.77	17.53	21.91
1.5	7.5	0.295595	6.97	13.93	17.41
1.5	7.6	0.371847	5.54	11.07	13.84
1.5	7.7	0.467677	4.41	8.811	1.01
1.5	7.8	0.588057	3.50	7.00	8.75
1.5	7.9	0.739194	3.48	6.96	5.57
1.5	8.0	0.928811	2.22	4.43	5.54
1.5	8.1	1.166495	1.77	3.53	4.41
1.5	8.2	1.464108	1.41	2.81	3.52
1.5	8.3	1.836238	1.12	2.24	2.80
1.5	8.4	2.300744	0.90	1.79	2.24
1.5	8.5	2.879312	0.72	1.43	1.79
1.5	8.6	3.598010	0.57	1.14	1.43
1.5	8.7	4.487811	0.46	0.92	1.15
1.5	8.8	5.584913	0.37	0.74	0.92
1.5	8.9	6.930756	0.30	0.59	0.74
1.5	9.0	8.571473	0.24	0.48	0.60
1.5	9.1	10.556542	0.20	0.39	0.49
1.5	9.2	12.935287	0.16	0.32	0.40
1.5	9.3	15.757981	0.13	0.26	0.33
1.5	9.4	19.060410	0.11	0.22	0.27
1.5	9.5	22.867081	0.09	0.18	0.23
1.5	9.6	27.178680	0.08	0.15	0.19
1.5	9.7	31.966354	0.07	0.13	0.16
1.5	9.8	37.166946	0.06	0.11	0.14
1.5	9.9	42.682816	0.05	0.10	0.12
1.5	10.0	48.386887	0.05	0.09	0.11
1.5	10.1	54.133316	0.04	0.08	0.10

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
2.0	5.0	0.000977	2106.72	4213.44	5266.80
2.0	5.1	0.001230	1673.44	3346.87	4183.59
2.0	5.2	0.001549	1329.27	2658.53	3323.16
2.0	5.3	0.001950	1055.88	2111.75	2639.69
2.0	5.4	0.002455	838.72	1677.44	2096.79
2.0	5.5	0.003091	666.22	1332.44	1665.56
2.0	5.6	0.003891	529.21	1058.41	1323.01
2.0	5.7	0.004898	420.37	840.73	1050.92
2.0	5.8	0.006165	333.92	667.83	834.78
2.0	5.9	0.007763	265.24	530.48	663.10
2.0	6.0	0.009772	210.70	421.39	526.73
2.0	6.1	0.012303	167.37	334.73	418.41
2.0	6.2	0.015487	132.95	265.89	332.37
2.0	6.3	0.019497	105.61	211.22	264.02
2.0	6.4	0.024544	83.89	167.78	209.73
2.0	6.5	0.030897	66.64	133.28	166.60
2.0	6.6	0.038893	52.94	105.88	132.35
2.0	6.7	0.048959	42.06	84.11	105.14
2.0	6.8	0.061628	33.41	66.82	83.53
2.0	6.9	0.077572	26.54	53.08	66.36
2.0	7.0	0.097638	21.09	42.18	52.72
2.0	7.1	0.122887	16.76	33.51	41.89
2.0	7.2	0.154657	13.32	26.63	33.28
2.0	7.3	0.194623	10.58	21.16	26.45
2.0	7.4	0.244892	8.41	16.82	21.02
2.0	7.5	0.308105	6.69	13.37	16.71
2.0	7.6	0.387571	5.32	10.63	13.28
2.0	7.7	0.487433	4.23	8.45	10.56
2.0	7.8	0.612868	3.36	6.72	8.40
2.0	7.9	0.770332	2.68	5.35	6.68
2.0	8.0	0.967859	2.13	4.25	5.32
2.0	8.1	1.215413	1.70	3.39	4.24
2.0	8.2	1.525312	1.35	2.70	3.37
2.0	8.3	1.912698	1.08	2.15	2.69
2.0	8.4	2.396075	0.86	1.72	2.15
2.0	8.5	2.997875	0.69	1.37	1.72
2.0	8.6	3.745031	0.55	1.10	1.37
2.0	8.7	4.669429	0.44	0.88	1.10
2.0	8.8	5.808229	0.36	0.71	0.89
2.0	8.9	7.203783	0.29	0.57	0.71
2.0	9.0	8.902952	0.23	0.46	0.58
2.0	9.1	10.955589	0.19	0.38	0.47
2.0	9.2	13.411801	0.16	0.31	0.38
2.0	9.3	16.317764	0.13	0.25	0.32
2.0	9.4	19.710068	0.11	0.21	0.26
2.0	9.5	23.608643	0.09	0.17	0.22
2.0	9.6	28.009293	0.08	0.15	0.18
2.0	9.7	32.877228	0.07	0.13	0.16
2.0	9.8	38.142929	0.06	0.11	0.13
2.0	9.9	43.702896	0.05	0.09	0.12
2.0	10.0	49.425735	0.04	0.08	0.10
2.0	10.1	55.163666	0.04	0.07	0.09

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
2.5	5.0	0.001019	2021.24	4042.47	5053.09
2.5	5.1	0.001282	1605.53	3211.06	4013.83
2.5	5.2	0.001614	1275.33	2550.65	3188.31
2.5	5.3	0.002033	1013.03	2026.06	2532.58
2.5	5.4	0.002559	804.69	1609.37	2011.71
2.5	5.5	0.003221	639.19	1278.38	1597.97
2.5	5.6	0.004055	507.73	1015.46	1269.33
2.5	5.7	0.005105	403.31	806.62	1008.28
2.5	5.8	0.006427	320.37	640.73	800.91
2.5	5.9	0.008091	254.48	508.96	636.20
2.5	6.0	0.010186	202.15	404.29	505.36
2.5	6.1	0.012823	160.58	321.15	401.43
2.5	6.2	0.016142	127.56	255.11	318.88
2.5	6.3	0.020321	101.33	202.65	253.31
2.5	6.4	0.025581	80.49	160.98	201.22
2.5	6.5	0.032203	63.94	127.88	159.85
2.5	6.6	0.040538	50.79	101.58	126.98
2.5	6.7	0.051028	40.35	80.70	100.88
2.5	6.8	0.064232	32.06	64.11	80.14
2.5	6.9	0.080850	25.47	50.93	63.67
2.5	7.0	0.101763	20.24	40.47	50.58
2.5	7.1	0.128073	16.08	32.15	40.19
2.5	7.2	0.161187	12.78	25.55	31.93
2.5	7.3	0.202837	10.15	20.30	25.38
2.5	7.4	0.255223	8.07	16.13	20.17
2.5	7.5	0.321094	6.41	12.82	16.03
2.5	7.6	0.403897	5.10	10.20	12.74
2.5	7.7	0.507944	4.06	8.11	10.13
2.5	7.8	0.638623	3.23	6.45	8.06
2.5	7.9	0.802651	2.57	5.13	6.41
2.5	8.0	1.008380	2.04	4.08	5.10
2.5	8.1	1.266167	1.63	3.25	4.07
2.5	8.2	1.588799	1.30	2.59	3.24
2.5	8.3	1.991982	1.04	2.07	2.58
2.5	8.4	2.494885	0.83	1.65	2.06
2.5	8.5	3.120711	0.66	1.32	1.65
2.5	8.6	3.897244	0.53	1.06	1.32
2.5	8.7	4.857325	0.43	0.85	1.06
2.5	8.8	6.039048	0.34	0.68	0.85
2.5	8.9	7.485651	0.28	0.55	0.69
2.5	9.0	9.244681	0.23	0.45	0.56
2.5	9.1	11.366277	0.18	0.36	0.45
2.5	9.2	13.900191	0.15	0.30	0.37
2.5	9.3	16.891342	0.12	0.24	0.30
2.5	9.4	20.373840	0.10	0.20	0.25
2.5	9.5	24.363861	0.09	0.17	0.21
2.5	9.6	28.852127	0.07	0.14	0.18
2.5	9.7	33.797775	0.06	0.12	0.15
2.5	9.8	39.124969	0.06	0.11	0.13
2.5	9.9	44.724579	0.05	0.09	0.12
2.5	10.0	50.461304	0.04	0.08	0.10
2.5	10.1	56.185883	0.04	0.07	0.09

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
3.0	5.0	0.001062	1939.51	3879.02	4848.77
3.0	5.1	0.001336	1540.62	3081.23	3851.54
3.0	5.2	0.001683	1223.76	2447.52	3059.40
3.0	5.3	0.002118	972.07	1944.14	2430.18
3.0	5.4	0.002667	772.15	1544.30	1930.37
3.0	5.5	0.003357	613.35	1226.69	1533.36
3.0	5.6	0.004226	487.21	974.41	1218.01
3.0	5.7	0.005320	387.01	774.01	967.51
3.0	5.8	0.006698	307.41	614.82	768.53
3.0	5.9	0.008432	244.19	488.38	610.48
3.0	6.0	0.010615	193.97	387.94	484.93
3.0	6.1	0.013363	154.08	308.16	385.21
3.0	6.2	0.016822	122.40	244.79	305.99
3.0	6.3	0.021177	97.23	194.45	243.07
3.0	6.4	0.026659	77.24	154.47	193.09
3.0	6.5	0.033559	61.36	122.71	153.38
3.0	6.6	0.042245	48.74	97.48	121.85
3.0	6.7	0.053177	38.72	77.44	96.80
3.0	6.8	0.066937	30.76	61.52	76.90
3.0	6.9	0.084254	24.44	48.88	61.09
3.0	7.0	0.106046	19.42	38.83	48.54
3.0	7.1	0.133468	15.43	30.85	38.57
3.0	7.2	0.167968	12.26	24.52	30.65
3.0	7.3	0.211365	9.74	19.48	24.35
3.0	7.4	0.265949	7.74	15.48	19.36
3.0	7.5	0.334579	6.16	12.31	15.39
3.0	7.6	0.420845	4.90	9.79	12.23
3.0	7.7	0.529235	3.89	7.78	9.73
3.0	7.8	0.665354	3.10	6.19	7.74
3.0	7.9	0.836190	2.46	4.92	6.16
3.0	8.0	1.050425	1.96	3.92	4.90
3.0	8.1	1.318817	1.56	3.12	3.90
3.0	8.2	1.654540	1.25	2.49	3.11
3.0	8.3	2.074179	1.00	1.99	2.48
3.0	8.4	2.597286	0.80	1.59	1.98
3.0	8.5	3.247943	0.64	1.27	1.58
3.0	8.6	4.054812	0.51	1.02	1.27
3.0	8.7	5.051660	0.41	0.82	1.02
3.0	8.8	6.277546	0.33	0.66	0.82
3.0	8.9	7.776549	0.27	0.53	0.66
3.0	9.0	9.596846	0.22	0.43	0.54
3.0	9.1	11.788762	0.18	0.35	0.44
3.0	9.2	14.401571	0.15	0.29	0.36
3.0	9.3	17.478699	0.12	0.24	0.27
3.0	9.4	21.051636	0.10	0.20	0.24
3.0	9.5	25.132477	0.08	0.16	0.20
3.0	9.6	29.706726	0.07	0.14	0.17
3.0	9.7	34.727371	0.06	0.12	0.15
3.0	9.8	40.112305	0.05	0.10	0.13
3.0	9.9	45.747025	0.05	0.09	0.11
3.0	10.0	51.492737	0.04	0.08	0.10
3.0	10.1	57.199234	0.04	0.07	0.09

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
3.5	5.0	0.001106	1861.37	3722.74	4653.43
3.5	5.1	0.001393	1478.55	2957.09	3696.36
3.5	5.2	0.001753	1174.46	2348.91	2936.14
3.5	5.3	0.002207	932.91	1865.82	2332.27
3.5	5.4	0.002779	741.02	1482.03	1852.60
3.5	5.5	0.003498	588.64	1177.27	1471.59
3.5	5.6	0.004404	467.58	935.15	1168.94
3.5	5.7	0.005544	371.41	742.82	928.53
3.5	5.8	0.006979	295.03	590.06	737.57
3.5	5.9	0.008786	234.36	468.71	585.88
3.5	6.0	0.011060	186.16	372.32	465.40
3.5	6.1	0.013924	147.88	295.75	369.69
3.5	6.2	0.017529	117.47	234.93	293.66
3.5	6.3	0.022065	93.31	186.62	233.28
3.5	6.4	0.027778	74.13	148.25	185.31
3.5	6.5	0.034968	58.89	117.77	147.21
3.5	6.6	0.044018	46.78	93.55	116.94
3.5	6.7	0.055409	37.16	74.32	92.90
3.5	6.8	0.069745	29.52	59.04	73.80
3.5	6.9	0.087788	23.46	46.91	58.64
3.5	7.0	0.110493	18.64	37.27	46.59
3.5	7.1	0.139063	14.81	29.61	37.02
3.5	7.2	0.175007	11.77	23.53	29.41
3.5	7.3	0.220220	9.35	18.70	23.37
3.5	7.4	0.277083	7.43	14.86	18.58
3.5	7.5	0.348576	5.91	11.81	14.77
3.5	7.6	0.438434	4.70	9.39	11.74
3.5	7.7	0.551329	3.74	7.47	9.34
3.5	7.8	0.693092	2.97	5.94	7.43
3.5	7.9	0.870988	2.37	4.73	5.91
3.5	8.0	1.094039	1.88	3.76	4.71
3.5	8.1	1.373422	1.50	3.00	3.75
3.5	8.2	1.722906	1.20	2.39	2.99
3.5	8.3	2.159374	0.96	1.91	2.38
3.5	8.4	2.703372	0.76	1.52	1.90
3.5	8.5	3.379683	0.61	1.22	1.52
3.5	8.6	4.217851	0.49	0.98	1.22
3.5	8.7	5.252590	0.39	0.78	0.98
3.5	8.8	6.523889	0.32	0.63	0.79
3.5	8.9	8.076648	0.26	0.51	0.64
3.5	9.0	9.959602	0.21	0.41	0.52
3.5	9.1	12.223171	0.17	0.34	0.42
3.5	9.2	14.915968	0.14	0.28	0.35
3.5	9.3	18.079803	0.12	0.23	0.28
3.5	9.4	21.743225	0.10	0.19	0.24
3.5	9.5	25.914139	0.08	0.16	0.20
3.5	9.6	30.572556	0.07	0.13	0.17
3.5	9.7	35.665268	0.06	0.12	0.14
3.5	9.8	41.104065	0.05	0.10	0.13
3.5	9.9	46.769302	0.05	0.09	0.11
3.5	10.0	52.519104	0.04	0.08	0.10
3.5	10.1	58.202866	0.04	0.07	0.09

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
4.0	5.0	0.001152	1786.64	3573.28	4466.69
4.0	5.1	0.001451	1419.18	2838.36	3547.96
4.0	5.2	0.001826	1127.31	2254.61	2818.26
4.0	5.3	0.002299	895.46	1790.91	2238.64
4.0	5.4	0.002895	711.29	1422.58	1778.22
4.0	5.5	0.003644	565.00	1130.00	1412.51
4.0	5.6	0.004588	448.80	897.60	1122.01
4.0	5.7	0.005776	356.50	713.00	891.25
4.0	5.8	0.007271	283.19	566.37	707.96
4.0	5.9	0.009153	224.95	449.89	562.36
4.0	6.0	0.011523	178.69	357.37	446.71
4.0	6.1	0.014506	141.94	283.88	354.85
4.0	6.2	0.018262	112.75	225.50	281.88
4.0	6.3	0.022989	89.57	179.13	223.91
4.0	6.4	0.028939	71.15	142.30	177.87
4.0	6.5	0.036430	56.52	113.04	141.30
4.0	6.6	0.045858	44.89	89.78	112.22
4.0	6.7	0.057725	35.67	71.34	89.17
4.0	6.8	0.072661	28.34	56.67	70.84
4.0	6.9	0.091457	22.52	45.03	56.28
4.0	7.0	0.115110	17.89	35.77	44.72
4.0	7.1	0.144871	14.22	28.43	35.53
4.0	7.2	0.182314	11.30	22.59	28.23
4.0	7.3	0.229411	8.98	17.95	22.44
4.0	7.4	0.288639	7.14	14.27	17.83
4.0	7.5	0.363103	5.67	11.34	14.18
4.0	7.6	0.456690	4.51	9.02	11.27
4.0	7.7	0.574259	3.59	7.17	8.96
4.0	7.8	0.721875	2.85	5.70	7.13
4.0	7.9	0.907089	2.27	4.54	5.67
4.0	8.0	1.139280	1.81	3.61	4.52
4.0	8.1	1.430048	1.44	2.88	3.60
4.0	8.2	1.793680	1.15	2.30	2.87
4.0	8.3	2.247669	0.92	1.83	2.29
4.0	8.4	2.813272	0.73	1.46	1.83
4.0	8.5	3.516081	0.59	1.17	1.46
4.0	8.6	4.386545	0.47	0.94	1.17
4.0	8.7	5.460304	0.38	0.75	0.94
4.0	8.8	6.778277	0.31	0.61	0.76
4.0	8.9	8.386150	0.25	0.49	0.61
4.0	9.0	10.333151	0.20	0.40	0.50
4.0	9.1	12.669671	0.17	0.33	0.41
4.0	9.2	15.443539	0.14	0.27	0.33
4.0	9.3	18.694687	0.11	0.22	0.28
4.0	9.4	22.448563	0.09	0.18	0.23
4.0	9.5	26.708588	0.08	0.15	0.19
4.0	9.6	31.449203	0.07	0.13	0.16
4.0	9.7	36.610947	0.06	0.11	0.14
4.0	9.8	42.099579	0.05	0.10	0.12
4.0	9.9	47.790710	0.05	0.09	0.11
4.0	10.0	53.539764	0.04	0.08	0.10
4.0	10.1	59.196259	0.04	0.07	0.09

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
4.5	5.0	0.001200	1715.16	3430.32	4287.90
4.5	5.1	0.001511	1362.41	2724.81	3406.02
4.5	5.2	0.001903	1082.21	2164.41	2705.51
4.5	5.3	0.002395	859.63	1719.26	2149.08
4.5	5.4	0.003015	682.84	1365.67	1707.09
4.5	5.5	0.003795	542.40	1084.80	1356.00
4.5	5.6	0.004779	430.85	861.70	1077.12
4.5	5.7	0.006016	342.24	684.48	855.60
4.5	5.8	0.007574	271.86	543.71	679.64
4.5	5.9	0.009535	215.95	431.89	539.87
4.5	6.0	0.012003	171.54	343.07	428.84
4.5	6.1	0.015111	136.26	272.52	340.65
4.5	6.2	0.019022	108.24	216.48	270.60
4.5	6.3	0.023947	85.99	171.97	214.96
4.5	6.4	0.030145	68.31	136.61	170.76
4.5	6.5	0.037947	54.26	108.52	135.65
4.5	6.6	0.047768	43.11	86.21	107.76
4.5	6.7	0.060129	34.25	68.49	85.61
4.5	6.8	0.075685	27.21	54.41	68.01
4.5	6.9	0.095264	21.62	43.23	54.03
4.5	7.0	0.119901	17.17	34.34	42.93
4.5	7.1	0.150900	13.65	27.29	34.11
4.5	7.2	0.189897	10.85	21.69	27.11
4.5	7.3	0.238948	8.62	17.23	21.54
4.5	7.4	0.300632	6.85	13.70	17.12
4.5	7.5	0.378178	5.45	10.89	13.61
4.5	7.6	0.475631	4.33	8.66	10.82
4.5	7.7	0.598047	3.45	6.89	8.61
4.5	7.8	0.751732	2.74	5.48	6.85
4.5	7.9	0.944534	2.18	4.36	5.45
4.5	8.0	1.186194	1.74	3.47	4.34
4.5	8.1	1.488756	1.39	2.77	3.46
4.5	8.2	1.867034	1.11	2.21	2.76
4.5	8.3	2.339145	0.88	1.76	2.20
4.5	8.4	2.927079	0.71	1.41	1.76
4.5	8.5	3.657250	0.57	1.13	1.41
4.5	8.6	4.561008	0.45	0.90	1.13
4.5	8.7	5.574942	0.37	0.73	0.91
4.5	8.8	7.040864	0.29	0.58	0.73
4.5	8.9	8.705209	0.24	0.47	0.59
4.5	9.0	10.717620	0.19	0.38	0.48
4.5	9.1	13.128346	0.16	0.31	0.39
4.5	9.2	15.984256	0.13	0.26	0.32
4.5	9.3	19.323212	0.11	0.21	0.27
4.5	9.4	23.167343	0.09	0.18	0.22
4.5	9.5	27.515366	0.08	0.15	0.19
4.5	9.6	32.336014	0.07	0.13	0.16
4.5	9.7	37.563538	0.06	0.11	0.14
4.5	9.8	43.097900	0.05	0.10	0.12
4.5	9.9	48.810196	0.04	0.08	0.11
4.5	10.0	54.553772	0.04	0.08	0.09
4.5	10.1	60.178635	0.04	0.07	0.09

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
5.0	5.0	0.001250	1646.79	3293.58	4116.97
5.0	5.1	0.001574	1308.10	2616.19	3270.24
5.0	5.2	0.001982	1039.07	2078.13	2597.66
5.0	5.3	0.002495	825.36	1650.72	2063.41
5.0	5.4	0.003441	655.62	1311.23	1639.03
5.0	5.5	0.003954	520.78	1041.56	1301.94
5.0	5.6	0.004977	413.68	827.35	1034.18
5.0	5.7	0.006266	328.60	657.19	821.49
5.0	5.8	0.007888	261.02	522.04	652.55
5.0	5.9	0.009931	207.34	414.68	518.35
5.0	6.0	0.012502	164.70	329.40	411.75
5.0	6.1	0.015733	130.83	261.66	327.07
5.0	6.2	0.019812	103.93	207.85	259.82
5.0	6.3	0.024941	82.56	165.11	206.39
5.0	6.4	0.031396	65.58	131.16	163.95
5.0	6.5	0.039522	52.10	104.19	130.24
5.0	6.6	0.049751	41.39	82.77	103.47
5.0	6.7	0.062624	32.88	65.76	82.20
5.0	6.8	0.078826	26.12	52.24	65.30
5.0	6.9	0.099216	20.76	41.51	51.88
5.0	7.0	0.124873	16.49	32.98	41.22
5.0	7.1	0.157155	13.10	26.20	32.75
5.0	7.2	0.197766	10.41	20.82	26.03
5.0	7.3	0.248845	8.28	16.55	20.69
5.0	7.4	0.313075	6.58	13.15	16.44
5.0	7.5	0.393818	5.23	10.46	13.07
5.0	7.6	0.495282	4.16	8.31	10.39
5.0	7.7	0.622723	3.31	6.61	8.27
5.0	7.8	0.782700	2.63	5.26	6.58
5.0	7.9	0.983366	2.10	4.19	5.23
5.0	8.0	1.234838	1.67	3.33	4.17
5.0	8.1	1.549612	1.33	2.66	3.32
5.0	8.2	1.943048	1.06	2.12	2.65
5.0	8.3	2.433905	0.85	1.69	2.11
5.0	8.4	3.044909	0.68	1.35	1.69
5.0	8.5	3.803324	0.54	1.08	1.35
5.0	8.6	4.741405	0.44	0.87	1.09
5.0	8.7	5.896680	0.35	0.70	0.87
5.0	8.8	7.311830	0.28	0.56	0.70
5.0	8.9	9.034002	0.23	0.46	0.57
5.0	9.0	11.113169	0.19	0.37	0.46
5.0	9.1	13.599315	0.15	0.30	0.38
5.0	9.2	16.538147	0.13	0.25	0.31
5.0	9.3	19.965332	0.11	0.21	0.26
5.0	9.4	23.899353	0.09	0.17	0.22
5.0	9.5	28.334122	0.08	0.15	0.18
5.0	9.6	33.232437	0.06	0.12	0.15
5.0	9.7	38.522385	0.06	0.11	0.13
5.0	9.8	44.098221	0.05	0.09	0.12
5.0	9.9	49.826996	0.04	*0.08*	0.10
5.0	10.0	55.560364	0.04	0.07	0.09
5.0	10.1	61.149368	0.04	0.07	0.08

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
5.5	5.0	0.001302	1581.37	3162.74	3953.42
5.5	5.1	0.001639	1256.13	2512.26	3140.33
5.5	5.2	0.002064	997.79	1995.57	2494.47
5.5	5.3	0.002598	792.58	1585.15	1981.44
5.5	5.4	0.003270	629.57	1259.14	1573.93
5.5	5.5	0.004117	500.09	1000.18	1250.22
5.5	5.6	0.005183	397.24	794.48	993.10
5.5	5.7	0.006525	315.55	631.09	788.86
5.5	5.8	0.008215	250.65	501.30	626.63
5.5	5.9	0.010341	199.11	398.21	497.76
5.5	6.0	0.013019	158.16	316.31	395.39
5.5	6.1	0.016389	125.64	251.27	314.08
5.5	6.2	0.020632	99.80	199.60	249.50
5.5	6.3	0.025972	79.28	158.55	198.19
5.5	6.4	0.032695	62.98	125.95	157.44
5.5	6.5	0.041157	50.03	100.06	125.07
5.5	6.6	0.051808	39.75	79.49	99.36
5.5	6.7	0.065213	31.58	63.15	78.93
5.5	6.8	0.082085	25.09	50.17	62.71
5.5	6.9	0.103316	19.93	39.86	49.82
5.5	7.0	0.130032	15.84	31.67	39.59
5.5	7.1	0.163646	12.58	25.16	31.46
5.5	7.2	0.205931	10.00	20.00	25.00
5.5	7.3	0.259113	7.95	15.89	19.87
5.5	7.4	0.325984	6.32	12.63	15.79
5.5	7.5	0.410043	5.02	10.04	12.55
5.5	7.6	0.515666	4.00	7.99	9.98
5.5	7.7	0.648318	3.18	6.35	7.94
5.5	7.8	0.814815	2.53	5.05	6.32
5.5	7.9	1.023630	2.01	4.02	5.03
5.5	8.0	1.285267	1.60	3.20	4.01
5.5	8.1	1.612686	1.28	2.55	3.19
5.5	8.2	2.021806	1.02	2.04	2.55
5.5	8.3	2.532044	0.82	1.63	2.03
5.5	8.4	3.166888	0.65	1.30	1.63
5.5	8.5	3.954445	0.52	1.04	1.30
5.5	8.6	4.927885	0.42	0.84	1.04
5.5	8.7	6.125672	0.34	0.67	0.84
5.5	8.8	7.591349	0.27	0.54	0.68
5.5	8.9	9.372707	0.22	0.44	0.55
5.5	9.0	11.519955	0.18	0.36	0.45
5.5	9.1	14.082686	0.15	0.29	0.37
5.5	9.2	17.105301	0.12	0.24	0.30
5.5	9.3	20.620972	0.10	0.20	0.25
5.5	9.4	24.644409	0.09	0.17	0.21
5.5	9.5	29.164429	0.07	0.14	0.18
5.5	9.6	34.137909	0.06	0.12	0.15
5.5	9.7	39.486755	0.05	0.10	0.13
5.5	9.8	45.099777	0.05	0.09	0.11
5.5	9.9	50.840363	0.04	0.08	0.10
5.5	10.0	56.558868	0.04	0.07	0.09
5.5	10.1	62.107941	0.04	0.07	0.08

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
6.0	5.0	0.001356	1518.77	3037.54	3796.93
6.0	5.1	0.001707	1206.41	2412.82	3016.02
6.0	5.2	0.002149	958.29	1916.58	2395.72
6.0	5.3	0.002705	761.20	1522.40	1903.00
6.0	5.4	0.003405	604.65	1209.30	1511.62
6.0	5.5	0.004287	480.30	960.59	1200.74
6.0	5.6	0.005397	381.52	763.03	953.79
6.0	5.7	0.006794	303.06	606.11	757.63
6.0	5.8	0.008553	240.73	481.46	601.82
6.0	5.9	0.010768	191.22	382.44	478.06
6.0	6.0	0.013555	151.90	303.80	379.74
6.0	6.1	0.017064	120.66	241.32	301.65
6.0	6.2	0.021482	95.85	191.70	239.62
6.0	6.3	0.027042	76.14	152.27	190.33
6.0	6.4	0.034042	60.49	120.97	151.21
6.0	6.5	0.047852	48.05	96.10	120.12
6.0	6.6	0.053942	38.17	76.34	95.43
6.0	6.7	0.067899	30.33	60.65	75.81
6.0	6.8	0.085465	24.09	48.18	60.23
6.0	6.9	0.107570	19.14	38.28	47.85
6.0	7.0	0.135385	15.21	30.42	38.02
6.0	7.1	0.170379	12.09	24.17	30.21
6.0	7.2	0.214400	9.61	19.21	24.01
6.0	7.3	0.269763	7.64	15.27	19.08
6.0	7.4	0.339375	6.07	12.13	15.17
6.0	7.5	0.426871	4.83	9.65	12.06
6.0	7.6	0.536805	3.84	7.67	9.59
6.0	7.7	0.674859	3.05	6.10	7.63
6.0	7.8	0.848114	2.43	4.86	6.07
6.0	7.9	1.065372	1.94	3.87	4.83
6.0	8.0	1.337531	1.54	3.08	3.85
6.0	8.1	1.678039	1.23	2.45	3.07
6.0	8.2	2.103384	0.98	1.96	2.45
6.0	8.3	2.633657	0.78	1.56	1.95
6.0	8.4	3.293116	0.63	1.25	1.56
6.0	8.5	4.110734	0.50	1.00	1.25
6.0	8.6	5.120600	0.40	0.80	1.01
6.0	8.7	6.362090	0.33	0.65	0.81
6.0	8.8	7.879585	0.26	0.52	0.65
6.0	8.9	9.721457	0.21	0.42	0.53
6.0	9.0	11.938077	0.17	0.34	0.43
6.0	9.1	14.578496	0.14	0.28	0.35
6.0	9.2	17.685623	0.12	0.23	0.29
6.0	9.3	21.289932	0.10	0.19	0.24
6.0	9.4	25.402145	0.08	0.16	0.20
6.0	9.5	30.005783	0.07	0.14	0.17
6.0	9.6	35.051758	0.06	0.12	0.15
6.0	9.7	40.455826	0.05	0.10	0.13
6.0	9.8	46.101654	0.05	0.09	0.11
6.0	9.9	51.849319	0.04	0.08	0.10
6.0	10.0	57.548447	0.04	0.07	0.09
6.0	10.1	63.053726	0.04	0.07	0.08

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
6.5	5.0	0.001411	1458.86	2917.72	3647.15
6.5	5.1	0.001777	1158.82	2317.64	2897.05
6.5	5.2	0.002237	920.49	1840.98	2301.22
6.5	5.3	0.002816	731.18	1462.35	1827.94
6.5	5.4	0.003545	580.80	1161.60	1451.99
6.5	5.5	0.004463	461.35	922.70	1153.37
6.5	5.6	0.005619	366.47	732.94	916.17
6.5	5.7	0.007073	291.10	582.20	727.75
6.5	5.8	0.008904	231.24	462.47	578.08
6.5	5.9	0.011210	183.68	367.36	459.20
6.5	6.0	0.014112	145.91	291.81	364.77
6.5	6.1	0.017765	115.90	231.80	289.76
6.5	6.2	0.022324	92.07	184.14	230.17
6.5	6.3	0.028153	73.14	146.27	182.84
6.5	6.4	0.035439	58.10	116.20	145.25
6.5	6.5	0.044611	46.16	92.31	115.39
6.5	6.6	0.056156	36.67	73.33	91.66
6.5	6.7	0.070686	29.13	58.26	72.82
6.5	6.8	0.088772	23.14	46.28	57.86
6.5	6.9	0.111983	18.39	36.77	45.97
6.5	7.0	0.140937	14.61	29.22	36.52
6.5	7.1	0.177364	11.61	23.22	29.02
6.5	7.2	0.223185	9.23	18.45	23.06
6.5	7.3	0.280811	7.33	14.66	18.33
6.5	7.4	0.353263	5.83	11.66	14.57
6.5	7.5	0.444324	4.64	9.27	11.59
6.5	7.6	0.558728	3.69	7.37	9.21
6.5	7.7	0.702370	2.93	5.86	7.33
6.5	7.8	0.882636	2.34	4.67	5.83
6.5	7.9	1.108639	1.86	3.71	4.64
6.5	8.0	1.391697	1.48	2.96	3.70
6.5	8.1	1.745749	1.18	2.36	2.95
6.5	8.2	2.187875	0.94	1.88	2.35
6.5	8.3	2.738852	0.75	1.50	1.88
6.5	8.4	3.423727	0.60	1.20	1.50
6.5	8.5	4.272338	0.48	0.96	1.20
6.5	8.6	5.319695	0.39	0.77	0.97
6.5	8.7	6.606107	0.31	0.62	0.78
6.5	8.8	8.176723	0.25	0.50	0.63
6.5	8.9	10.080451	0.21	0.41	0.51
6.5	9.0	12.367712	0.17	0.33	0.42
6.5	9.1	15.086879	0.14	0.27	0.34
6.5	9.2	18.279175	0.12	0.23	0.28
6.5	9.3	21.972153	0.10	0.19	0.23
6.5	9.4	26.172302	0.08	0.16	0.20
6.5	9.5	30.857803	0.07	0.13	0.17
6.5	9.6	35.973419	0.05	0.10	0.13
6.5	9.7	41.428940	0.05	0.10	0.12
6.5	9.8	47.103149	0.05	0.09	0.11
6.5	9.9	52.853225	0.04	0.08	0.10
6.5	10.0	58.528580	0.04	0.07	0.09
6.5	10.1	63.986282	0.03	0.06	0.80

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
7.0	5.0	0.001469	1401.51	2803.02	3503.76
7.0	5.1	0.001850	1113.27	2226.53	2783.17
7.0	5.2	0.002328	884.31	1768.61	2210.76
7.0	5.3	0.002931	702.44	1404.87	1756.08
7.0	5.4	0.003690	557.97	1115.93	1394.92
7.0	5.5	0.004646	443.22	886.43	1108.04
7.0	5.6	0.005848	352.06	704.12	880.16
7.0	5.7	0.007363	279.66	559.32	699.14
7.0	5.8	0.009269	222.15	444.29	555.36
7.0	5.9	0.011608	176.46	352.92	441.15
7.0	6.0	0.014689	140.17	280.34	350.43
7.0	6.1	0.018492	111.35	222.69	278.37
7.0	6.2	0.023279	88.45	176.90	221.13
7.0	6.3	0.029304	70.27	140.53	175.66
7.0	6.4	0.036889	55.82	111.63	139.54
7.0	6.5	0.046436	44.34	88.68	110.85
7.0	6.6	0.058452	35.23	70.45	88.06
7.0	6.7	0.073575	27.99	55.97	69.96
7.0	6.8	0.092609	22.24	44.47	55.58
7.0	6.9	0.116560	17.67	35.33	44.16
7.0	7.0	0.146695	14.04	28.07	35.09
7.0	7.1	0.184608	11.16	22.31	27.88
7.0	7.2	0.232297	8.87	17.73	22.16
7.0	7.3	0.292268	7.05	14.09	17.61
7.0	7.4	0.367665	5.60	11.20	14.00
7.0	7.5	0.462421	4.46	8.91	11.13
7.0	7.6	0.581457	3.54	7.08	8.85
7.0	7.7	0.730910	2.82	5.63	7.04
7.0	7.8	0.918422	2.24	4.48	5.60
7.0	7.9	1.153480	1.79	3.57	4.46
7.0	8.0	1.447819	1.42	2.84	3.56
7.0	8.1	1.815886	1.14	2.27	2.83
7.0	8.2	2.275364	0.91	1.81	2.26
7.0	8.3	2.847732	0.73	1.45	1.81
7.0	8.4	3.558835	0.58	1.16	1.45
7.0	8.5	4.439395	0.47	0.93	1.16
7.0	8.6	5.525353	0.38	0.75	0.93
7.0	8.7	6.857883	0.30	0.60	0.75
7.0	8.8	8.482924	0.25	0.49	0.62
7.0	8.9	10.449829	0.20	0.39	0.49
7.0	9.0	12.808962	0.16	0.32	0.40
7.0	9.1	15.607864	0.13	0.26	0.33
7.0	9.2	18.885880	0.11	0.22	0.27
7.0	9.3	22.667435	0.09	0.18	0.23
7.0	9.4	26.954575	0.08	0.15	0.19
7.0	9.5	31.719955	0.07	0.13	0.16
7.0	9.6	36.902222	0.06	0.11	0.14
7.0	9.7	42.405304	0.05	0.10	0.12
7.0	9.8	48.103409	0.05	0.09	0.11
7.0	9.9	53.851303	0.04	0.08	0.10
7.0	10.0	59.498566	0.04	0.07	0.09
7.0	10.1	64.905151	0.03	0.06	0.08

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
7.5	5.0	0.001529	1346.62	2693.23	3366.54
7.5	5.1	0.001925	1069.66	2139.32	2674.15
7.5	5.2	0.002423	849.67	1699.33	2124.16
7.5	5.3	0.003051	674.92	1349.84	1687.30
7.5	5.4	0.003841	536.11	1072.22	1340.28
7.5	5.5	0.004835	425.86	851.71	1064.63
7.5	5.6	0.006087	338.27	676.54	845.68
7.5	5.7	0.007663	268.71	537.41	671.76
7.5	5.8	0.009647	213.45	426.89	533.61
7.5	5.9	0.012144	169.55	339.10	423.87
7.5	6.0	0.015288	134.68	269.36	336.70
7.5	6.1	0.019246	106.99	213.97	267.46
7.5	6.2	0.024227	84.99	169.97	212.47
7.5	6.3	0.030499	67.51	135.02	168.78
7.5	6.4	0.038392	53.63	107.26	134.08
7.5	6.5	0.048328	42.61	85.21	106.51
7.5	6.6	0.050834	33.85	67.69	84.62
7.5	6.7	0.076573	26.89	53.78	67.22
7.5	6.8	0.096381	21.37	42.73	53.41
7.5	6.9	0.121306	16.98	33.95	42.43
7.5	7.0	0.152667	13.49	26.97	33.72
7.5	7.1	0.192120	10.72	21.43	26.79
7.5	7.2	0.241744	8.52	17.03	21.29
7.5	7.3	0.304147	6.77	13.54	16.92
7.5	7.4	0.382596	5.38	10.76	13.45
7.5	7.5	0.481183	4.28	8.56	10.70
7.5	7.6	0.605018	3.41	6.81	8.51
7.5	7.7	0.760481	2.71	5.41	6.77
7.5	7.8	0.955507	2.16	4.31	5.39
7.5	7.9	1.199941	1.72	3.43	4.29
7.5	8.0	1.505955	1.37	2.73	3.43
7.5	8.1	1.888518	1.09	2.18	2.73
7.5	8.2	2.365932	0.87	1.74	2.18
7.5	8.3	2.960391	0.70	1.39	1.74
7.5	8.4	3.698557	0.56	1.11	1.39
7.5	8.5	4.612038	0.45	0.89	1.12
7.5	8.6	5.737683	0.36	0.72	0.90
7.5	8.7	7.117567	0.29	0.58	0.72
7.5	8.8	8.798328	0.24	0.47	0.59
7.5	8.9	10.829711	0.19	0.38	0.48
7.5	9.0	13.261907	0.16	0.31	0.39
7.5	9.1	16.141449	0.13	0.26	0.32
7.5	9.2	19.505630	0.11	0.21	0.26
7.5	9.3	23.375549	0.09	0.18	0.22
7.5	9.4	27.748535	0.08	0.15	0.19
7.5	9.5	32.591660	0.07	0.13	0.16
7.5	9.6	37.837402	0.06	0.11	0.14
7.5	9.7	43.384079	0.05	0.09	0.12
7.5	9.8	49.101578	0.04	0.08	0.10
7.5	9.9	54.842697	0.04	0.08	0.09
7.5	10.0	60.457733	0.04	0.07	0.09
7.5	10.1	65.809845	0.03	0.06	0.08

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
8.0	5.0	0.001591	1294.05	2588.10	3235.12
8.0	5.1	0.002003	1027.55	2055.10	2569.76
8.0	5.2	0.002522	816.50	1633.00	2041.25
8.0	5.3	0.003175	648.58	1297.15	1621.43
8.0	5.4	0.003997	515.19	1030.37	1287.96
8.0	5.5	0.005031	409.23	818.46	1023.08
8.0	5.6	0.006334	325.07	650.14	812.67
8.0	5.7	0.007974	258.22	516.43	645.54
8.0	5.8	0.010038	205.11	410.22	512.78
8.0	5.9	0.012637	162.93	325.86	407.33
8.0	6.0	0.015909	129.43	258.85	323.56
8.0	6.1	0.020027	102.81	205.62	257.03
8.0	6.2	0.025211	81.67	163.34	204.17
8.0	6.3	0.031737	64.88	129.75	162.19
8.0	6.4	0.039951	51.54	103.08	128.84
8.0	6.5	0.050290	40.94	81.88	102.36
8.0	6.6	0.063304	32.53	65.05	81.31
8.0	6.7	0.079681	25.84	51.68	64.60
8.0	6.8	0.100292	20.53	41.06	51.33
8.0	6.9	0.126227	16.31	32.62	40.78
8.0	7.0	0.158859	12.96	25.92	32.40
8.0	7.1	0.199908	10.30	20.60	25.75
8.0	7.2	0.251539	8.19	16.37	20.46
8.0	7.3	0.316463	6.51	13.01	16.27
8.0	7.4	0.398076	5.17	10.34	12.93
8.0	7.5	0.500632	4.12	8.23	10.28
8.0	7.6	0.629441	3.27	6.54	8.18
8.0	7.7	0.791129	2.61	5.21	6.51
8.0	7.8	0.993935	2.07	4.14	5.18
8.0	7.9	1.248076	1.65	3.30	4.12
8.0	8.0	1.566172	1.32	2.63	3.29
8.0	8.1	1.963727	1.05	2.10	2.62
8.0	8.2	2.459677	0.84	1.67	2.09
8.0	8.3	3.076948	0.67	1.34	1.67
8.0	8.4	3.843025	0.54	1.07	1.34
8.0	8.5	4.790408	0.43	0.86	1.07
8.0	8.6	5.956876	0.35	0.69	0.86
8.0	8.7	7.385345	0.28	0.56	0.70
8.0	8.8	9.123128	0.23	0.45	0.56
8.0	8.9	11.220277	0.19	0.37	0.46
8.0	9.0	13.726683	0.15	0.30	0.38
8.0	9.1	16.687729	0.13	0.25	0.31
8.0	9.2	20.138428	0.10	0.20	0.26
8.0	9.3	24.096283	0.09	0.17	0.21
8.0	9.4	28.553874	0.07	0.14	0.18
8.0	9.5	33.472443	0.06	0.12	0.15
8.0	9.6	38.778397	0.06	0.11	0.13
8.0	9.7	44.364563	0.05	0.09	0.12
8.0	9.8	50.096954	0.04	0.08	0.10
8.0	9.9	55.826797	0.05	0.09	0.07
8.0	10.0	61.405579	0.04	0.07	0.08
8.0	10.1	66.700027	0.03	0.06	0.08

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
8.5	5.0	0.001656	1243.71	2487.42	3109.28
8.5	5.1	0.002084	987.92	1975.84	2469.80
8.5	5.2	0.002624	784.74	1569.48	1961.85
8.5	5.3	0.003303	623.35	1246.69	1558.36
8.5	5.4	0.004158	495.15	990.29	1237.86
8.5	5.5	0.005235	393.32	786.63	983.28
8.5	5.6	0.006590	312.43	624.85	781.06
8.5	5.7	0.008290	248.17	496.34	620.43
8.5	5.8	0.010445	197.14	394.27	492.84
8.5	5.9	0.013149	156.60	313.19	391.48
8.5	6.0	0.016553	124.39	248.78	310.98
8.5	6.1	0.020838	98.81	197.62	247.03
8.5	6.2	0.026231	78.50	156.99	196.23
8.5	6.3	0.033021	62.36	124.71	155.88
8.5	6.4	0.041568	49.54	99.07	123.83
8.5	6.5	0.052325	39.35	78.70	98.38
8.5	6.6	0.065864	31.26	62.52	78.15
8.5	6.7	0.082904	24.84	49.67	62.09
8.5	6.8	0.104347	19.73	39.46	49.33
8.5	6.9	0.131329	15.68	31.36	39.20
8.5	7.0	0.165277	12.46	24.92	31.14
8.5	7.1	0.207983	9.90	19.80	24.75
8.5	7.2	0.261693	7.87	15.74	19.67
8.5	7.3	0.329229	6.26	12.51	15.64
8.5	7.4	0.414121	4.97	9.94	12.43
8.5	7.5	0.520788	3.96	7.91	9.88
8.5	7.6	0.654750	3.15	6.29	7.86
8.5	7.7	0.822885	2.50	5.00	6.26
8.5	7.8	1.033747	1.99	3.98	4.98
8.5	7.9	1.297935	1.59	3.17	3.97
8.5	8.0	1.628528	1.27	2.53	3.16
8.5	8.1	2.041583	1.01	2.02	2.52
8.5	8.2	2.556683	0.81	1.61	2.01
8.5	8.3	3.197501	0.65	1.29	1.61
8.5	8.4	3.992355	0.52	1.03	1.29
8.5	8.5	4.974647	0.42	0.83	1.03
8.5	8.6	6.183067	0.34	0.67	0.83
8.5	8.7	7.661354	0.27	0.54	0.67
8.5	8.8	9.457451	0.22	0.44	0.54
8.5	8.9	11.621622	0.18	0.35	0.44
8.5	9.0	14.203341	0.15	0.29	0.36
8.5	9.1	17.246658	0.12	0.24	0.30
8.5	9.2	20.784088	0.10	0.20	0.25
8.5	9.3	24.829391	0.09	0.17	0.21
8.5	9.4	29.370132	0.07	0.14	0.18
8.5	9.5	34.361679	0.06	0.12	0.15
8.5	9.6	39.724426	0.05	0.10	0.13
8.5	9.7	45.345917	0.05	0.09	0.11
8.5	9.8	51.088684	0.04	0.08	0.10
8.5	9.9	56.802841	0.04	0.07	0.09
8.5	10.0	62.341492	0.04	0.07	0.08
8.5	10.1	67.575378	0.03	0.06	0.08

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
9.0	5.0	0.001722	1195.50	2391.00	2986.75
9.0	5.1	0.002168	949.63	1899.25	2374.06
9.0	5.2	0.002730	754.32	1508.64	1885.80
9.0	5.3	0.003436	599.19	1198.37	1497.96
9.0	5.4	0.004326	475.96	951.91	1189.88
9.0	5.5	0.005446	378.07	756.13	945.17
9.0	5.6	0.006856	300.32	600.63	750.79
9.0	5.7	0.008631	238.56	477.11	596.38
9.0	5.8	0.010866	189.50	378.99	473.73
9.0	5.9	0.013679	150.53	301.05	376.31
9.0	6.0	0.017220	119.57	239.14	298.93
9.0	6.1	0.021678	94.98	189.96	237.46
9.0	6.2	0.027289	75.45	150.90	188.63
9.0	6.3	0.034352	59.94	119.88	149.84
9.0	6.4	0.043243	47.62	95.23	119.04
9.0	6.5	0.054434	37.83	75.65	94.56
9.0	6.6	0.068518	30.05	60.10	75.13
9.0	6.7	0.086244	23.88	47.75	59.69
9.0	6.8	0.108550	18.97	37.94	47.42
9.0	6.9	0.136618	15.07	30.14	37.68
9.0	7.0	0.171931	11.98	23.95	29.94
9.0	7.1	0.216352	9.52	19.03	23.79
9.0	7.2	0.272218	7.57	15.13	18.91
9.0	7.3	0.342460	6.01	12.02	15.03
9.0	7.4	0.430749	4.78	9.56	11.95
9.0	7.5	0.541677	3.80	7.60	9.50
9.0	7.6	0.680974	3.03	6.05	7.56
9.0	7.7	0.855786	2.41	4.81	6.01
9.0	7.8	1.074986	1.92	3.83	4.79
9.0	7.9	1.349569	1.53	3.05	3.81
9.0	8.0	1.693090	1.22	2.43	3.04
9.0	8.1	2.122168	0.97	1.94	2.43
9.0	8.2	2.657047	0.78	1.55	1.94
9.0	8.3	3.322164	0.62	1.24	1.55
9.0	8.4	4.146683	0.50	0.99	1.24
9.0	8.5	5.164902	0.40	0.80	1.00
9.0	8.6	6.416409	0.32	0.64	0.80
9.0	8.7	7.945760	0.26	0.52	0.65
9.0	8.8	9.801463	0.21	0.42	0.53
9.0	8.9	12.033894	0.17	0.34	0.43
9.0	9.0	14.691971	0.14	0.28	0.35
9.0	9.1	17.818237	0.12	0.23	0.29
9.0	9.2	21.442435	0.10	0.19	0.24
9.0	9.3	25.574615	0.08	0.16	0.20
9.0	9.4	30.196884	0.07	0.14	0.17
9.0	9.5	35.258789	0.06	0.12	0.15
9.0	9.6	40.674789	0.05	0.10	0.13
9.0	9.7	46.327423	0.05	0.09	0.11
9.0	9.8	52.076035	0.04	0.08	0.10
9.0	9.9	57.770203	0.04	0.07	0.09
9.0	10.0	63.265015	0.04	0.07	0.08
9.0	10.1	68.435562	0.03	0.06	0.08

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
9.5	5.0	0.001791	1436.65	2873.30	2298.64
9.5	5.1	0.002255	912.94	1825.88	2282.35
9.5	5.2	0.002839	725.18	1450.36	1812.95
9.5	5.3	0.003574	576.04	1152.07	1440.09
9.5	5.4	0.004500	457.57	915.13	1143.92
9.5	5.5	0.005665	363.47	726.93	908.66
9.5	5.6	0.007132	288.72	577.43	721.78
9.5	5.7	0.008978	229.34	458.68	573.34
9.5	5.8	0.011302	182.18	364.35	455.44
9.5	5.9	0.014228	144.71	289.42	361.78
9.5	6.0	0.017912	114.95	229.90	287.38
9.5	6.1	0.022549	91.32	182.63	228.28
9.5	6.2	0.028385	72.54	145.08	181.34
8.5	6.3	0.035732	57.63	115.25	144.06
9.5	6.4	0.044980	45.78	91.55	114.44
9.5	6.5	0.056620	36.37	72.73	90.91
9.5	6.6	0.071270	28.89	57.78	72.23
9.5	6.7	0.089706	22.96	45.91	57.38
9.5	6.8	0.112907	18.24	36.47	45.59
9.5	6.9	0.142100	14.49	28.98	36.22
9.5	7.0	0.178828	11.52	23.03	28.78
9.5	7.1	0.225026	9.15	18.30	22.88
9.5	7.2	0.283126	7.27	14.54	18.18
9.5	7.3	0.356172	5.78	11.56	14.45
9.5	7.4	0.447981	4.60	9.19	11.49
9.5	7.5	0.563321	3.66	7.31	9.14
9.5	7.6	0.708145	2.91	5.82	7.27
9.5	7.7	0.889868	2.32	4.63	5.78
9.5	7.8	1.117701	1.84	3.68	4.61
9.5	7.9	1.403039	1.47	2.94	3.67
9.5	8.0	1.759926	1.17	2.34	2.92
9.5	8.1	2.205562	0.94	1.87	2.33
9.5	8.2	2.760865	0.75	1.49	1.86
9.5	8.3	3.451054	0.60	1.19	1.49
9.5	8.4	4.306136	0.48	0.96	1.20
9.5	8.5	5.361318	0.39	0.77	0.96
9.5	8.6	6.657079	0.31	0.62	0.77
9.5	8.7	8.238744	0.25	0.50	0.62
9.5	8.8	10.155314	0.21	0.41	0.51
9.5	8.9	12.457209	0.17	0.33	0.41
9.5	9.0	15.192640	0.14	0.27	0.34
9.5	9.1	18.402481	0.11	0.22	0.28
9.5	9.2	22.113632	0.10	0.19	0.23
9.5	9.3	26.331696	0.08	0.16	0.20
9.5	9.4	31.033737	0.07	0.13	0.17
9.5	9.5	36.163254	0.06	0.11	0.14
9.5	9.6	41.628845	0.05	0.10	0.12
9.5	9.7	47.308334	0.05	0.09	0.11
9.5	9.8	53.058334	0.04	0.08	0.10
9.5	9.9	58.728287	0.04	0.07	0.09
9.5	10.0	64.175751	0.03	0.06	0.08
9.5	10.1	69.280334	0.03	0.06	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
10.0	5.0	0.001863	1105.08	2210.15	2762.69
10.0	5.1	0.002346	877.80	1755.60	2194.50
10.0	5.2	0.002953	697.27	1394.53	1743.16
10.0	5.3	0.003718	553.86	1107.72	1384.66
10.0	5.4	0.004680	439.96	879.91	1099.88
10.0	5.5	0.005892	349.47	698.94	873.68
10.0	5.6	0.007417	277.60	555.20	694.00
10.0	5.7	0.009337	220.51	441.02	551.28
10.0	5.8	0.011755	175.16	350.32	437.90
10.0	5.9	0.014798	139.14	278.28	347.85
10.0	6.0	0.018629	110.53	221.05	276.35
10.0	6.1	0.023451	87.80	175.60	219.50
10.0	6.2	0.029521	69.75	139.49	174.37
10.0	6.3	0.037162	55.41	110.81	138.51
10.0	6.4	0.046780	44.02	88.03	110.04
10.0	6.5	0.058885	34.97	69.93	87.47
10.0	6.6	0.074121	27.78	55.56	69.45
10.0	6.7	0.093295	22.07	44.14	55.17
10.0	6.8	0.117423	17.54	35.07	43.84
10.0	6.9	0.147781	13.93	27.86	34.83
10.0	7.0	0.185974	11.07	22.14	27.68
10.0	7.1	0.234014	8.80	17.60	22.00
10.0	7.2	0.294428	7.00	13.99	17.48
10.0	7.3	0.370380	5.56	11.12	13.90
10.0	7.4	0.465833	4.42	8.84	11.05
10.0	7.5	0.585742	3.52	7.03	8.79
10.0	7.6	0.736288	2.80	5.59	6.99
10.0	7.7	0.925166	2.23	4.45	5.56
10.0	7.8	1.161929	1.77	3.54	4.43
10.0	7.9	1.458393	1.41	2.82	3.53
10.0	8.0	1.829101	1.13	2.25	2.81
10.0	8.1	2.291843	0.90	1.80	2.25
10.0	8.2	2.868236	0.72	1.43	1.79
10.0	8.3	3.584270	0.58	1.15	1.44
10.0	8.4	4.470831	0.46	0.92	1.15
10.0	8.5	5.564026	0.37	0.74	0.93
10.0	8.6	6.905202	0.30	0.60	0.75
10.0	8.7	8.540426	0.24	0.48	0.60
10.0	8.8	10.519133	0.20	0.39	0.49
10.0	8.9	12.891670	0.16	0.32	0.40
10.0	9.0	15.705387	0.13	0.26	0.33
10.0	9.1	18.999268	0.11	0.22	0.27
10.0	9.2	22.797165	0.09	0.18	0.23
10.0	9.3	27.100220	0.08	0.15	0.19
10.0	9.4	31.880127	0.07	0.13	0.16
10.0	9.5	37.074326	0.06	0.11	0.14
10.0	9.6	42.585770	0.05	0.10	0.12
10.0	9.7	48.287796	0.04	0.08	0.11
10.0	9.8	54.034760	0.04	0.08	0.10
10.0	9.9	59.676407	0.04	0.07	0.09
10.0	10.0	65.073166	0.03	0.06	0.08
10.0	10.1	70.109451	0.03	0.06	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
10.5	5.0	0.001938	1062.68	2125.36	2656.70
10.5	5.1	0.002439	844.12	1688.24	2110.31
10.5	5.2	0.003071	670.52	1341.03	1676.29
10.5	5.3	0.003866	532.62	1065.23	1331.54
10.5	5.4	0.004867	423.08	846.15	1057.69
10.5	5.5	0.006127	336.07	672.13	840.16
10.5	5.6	0.007713	266.95	533.90	667.38
10.5	5.7	0.009710	212.05	424.10	530.13
10.5	5.8	0.012224	168.44	336.88	421.11
10.5	5.9	0.015388	133.81	267.61	334.51
10.5	6.0	0.019372	106.29	212.57	265.72
10.5	6.1	0.024387	84.43	168.86	211.08
10.5	6.2	0.030699	67.07	134.14	167.68
10.5	6.3	0.038644	53.28	106.56	133.20
10.5	6.4	0.048645	42.33	84.65	105.82
10.5	6.5	0.061233	33.63	67.25	84.06
10.5	6.6	0.077076	26.72	53.43	66.78
10.5	6.7	0.097013	21.23	42.45	53.06
10.5	6.8	0.122101	16.87	33.73	42.16
10.5	6.9	0.153668	13.40	26.80	33.50
10.5	7.0	0.193379	10.65	21.29	26.62
10.5	7.1	0.243328	8.46	16.92	21.15
10.5	7.2	0.306138	6.73	13.45	16.81
10.5	7.3	0.385099	5.35	10.69	13.37
10.5	7.4	0.484328	4.25	8.50	10.63
10.5	7.5	0.608968	3.38	6.76	8.45
10.5	7.6	0.765438	2.69	5.38	6.72
10.5	7.7	0.916722	2.14	4.28	5.35
10.5	7.8	1.207726	1.71	3.41	4.26
10.5	7.9	1.515695	1.36	2.72	3.40
10.5	8.0	1.900685	1.09	2.17	2.71
10.5	8.1	2.381100	0.87	1.73	2.16
10.5	8.2	2.979254	0.69	1.38	1.73
10.5	8.3	3.721942	0.56	1.11	1.38
10.5	8.4	4.640923	0.45	0.89	1.11
10.5	8.5	5.773191	0.36	0.71	0.89
10.5	8.6	7.160964	0.29	0.57	0.72
10.5	8.7	8.850996	0.23	0.46	0.58
10.5	8.8	10.893088	0.19	0.38	0.47
10.5	8.9	13.337388	0.16	0.31	0.39
10.5	9.0	16.230255	0.13	0.25	0.32
10.5	9.1	19.608612	0.11	0.21	0.26
10.5	9.2	23.492996	0.09	0.17	0.22
10.5	9.3	27.879974	0.08	0.15	0.18
10.5	9.4	32.735641	0.07	0.13	0.16
10.5	9.5	37.991486	0.06	0.11	0.14
10.5	9.6	43.544922	0.05	0.09	0.12
10.5	9.7	49.265182	0.04	0.08	0.10
10.5	9.8	55.004745	0.04	0.07	0.09
10.5	9.9	60.614120	0.04	0.07	0.08
10.5	10.0	65.956970	0.03	0.06	0.08
10.5	10.1	70.922760	0.03	0.06	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
11.0	5.0	0.002015	1022.06	2044.11	2555.14
11.0	5.1	0.002536	811.85	1623.70	2029.63
11.0	5.2	0.003193	644.88	1289.76	1612.21
11.0	5.3	0.004019	512.26	1024.51	1280.63
11.0	5.4	0.005060	406.90	813.80	1017.26
11.0	5.5	0.006390	323.22	646.44	808.05
11.0	5.6	0.008020	256.75	513.49	641.87
11.0	5.7	0.010096	203.95	407.89	509.86
11.0	5.8	0.012710	162.01	324.01	405.01
11.0	5.9	0.016000	128.69	257.38	321.72
11.0	6.0	0.020142	102.23	204.45	255.56
11.0	6.1	0.025356	81.21	162.41	203.01
11.0	6.2	0.031919	64.51	129.01	161.27
11.0	6.3	0.040180	51.25	102.49	128.11
11.0	6.4	0.050578	40.71	81.42	101.77
11.0	6.5	0.063666	32.34	64.68	80.85
11.0	6.6	0.080137	25.70	51.39	64.23
11.0	6.7	0.100865	20.42	40.83	51.03
11.0	6.8	0.126949	16.22	32.44	40.55
11.0	6.9	0.159766	12.89	25.77	32.22
11.0	7.0	0.201050	10.24	20.48	25.60
11.0	7.1	0.252975	8.14	16.28	20.35
11.0	7.2	0.318268	6.47	12.94	16.17
11.0	7.3	0.400345	5.15	10.29	12.86
11.0	7.4	0.503483	4.09	8.18	10.22
11.0	7.5	0.633021	3.25	6.50	8.13
11.0	7.6	0.795621	2.59	5.17	6.47
11.0	7.7	0.999567	2.06	4.12	5.15
11.0	7.8	1.255130	2.05	4.10	3.28
11.0	7.9	1.574994	1.31	2.61	3.27
11.0	8.0	1.974744	1.04	2.08	2.61
11.0	8.1	2.473405	0.83	1.66	2.08
11.0	8.2	3.094016	0.67	1.33	1.66
11.0	8.3	3.864173	0.53	1.06	1.33
11.0	8.4	4.186510	0.43	0.85	1.07
11.0	8.5	5.988933	0.35	0.69	0.86
11.0	8.6	7.424474	0.28	0.55	0.69
11.0	8.7	9.170552	0.23	0.45	0.56
11.0	8.8	11.277250	0.18	0.36	0.46
11.0	8.9	13.794406	0.15	0.30	0.37
11.0	9.0	16.767227	0.12	0.24	0.31
11.0	9.1	20.230377	0.10	0.20	0.25
11.0	9.2	24.200836	0.09	0.17	0.21
11.0	9.3	28.670441	0.07	0.14	0.18
11.0	9.4	33.599640	0.06	0.12	0.15
11.0	9.5	38.913986	0.05	0.10	0.13
11.0	9.6	44.505478	0.05	0.09	0.12
11.0	9.7	50.239424	0.04	0.08	0.10
11.0	9.8	55.967484	0.04	0.07	0.09
11.0	9.9	61.540726	0.04	0.07	0.08
11.0	10.0	66.826706	0.03	0.06	0.08
11.0	10.1	71.720001	0.03	0.06	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
11.5	5.0	0.002094	983.12	1966.23	2457.79
11.5	5.1	0.002637	780.92	1561.84	1952.31
11.5	5.2	0.003319	620.32	1240.63	1550.79
11.5	5.3	0.004179	492.73	985.48	1231.85
11.5	5.4	0.005261	391.40	782.80	978.50
11.5	5.5	0.006623	310.91	621.81	777.26
11.5	5.6	0.008337	246.97	493.93	617.41
11.5	5.7	0.010496	196.18	392.35	490.44
11.5	5.8	0.013213	155.83	311.66	389.58
11.5	5.9	0.016633	123.79	247.57	309.47
11.5	6.0	0.020939	98.33	196.66	245.83
11.5	6.1	0.026360	78.11	156.22	195.28
11.5	6.2	0.033183	62.05	124.10	155.13
11.5	6.3	0.041771	49.29	98.58	123.23
11.5	6.4	0.052580	39.16	78.32	97.90
11.5	6.5	0.066186	31.11	62.22	77.77
11.5	6.6	0.083308	24.72	49.43	61.79
11.5	6.7	0.104856	19.64	39.27	49.09
11.5	6.8	0.131970	15.60	31.20	39.00
11.5	6.9	0.166084	12.40	24.79	30.99
11.5	7.0	0.208997	9.85	19.70	24.63
11.5	7.1	0.262969	7.83	15.66	19.57
11.5	7.2	0.330833	6.23	12.45	15.56
11.5	7.3	0.416136	4.93	9.86	12.37
11.5	7.4	0.523320	3.94	7.87	9.84
11.5	7.5	0.657929	3.13	6.26	7.82
11.5	7.6	0.826873	2.49	4.98	6.23
11.5	7.7	1.038746	1.98	3.96	4.96
11.5	7.8	1.304193	1.58	3.16	3.95
11.5	7.9	1.636356	1.26	2.52	3.15
11.5	8.0	2.051356	1.01	2.01	2.51
11.5	8.1	2.568856	0.80	1.60	2.00
11.5	8.2	3.212626	0.64	1.28	1.60
11.5	8.3	4.011085	0.52	1.03	1.28
11.5	8.4	4.997746	0.41	0.82	1.03
11.5	8.5	6.211401	0.33	0.66	0.83
11.5	8.6	7.695907	0.27	0.53	0.67
11.5	8.7	9.499279	0.22	0.43	0.54
11.5	8.8	11.671788	0.18	0.35	0.44
11.5	8.9	14.262853	0.15	0.29	0.36
11.5	9.0	17.316345	0.12	0.24	0.30
11.5	9.1	20.864471	0.10	0.20	0.25
11.5	9.2	24.920502	0.08	0.16	0.21
11.5	9.3	29.471359	0.07	0.14	0.17
11.5	9.4	34.471710	0.06	0.12	0.15
11.5	9.5	39.841202	0.05	0.10	0.13
11.5	9.6	45.466766	0.05	0.09	0.11
11.5	9.7	51.210495	0.04	0.08	0.10
11.5	9.8	56.922424	0.04	0.07	0.09
11.5	9.9	62.455872	0.03	0.06	0.08
11.5	10.0	67.682114	0.03	0.06	0.08
11.5	10.1	72.501129	0.03	0.06	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
12.0	5.0	0.002177	945.79	1891.58	2364.47
12.0	5.1	0.002741	751.27	1502.54	1878.18
12.0	5.2	0.003450	596.76	1193.52	1491.90
12.0	5.3	0.004344	474.03	948.06	1185.07
12.0	5.4	0.005468	376.54	753.08	941.35
12.0	5.5	0.006884	299.10	598.20	747.75
12.0	5.6	0.008666	237.59	475.18	593.97
12.0	5.7	0.010910	188.73	377.45	471.82
12.0	5.8	0.013734	149.92	299.83	374.79
12.0	5.9	0.017290	119.09	238.17	297.72
12.0	6.0	0.021766	94.60	189.20	236.50
12.0	6.1	0.027400	75.15	150.29	187.87
12.0	6.2	0.034492	59.70	119.39	149.24
12.0	6.3	0.043419	47.42	94.84	118.56
12.0	6.4	0.054655	37.67	75.34	94.18
12.0	6.5	0.068796	29.93	59.86	74.82
12.0	6.6	0.086594	23.78	47.55	59.44
12.0	6.7	0.108990	18.89	37.78	47.23
12.0	6.8	0.137172	15.01	30.02	37.53
12.0	6.9	0.172627	11.93	23.85	29.82
12.0	7.0	0.217228	9.48	18.96	23.70
12.0	7.1	0.273320	7.54	15.07	18.83
12.0	7.2	0.343845	5.99	11.98	14.97
12.0	7.3	0.432490	4.76	9.52	11.90
12.0	7.4	0.543863	3.79	7.57	9.46
12.0	7.5	0.683719	3.01	6.02	7.53
12.0	7.6	0.859228	2.40	4.79	5.99
12.0	7.7	1.079301	1.91	3.81	4.77
12.0	7.8	1.354971	1.52	3.04	3.80
12.0	7.9	1.699842	1.21	2.42	3.03
12.0	8.0	2.130595	0.97	1.93	2.42
12.0	8.1	2.667542	0.77	1.54	1.93
12.0	8.2	3.335194	0.62	1.23	1.54
12.0	8.3	4.162807	0.50	0.99	1.24
12.0	8.4	5.184772	0.40	0.79	0.99
12.0	8.5	6.440766	0.32	0.64	0.80
12.0	8.6	7.975429	0.26	0.52	0.65
12.0	8.7	9.837313	0.21	0.42	0.53
12.0	8.8	12.076824	0.17	0.34	0.43
12.0	8.9	14.742795	0.14	0.28	0.35
12.0	9.0	17.877609	0.12	0.23	0.29
12.0	9.1	21.510818	0.10	0.19	0.24
12.0	9.2	25.651764	0.08	0.16	0.20
12.0	9.3	30.282303	0.07	0.13	0.17
12.0	9.4	35.351288	0.06	0.12	0.15
12.0	9.5	40.772552	0.05	0.10	0.13
12.0	9.6	46.428116	0.05	0.09	0.11
12.0	9.7	52.177094	0.04	0.08	0.10
12.0	9.8	57.868942	0.04	0.07	0.09
12.0	9.9	63.359085	0.03	0.06	0.08
12.0	10.0	68.522949	0.03	0.06	0.08
12.0	10.1	73.266113	0.03	0.06	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
12.5	5.0	0.002263	910.01	1820.01	2275.01
12.5	5.1	0.002848	722.85	1445.69	1807.12
12.5	5.2	0.003586	574.18	1148.36	1435.46
12.5	5.3	0.004514	456.10	912.19	1140.24
12.5	5.4	0.005683	362.30	724.59	905.73
12.5	5.5	0.007155	287.79	575.57	719.43
12.5	5.6	0.009007	228.60	457.20	571.50
12.5	5.7	0.011339	181.59	363.17	453.97
12.5	5.8	0.014274	144.25	288.49	360.61
12.5	5.9	0.017970	144.58	289.16	361.46
12.5	6.0	0.022621	91.02	182.04	227.55
12.5	6.1	0.028477	72.31	144.61	180.76
12.5	6.2	0.035848	57.44	114.87	143.59
12.5	6.3	0.045125	45.63	91.26	114.07
12.5	6.4	0.056803	36.25	72.50	90.62
12.5	6.5	0.071500	28.80	57.59	71.99
12.5	6.6	0.089996	22.90	45.79	57.20
12.5	6.7	0.113271	18.18	36.35	45.44
12.5	6.8	0.142558	14.45	28.89	36.11
12.5	6.9	0.179404	11.48	22.95	28.69
12.5	7.0	0.225751	9.12	18.24	22.80
12.5	7.1	0.284037	7.25	14.50	18.12
12.5	7.2	0.357319	5.76	11.52	14.41
12.5	7.3	0.449421	4.58	9.16	11.45
12.5	7.4	0.565129	3.65	7.29	9.11
12.5	7.5	0.710415	2.90	5.80	7.25
12.5	7.6	0.892716	2.31	4.61	5.77
12.5	7.7	1.121268	1.84	3.67	4.59
12.5	7.8	1.407505	1.46	2.92	3.66
12.5	7.9	1.765508	1.17	2.33	2.92
12.5	8.0	2.212527	0.93	1.86	2.33
12.5	8.1	2.769537	0.75	1.49	1.86
12.5	8.2	3.461811	0.60	1.19	1.49
12.5	8.3	4.319439	0.48	0.95	1.19
12.5	8.4	5.377696	0.38	0.76	0.96
12.5	8.5	6.677136	0.31	0.62	0.77
12.5	8.6	8.263145	0.25	0.50	0.62
12.5	8.7	10.184763	0.20	0.40	0.51
12.5	8.8	12.492405	0.17	0.33	0.41
12.5	8.9	15.234232	0.14	0.27	0.34
12.5	9.0	18.450928	0.11	0.22	0.28
12.5	9.1	22.169205	0.09	0.18	0.23
12.5	9.2	26.394272	0.08	0.16	0.20
12.5	9.3	31.102768	0.07	0.13	0.17
12.5	9.4	36.237701	0.06	0.11	0.11
12.5	9.5	41.707199	0.05	0.10	0.12
12.5	9.6	47.388672	0.05	0.09	0.11
12.5	9.7	53.138611	0.04	0.08	0.10
12.5	9.8	58.806381	0.04	0.07	0.09
12.5	9.9	64.249832	0.03	0.06	0.08
12.5	10.0	69.348877	0.03	0.06	0.07
12.5	10.1	74.014801	0.03	0.05	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
13.0	5.0	0.002351	875.69	1751.38	2189.23
13.0	5.1	0.002960	695.59	1391.18	1738.98
13.0	5.2	0.003726	552.53	1105.06	1381.33
13.0	5.3	0.004691	438.90	877.79	1097.24
13.0	5.4	0.005906	348.63	697.26	871.58
13.0	5.5	0.007435	276.94	553.87	692.33
13.0	5.6	0.009360	219.98	439.96	549.95
13.0	5.7	0.011783	174.74	349.48	436.85
13.0	5.8	0.014834	138.81	277.61	347.02
13.0	5.9	0.018674	110.26	220.52	275.66
13.0	6.0	0.023508	87.59	175.18	218.97
13.0	6.1	0.029592	69.58	139.16	173.95
13.0	6.2	0.037252	55.27	110.54	138.18
13.0	6.3	0.046893	43.91	87.82	109.77
13.0	6.4	0.059027	34.88	69.76	87.21
13.0	6.5	0.074299	27.71	55.42	69.28
13.0	6.6	0.093519	22.02	44.03	55.04
13.0	6.7	0.117705	17.49	34.98	43.73
13.0	6.8	0.148136	13.90	27.80	34.75
13.0	6.9	0.186421	11.05	22.09	27.61
13.0	7.0	0.234576	8.78	17.55	21.94
13.0	7.1	0.295134	6.98	13.95	17.44
13.0	7.2	0.371268	5.55	11.09	13.86
13.0	7.3	0.466949	4.41	8.82	11.02
13.0	7.4	0.587144	3.51	7.01	8.77
13.0	7.5	0.738047	2.79	5.58	6.97
13.0	7.6	0.927373	2.22	4.44	5.55
13.0	7.7	1.164695	1.77	3.53	4.42
13.0	7.8	1.461854	1.41	2.82	3.52
13.0	7.9	1.833423	1.13	2.25	2.81
13.0	8.0	2.297234	0.90	1.79	2.24
13.0	8.1	2.874942	0.71	1.42	1.79
13.0	8.2	3.592588	0.58	1.15	1.43
13.0	8.3	4.481112	0.46	0.92	1.15
13.0	8.4	5.576673	0.37	0.74	0.92
13.0	8.5	6.920680	0.30	0.59	0.74
13.0	8.6	8.559232	0.24	0.48	0.60
13.0	8.7	10.541792	0.20	0.39	0.49
13.0	8.8	12.918694	0.16	0.32	0.40
13.0	8.9	15.737243	0.13	0.26	0.33
13.0	9.01	9.036301	0.11	0.22	0.27
13.0	9.1	22.839508	0.09	0.18	0.23
13.0	9.2	27.147751	0.08	0.15	0.19
13.0	9.3	31.932358	0.07	0.13	0.16
13.0	9.4	37.130447	0.06	0.11	0.14
13.0	9.5	42.644577	0.05	0.10	0.12
13.0	9.6	48.347839	0.04	0.08	0.11
13.0	9.7	59.094498	0.04	0.08	0.10
13.0	9.8	59.734268	0.04	0.07	0.09
13.0	9.9	65.127808	0.03	0.06	0.08
13.0	10.0	70.159790	0.03	0.06	0.07
13.0	10.1	74.747238	0.03	0.05	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
13.5	5.0	0.002443	842.79	1685.57	2106.96
13.5	5.1	0.003076	669.45	1338.90	1673.63
13.5	5.2	0.003872	531.77	1063.54	1329.42
13.5	5.3	0.004874	422.41	844.81	1056.01
13.5	5.4	0.006137	335.53	671.06	838.83
13.5	5.5	0.007725	266.53	533.05	666.32
13.5	5.6	0.009725	211.72	423.43	529.29
13.5	5.7	0.012243	168.18	336.35	420.44
13.5	5.8	0.015413	133.59	267.18	333.98
13.5	5.9	0.019403	106.12	212.24	265.30
13.5	6.0	0.024425	84.30	168.59	210.74
13.5	6.1	0.030748	66.97	133.93	167.41
13.5	6.2	0.038706	53.20	106.39	132.99
13.5	6.3	0.048723	42.26	84.52	105.65
13.5	6.4	0.061330	33.57	67.14	83.93
13.5	6.5	0.077198	26.67	53.34	66.68
13.5	6.6	0.097167	21.19	42.38	52.98
13.5	6.7	0.122295	16.84	33.67	42.09
13.5	6.8	0.153912	13.38	26.75	33.44
13.5	6.9	0.193686	10.63	21.26	26.58
13.5	7.0	0.243713	8.45	16.90	21.12
13.5	7.1	0.306623	6.72	13.43	16.79
13.5	7.2	0.385709	5.34	10.68	13.35
13.5	7.3	0.485094	4.25	8.49	10.61
13.5	7.4	0.609930	3.38	6.75	8.44
13.5	7.5	0.766644	2.69	5.37	6.71
13.5	7.6	0.963235	2.14	4.27	5.34
13.5	7.7	1.209622	1.70	3.40	4.26
13.5	7.8	1.518067	1.36	2.71	3.39
13.5	7.9	1.903648	1.08	2.16	2.70
13.5	8.0	2.384792	0.87	1.73	2.16
13.5	8.1	2.983849	0.69	1.38	1.73
13.5	8.2	3.727636	0.55	1.10	1.38
13.5	8.3	4.647949	0.44	0.88	1.11
13.5	8.4	5.781829	0.36	0.71	0.89
13.5	8.5	7.171528	0.29	0.57	0.72
13.5	8.6	8.863815	0.23	0.46	0.58
13.5	8.7	10.908510	0.19	0.38	0.47
13.5	8.8	13.355752	0.16	0.31	0.39
13.5	8.9	16.251862	0.13	0.25	0.32
13.5	9.0	19.633667	0.11	0.21	0.26
13.5	9.1	23.521530	0.09	0.17	0.22
13.5	9.2	27.911911	0.08	0.15	0.18
13.5	9.3	32.770599	0.06	0.12	0.16
13.5	9.4	38.028915	0.06	0.11	0.14
13.5	9.5	43.583969	0.05	0.09	0.12
13.5	9.6	49.304855	0.04	0.08	0.10
13.5	9.7	55.044052	0.04	0.07	0.09
13.5	9.8	60.651993	0.04	0.07	0.08
13.5	9.9	65.992615	0.03	0.06	0.08
13.5	10.0	70.955490	0.03	0.06	0.07
13.5	10.1	75.463333	0.03	0.05	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
14.0	5.0	0.002538	811.22	1622.44	2028.05
14.0	5.1	0.003195	644.38	1288.76	1610.95
14.0	5.2	0.004023	511.86	1023.71	1279.64
14.0	5.3	0.005064	406.59	813.17	1016.46
14.0	5.4	0.006375	322.97	645.93	807.42
14.0	5.5	0.008026	256.55	513.09	641.36
14.0	5.6	0.010104	203.79	407.57	509.47
14.0	5.7	0.012719	161.88	323.75	404.69
14.0	5.8	0.016012	128.59	257.18	321.47
14.0	5.9	0.020157	102.15	204.29	255.36
14.0	6.0	0.025375	81.14	162.28	202.85
14.0	6.1	0.031944	64.46	128.91	161.14
14.0	6.2	0.040211	51.21	102.41	128.01
14.0	6.3	0.050618	40.68	81.35	101.69
14.0	6.4	0.063715	32.32	64.63	80.79
14.0	6.5	0.080199	25.68	51.35	64.18
14.0	6.6	0.100944	20.40	40.79	50.99
14.0	6.7	0.127048	16.21	32.41	40.52
14.0	6.8	0.159891	12.88	25.75	32.19
14.0	6.9	0.201207	10.24	20.47	25.58
14.0	7.0	0.253172	8.13	16.26	20.33
14.0	7.1	0.318516	6.47	12.93	16.16
14.0	7.2	0.400657	5.13	10.26	12.82
14.0	7.3	0.503873	4.09	8.17	10.22
14.0	7.4	0.633511	3.25	6.50	8.13
14.0	7.5	0.796236	2.59	5.17	6.46
14.0	7.6	1.000338	2.06	4.12	5.15
14.0	7.7	1.256096	1.64	3.28	4.10
14.0	7.8	1.576203	1.31	2.61	3.27
14.0	7.9	1.976254	1.04	2.08	2.60
14.0	8.0	2.475287	0.83	1.66	2.08
14.0	8.1	3.096354	0.67	1.33	1.66
14.0	8.2	3.867069	0.53	1.06	1.33
14.0	8.3	4.820082	0.43	0.85	1.07
14.0	8.4	5.993320	0.35	0.69	0.86
14.0	8.5	7.429831	0.28	0.55	0.69
14.0	8.6	9.177052	0.23	0.45	0.56
14.0	8.7	11.285058	0.18	0.36	0.46
14.0	8.8	13.803685	0.15	0.30	0.37
14.0	8.9	16.778107	0.12	0.24	0.31
14.0	9.0	20.242950	0.10	0.20	0.25
14.0	9.1	24.215134	0.09	0.17	0.21
14.0	9.2	28.686386	0.07	0.14	0.18
14.0	9.3	33.617050	0.06	0.12	0.15
14.0	9.4	38.932526	0.05	0.10	0.13
14.0	9.5	44.524719	0.05	0.09	0.12
14.0	9.6	50.259125	0.04	0.08	0.10
14.0	9.7	55.986694	0.04	0.07	0.09
14.0	9.8	61.559189	0.04	0.07	0.08
14.0	9.9	66.843964	0.03	0.06	0.08
14.0	10.0	71.735809	0.03	0.06	0.07
14.0	10.1	76.163239	0.03	0.05	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
14.5	5.0	0.002637	780.95	1561.89	1952.36
14.5	5.1	0.003319	620.33	1240.66	1550.83
14.5	5.2	0.004179	492.75	985.50	1231.88
14.5	5.3	0.005260	391.41	782.82	978.53
14.5	5.4	0.006622	310.92	621.83	777.28
14.5	5.5	0.008337	246.97	493.94	617.43
14.5	5.6	0.101495	196.18	392.36	490.45
14.5	5.7	0.013213	155.84	311.67	389.59
14.5	5.8	0.016633	123.79	247.58	309.48
14.5	5.9	0.020939	98.34	196.67	245.84
14.5	6.0	0.026359	78.12	156.23	195.29
14.5	6.1	0.033182	62.05	124.10	155.13
14.5	6.2	0.041769	49.30	98.59	123.24
14.5	6.3	0.052579	39.16	78.32	97.90
14.5	6.4	0.066184	31.11	62.22	77.78
14.5	6.5	0.083306	24.72	49.43	61.79
14.5	6.6	0.104853	19.64	39.27	49.09
14.5	6.7	0.131966	15.60	31.20	39.01
14.5	6.8	0.166079	12.40	24.79	30.99
14.5	6.9	0.208991	9.85	19.70	24.63
14.5	7.0	0.262961	7.83	15.66	19.58
14.5	7.1	0.330823	7.78	15.56	12.45
14.5	7.2	0.416125	4.95	9.90	12.37
14.5	7.3	0.523305	3.94	7.87	9.84
14.5	7.4	0.657910	3.13	6.26	7.82
14.5	7.5	0.826850	2.49	4.98	6.23
14.5	7.6	1.038716	1.98	3.96	4.96
14.5	7.7	1.304158	1.58	3.16	3.95
14.5	7.8	1.636310	1.26	2.52	3.15
14.5	7.9	2.051298	1.01	2.01	2.51
14.5	8.0	2.568785	0.80	1.60	2.00
14.5	8.1	3.212536	0.64	1.28	1.60
14.5	8.2	4.010974	0.52	1.03	1.28
14.5	8.3	4.997609	0.41	0.82	1.03
14.5	8.4	6.211236	0.31	0.62	0.78
14.5	8.5	7.695704	0.27	0.53	0.67
14.5	8.6	9.499033	0.22	0.43	0.54
14.5	8.7	11.671494	0.18	0.35	0.44
14.5	8.8	14.262504	0.15	0.29	0.36
14.5	8.9	17.315933	0.12	0.24	0.30
14.5	9.0	20.863998	0.10	0.20	0.25
14.5	9.1	24.919968	0.08	0.16	0.21
14.5	9.2	29.470764	0.07	0.14	0.17
14.5	9.3	34.471069	0.06	0.12	0.15
14.5	9.4	39.840515	0.05	0.10	0.13
14.5	9.5	45.466049	0.05	0.09	0.11
14.5	9.6	51.209763	0.04	0.08	0.10
14.5	9.7	56.921707	0.04	0.07	0.09
14.5	9.8	62.455200	0.03	0.06	0.08
14.5	9.9	67.681503	0.03	0.06	0.08
14.5	10.0	72.500580	0.03	0.06	0.07
14.5	10.1	76.846893	0.03	0.05	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
15.0	5.0	0.002738	751.90	1503.79	1879.74
15.0	5.1	0.003447	597.26	1194.52	1493.15
15.0	5.2	0.004340	474.43	948.85	1186.06
15.0	5.3	0.005464	376.86	753.71	942.13
15.0	5.4	0.006878	299.35	598.70	748.37
15.0	5.5	0.008659	237.79	475.57	594.47
15.0	5.6	0.010901	188.89	377.77	472.21
15.0	5.7	0.013723	150.04	300.08	375.10
15.0	5.8	0.017275	119.19	238.37	297.97
15.0	5.9	0.021748	94.68	189.35	236.69
15.0	6.0	0.027377	75.21	150.42	188.02
15.0	6.1	0.034463	59.75	119.49	149.36
15.0	6.2	0.043382	47.46	94.92	118.65
15.0	6.3	0.054609	37.71	75.41	94.26
15.0	6.4	0.068739	29.95	59.90	74.88
15.0	6.5	0.086522	23.80	47.59	59.49
15.0	6.6	0.108900	18.91	37.81	47.27
15.0	6.7	0.137058	15.02	30.04	37.56
15.0	6.8	0.172484	11.94	23.87	29.84
15.0	6.9	0.217048	9.49	18.97	23.71
15.0	7.0	0.273093	7.54	15.08	18.85
15.0	7.1	0.343560	6.00	11.99	14.98
15.0	7.2	0.432131	4.77	9.53	11.91
15.0	7.3	0.543412	3.79	7.58	9.47
15.0	7.4	0.683153	3.01	6.02	7.53
15.0	7.5	0.858519	2.40	4.80	6.00
15.0	7.6	1.078414	1.91	3.82	4.77
15.0	7.7	1.353860	1.52	3.04	3.80
15.0	7.8	1.698453	1.21	2.42	3.03
15.0	7.9	2.128860	0.97	1.93	2.42
15.0	8.0	2.665380	0.77	1.54	1.93
15.0	8.1	3.332511	0.62	1.23	1.54
15.0	8.2	4.159486	0.50	0.99	1.24
15.0	8.3	5.180678	0.40	0.79	0.99
15.0	8.4	6.435757	0.32	0.64	0.80
15.0	8.5	7.969327	0.26	0.52	0.65
15.0	8.6	9.829939	0.21	0.42	0.52
15.0	8.7	12.067986	0.17	0.34	0.43
15.0	8.8	14.732332	0.14	0.28	0.35
15.0	8.9	17.865387	0.12	0.23	0.29
15.0	9.0	21.496765	0.10	0.19	0.24
15.0	9.1	25.635895	0.08	0.16	0.20
15.0	9.2	30.264740	0.07	0.14	0.17
15.0	9.3	35.332260	0.06	0.12	0.15
15.0	9.4	40.752441	0.05	0.10	0.13
15.0	9.5	46.407425	0.05	0.09	0.11
15.0	9.6	52.156326	0.04	0.08	0.10
15.0	9.7	57.848663	0.04	0.07	0.09
15.0	9.8	63.339767	0.03	0.06	0.08
15.0	9.9	68.505005	0.03	0.06	0.08
15.0	10.0	73.249847	0.03	0.06	0.07
15.0	10.1	77.514450	0.03	0.05	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
15.5	5.0	0.002844	724.03	1448.05	1810.06
15.5	5.1	0.003580	575.12	1150.24	1437.80
15.5	5.2	0.004507	456.84	913.68	1142.10
15.5	5.3	0.005674	362.89	725.77	907.21
15.5	5.4	0.007143	288.26	576.51	720.63
15.5	5.5	0.008992	228.97	457.94	572.43
15.5	5.6	0.011320	181.89	363.77	454.71
15.5	5.7	0.014251	144.48	288.96	361.20
15.5	5.8	0.017940	114.77	229.54	286.92
15.5	5.9	0.022585	91.17	182.34	227.92
15.5	6.0	0.028431	72.42	144.84	181.06
15.5	6.1	0.035789	57.53	115.06	143.83
15.5	6.2	0.045052	45.70	91.40	114.26
15.5	6.3	0.056710	36.31	72.61	90.77
15.5	6.4	0.071383	28.85	57.69	72.11
15.5	6.5	0.089849	22.92	45.83	57.29
15.5	6.6	0.113087	18.21	36.41	45.52
15.5	6.7	0.142327	14.47	28.93	36.17
15.5	6.8	0.179112	11.50	22.99	28.74
15.5	6.9	0.225384	9.14	18.27	22.84
15.5	7.0	0.283575	7.26	14.52	18.15
15.5	7.1	0.356739	5.77	11.54	14.43
15.5	7.2	0.448692	4.59	9.18	11.47
15.5	7.3	0.564214	3.65	7.30	9.12
15.5	7.4	0.709266	2.91	5.81	7.26
15.5	7.5	0.891276	2.31	4.62	5.78
15.5	7.6	1.119464	1.84	3.68	4.60
15.5	7.7	1.405247	1.47	2.93	3.66
15.5	7.8	1.762685	1.17	2.34	2.92
15.5	7.9	2.209003	0.93	1.86	2.33
15.5	8.0	2.765151	0.75	1.49	1.86
15.5	8.1	3.456368	0.60	1.19	1.49
15.5	8.2	4.312708	0.48	0.95	1.19
15.5	8.3	5.369413	0.39	0.77	0.96
15.5	8.4	6.666994	0.31	0.62	0.77
15.5	8.5	8.250807	0.25	0.50	0.62
15.5	8.6	10.169873	0.20	0.40	0.51
15.5	8.7	12.474609	0.17	0.33	0.41
15.5	8.8	15.213197	0.14	0.27	0.34
15.5	8.9	18.426422	0.11	0.22	0.28
15.5	9.0	22.141098	0.09	0.18	0.23
15.5	9.1	26.362610	0.08	0.16	0.20
15.5	9.2	31.067855	0.07	0.13	0.17
15.5	9.3	36.200058	0.06	0.11	0.14
15.5	9.4	41.667587	0.05	0.10	0.12
15.5	9.5	47.348053	0.05	0.09	0.11
15.5	9.6	53.098038	0.04	0.08	0.10
15.5	9.7	58.766891	0.04	0.07	0.09
15.5	9.8	64.212418	0.03	0.06	0.08
15.5	9.9	69.314270	0.03	0.06	0.07
15.5	10.0	73.983475	0.03	0.05	0.07
15.5	10.1	78.166016	0.03	0.05	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
16.0	5.0	0.002953	697.28	1394.55	1743.19
16.0	5.1	0.003717	553.87	1107.74	1384.68
16.0	5.2	0.004680	439.96	879.92	1099.90
16.0	5.3	0.005892	349.48	698.96	873.70
16.0	5.4	0.007417	277.61	555.21	694.01
16.0	5.5	0.009337	220.52	441.03	551.29
16.0	5.6	0.011755	175.17	350.33	437.91
16.0	5.7	0.014798	139.14	278.28	347.86
16.0	5.8	0.018629	110.53	221.06	276.32
16.0	5.9	0.023451	87.80	175.60	219.50
16.0	6.0	0.029521	69.75	139.49	174.37
16.0	6.1	0.037162	55.41	110.81	138.52
16.0	6.2	0.046779	44.02	88.03	110.04
16.0	6.3	0.058884	34.97	69.93	87.42
16.0	6.4	0.074120	27.78	55.56	68.45
16.0	6.5	0.093293	22.07	44.14	55.18
16.0	6.6	0.117420	17.54	35.07	43.84
16.0	6.7	0.147779	13.94	27.87	34.83
16.0	6.8	0.185971	11.07	22.14	27.68
16.0	6.9	0.234010	8.80	17.60	22.00
16.0	7.0	0.294422	7.00	13.99	17.48
16.0	7.1	0.370373	5.56	11.12	13.90
16.0	7.2	0.465825	4.42	8.84	11.05
16.0	7.3	0.585732	3.52	7.03	8.79
16.0	7.4	0.736275	2.80	5.59	6.99
16.0	7.5	0.925150	2.23	4.45	5.56
16.0	7.6	1.161910	1.77	3.54	4.43
16.0	7.7	1.458368	1.41	2.82	3.53
16.0	7.8	1.829067	1.13	2.25	2.81
16.0	7.9	2.291803	0.90	1.80	2.25
16.0	8.0	2.868185	0.72	1.43	1.79
16.0	8.1	3.584208	0.58	1.15	1.44
16.0	8.2	4.470758	0.46	0.92	1.15
16.0	8.3	5.563936	0.37	0.74	0.93
16.0	8.4	6.905092	0.30	0.60	0.75
16.0	8.5	8.540292	0.24	0.48	0.60
16.0	8.6	10.518970	0.15	0.30	0.38
16.0	8.7	12.891467	0.16	0.32	0.40
16.0	8.8	15.705150	0.13	0.26	0.33
16.0	8.9	18.998993	0.11	0.22	0.27
16.0	9.0	22.796860	0.09	0.18	0.23
16.0	9.1	27.099869	0.08	0.15	0.19
16.0	9.2	31.879730	0.07	0.13	0.16
16.0	9.3	37.073914	0.06	0.11	0.14
16.0	9.4	42.585342	0.05	0.10	0.12
16.0	9.5	48.287354	0.04	0.08	0.11
16.0	9.6	54.034348	0.04	0.08	0.10
16.0	9.7	59.675995	0.04	0.07	0.09
16.0	9.8	65.072754	0.03	0.06	0.08
16.0	9.9	70.109070	0.03	0.06	0.07
16.0	10.0	74.701492	0.03	0.05	0.07
16.0	10.1	78.801666	0.03	0.05	0.07

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
16.5	5.0	0.003066	671.61	1343.21	1679.01
16.5	5.1	0.003860	533.48	1066.96	1333.70
16.5	5.2	0.004859	423.77	847.53	1059.41
16.5	5.3	0.006117	336.61	673.22	841.53
16.5	5.4	0.007701	267.39	534.77	668.46
16.5	5.5	0.009694	212.40	424.79	530.99
16.5	5.6	0.012204	168.72	337.43	421.79
16.5	5.7	0.015363	134.02	268.04	335.05
16.5	5.8	0.019340	106.46	212.92	266.15
16.5	5.9	0.024347	84.57	169.14	211.42
16.5	6.0	0.030649	67.18	134.36	167.95
16.5	6.1	0.038582	53.37	106.73	133.42
16.5	6.2	0.048567	42.40	84.79	105.99
16.5	6.3	0.061134	33.68	67.36	84.20
16.5	6.4	0.076951	26.76	53.51	66.89
16.5	6.5	0.096856	21.26	42.52	53.15
16.5	6.6	0.121903	16.89	33.78	42.23
16.5	6.7	0.153419	13.42	26.84	33.55
16.5	6.8	0.193066	10.67	21.33	26.66
16.5	6.9	0.242934	8.48	16.95	21.19
16.5	7.0	0.305643	6.74	13.47	16.84
16.5	7.1	0.384476	5.36	10.71	13.39
16.5	7.2	0.483545	4.26	8.52	10.65
16.5	7.3	0.607986	3.39	6.77	8.47
16.5	7.4	0.764204	2.70	5.39	6.74
16.5	7.5	0.960175	2.15	4.29	5.36
16.5	7.6	1.205789	1.71	3.41	4.27
16.5	7.7	1.513271	1.36	2.72	3.40
16.5	7.8	1.897657	1.09	2.17	2.71
16.5	7.9	2.377325	0.87	1.73	2.16
16.5	8.0	2.974561	0.69	1.38	1.73
16.5	8.1	3.716127	0.56	1.11	1.39
16.5	8.2	4.633736	0.45	0.89	1.11
16.5	8.3	5.764360	0.36	0.71	0.89
16.5	8.4	7.150168	0.29	0.57	0.72
16.5	8.5	8.837895	0.23	0.46	0.58
16.5	8.6	10.877323	0.19	0.38	0.47
16.5	8.7	13.318614	0.16	0.31	0.39
16.5	8.8	16.208176	0.13	0.25	0.32
16.5	8.9	19.583008	0.11	0.21	0.26
16.5	9.0	23.463806	0.09	0.17	0.22
16.5	9.1	27.847305	0.08	0.15	0.18
16.5	9.2	32.699860	0.06	0.12	0.16
16.5	9.3	37.953217	0.06	0.11	0.14
16.5	9.4	43.504990	0.05	0.09	0.12
16.5	9.5	49.224564	0.04	0.08	0.10
16.5	9.6	54.964523	0.04	0.07	0.09
16.5	9.7	60.575333	0.04	0.07	0.08
16.5	9.8	65.920471	0.03	0.06	0.08
16.5	9.9	70.889236	0.03	0.06	0.07
16.5	10.0	75.403809	0.03	0.05	0.07
16.5	10.1	79.421509	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
17.0	5.0	0.003183	646.96	1293.92	1617.40
17.0	5.1	0.004007	513.91	1027.81	1284.76
17.0	5.2	0.005044	408.22	816.43	1020.53
17.0	5.3	0.006350	324.26	648.52	810.65
17.0	5.4	0.007994	257.58	515.15	643.93
17.0	5.5	0.010063	204.60	409.20	511.51
17.0	5.6	0.012669	162.53	325.05	406.32
17.0	5.7	0.015948	129.11	258.21	322.76
17.0	5.8	0.020077	102.56	205.11	265.39
17.0	5.9	0.025274	81.47	162.93	203.67
17.0	6.0	0.031816	64.72	129.43	161.79
17.0	6.1	0.040051	51.41	102.82	128.52
17.0	6.2	0.050416	40.84	81.68	102.10
17.0	6.3	0.063461	32.45	64.89	81.11
17.0	6.4	0.079880	25.78	51.55	64.44
17.0	6.5	0.100542	20.48	40.96	51.20
17.0	6.6	0.126541	16.27	32.54	40.68
17.0	6.7	0.159254	12.93	25.86	32.32
17.0	6.8	0.200405	10.28	20.55	25.69
17.0	6.9	0.252164	8.17	16.33	20.41
17.0	7.0	0.317249	6.49	12.98	16.23
17.0	7.1	0.399064	5.16	10.32	12.90
17.0	7.2	0.501872	4.10	8.20	10.26
17.0	7.3	0.630999	3.27	6.53	8.16
17.0	7.4	0.793084	2.60	5.19	6.49
17.0	7.5	0.996386	2.07	4.13	5.17
17.0	7.6	1.251145	1.65	3.29	4.11
17.0	7.7	1.570012	1.31	2.62	3.28
17.0	7.8	1.968523	1.05	2.09	2.61
17.0	7.9	2.465652	0.84	1.67	2.09
17.0	8.0	3.084377	0.67	1.33	1.67
17.0	8.1	3.852230	0.54	1.07	1.34
17.0	8.2	4.801769	0.43	0.86	1.07
17.0	8.3	5.970829	0.35	0.69	0.86
17.0	8.4	7.402375	0.28	0.56	0.70
17.0	8.5	9.143778	0.23	0.45	0.56
17.0	8.6	11.245087	0.19	0.37	0.46
17.0	8.7	13.756176	0.15	0.30	0.37
17.0	8.8	16.722351	0.13	0.25	0.31
17.0	8.9	20.178467	0.10	0.20	0.26
17.0	9.0	24.141815	0.09	0.17	0.21
17.0	9.1	28.604660	0.07	0.14	0.18
17.0	9.2	33.527878	0.06	0.12	0.15
17.0	9.3	38.837479	0.06	0.11	0.13
17.0	9.4	44.425980	0.05	0.09	0.12
17.0	9.5	50.159134	0.04	0.08	0.10
17.0	9.6	55.888123	0.04	0.07	0.09
17.0	9.7	61.464508	0.04	0.07	0.08
17.0	9.8	66.755280	0.03	0.06	0.08
17.0	9.9	71.654678	0.03	0.06	0.07
17.0	10.0	76.090561	0.03	0.05	0.07
17.0	10.1	80.025818	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
17.5	5.0	0.003303	623.30	1246.60	1558.26
17.5	5.1	0.004159	495.11	990.22	1237.78
17.5	5.2	0.005235	393.29	786.57	983.22
17.5	5.3	0.006591	312.41	624.81	781.01
17.5	5.4	0.008297	248.16	496.31	620.39
17.5	5.5	0.010445	197.12	394.24	492.80
17.5	5.6	0.013150	156.59	313.17	391.46
17.5	5.7	0.016554	124.38	248.76	310.96
17.5	5.8	0.020839	98.81	197.61	247.01
17.5	5.9	0.026233	78.49	156.98	196.22
17.5	6.0	0.033023	62.35	124.70	155.87
17.5	6.1	0.041570	49.53	99.06	123.83
17.5	6.2	0.052328	39.35	78.69	98.37
17.5	6.3	0.065868	31.26	62.52	78.15
17.5	6.4	0.082909	24.84	49.67	62.09
17.5	6.5	0.104354	19.73	39.46	49.33
17.5	6.6	0.131338	15.68	31.35	39.19
17.5	6.7	0.165289	12.46	24.91	31.14
17.5	6.8	0.207997	9.90	19.80	24.75
17.5	6.9	0.261711	7.87	15.73	19.67
17.5	7.0	0.329251	6.26	12.51	15.63
17.5	7.1	0.414149	4.97	9.94	12.43
17.5	7.2	0.520824	3.96	7.91	9.88
17.5	7.3	0.654794	3.15	6.29	7.86
17.5	7.4	0.822941	2.50	5.00	6.26
17.5	7.5	1.033816	1.99	3.98	4.98
17.5	7.6	1.298021	1.59	3.17	3.97
17.5	7.7	1.628636	1.27	2.53	3.16
17.5	7.8	2.041718	1.01	2.02	2.52
17.5	7.9	2.556851	0.81	1.61	2.01
17.5	8.0	3.197714	0.65	1.29	1.61
17.5	8.1	3.992620	0.52	1.03	1.29
17.5	8.2	4.974972	0.42	0.83	1.03
17.5	8.3	6.183463	0.33	0.66	0.83
17.5	8.4	7.661833	0.27	0.54	0.67
17.5	8.5	9.458030	0.22	0.43	0.54
17.5	8.6	11.622317	0.18	0.35	0.44
17.5	8.7	14.204165	0.15	0.29	0.36
17.5	8.8	17.247635	0.12	0.24	0.30
17.5	8.9	20.785217	0.10	0.20	0.25
17.5	9.0	24.830673	0.08	0.16	0.21
17.5	9.1	29.371536	0.07	0.14	0.18
17.5	9.2	34.363205	0.06	0.12	0.15
17.5	9.3	39.726044	0.05	0.10	0.13
17.5	9.4	45.347610	0.05	0.09	0.11
17.5	9.5	51.090378	0.04	0.08	0.10
17.5	9.6	56.804504	0.04	0.07	0.09
17.5	9.7	62.343094	0.04	0.07	0.08
17.5	9.8	67.576859	0.03	0.06	0.08
17.5	9.9	72.405212	0.03	0.06	0.07
17.5	10.0	76.761780	0.03	0.05	0.07
17.5	10.1	80.614670	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
18.0	5.0	0.003428	600.59	1201.17	1501.47
18.0	5.1	0.004316	477.07	954.14	1192.67
18.0	5.2	0.005433	378.96	757.91	947.38
18.0	5.3	0.006840	301.02	602.04	752.55
18.0	5.4	0.008611	239.11	478.22	597.78
18.0	5.5	0.010840	189.94	379.87	474.84
18.0	5.6	0.013647	150.88	301.75	377.19
18.0	5.7	0.017180	119.85	239.70	299.63
18.0	5.8	0.021627	95.21	190.41	238.01
18.0	5.9	0.027225	75.63	151.26	189.07
18.0	6.0	0.034272	60.08	120.16	150.20
18.0	6.1	0.043142	47.73	95.45	119.31
18.0	6.2	0.054307	37.92	75.83	94.79
18.0	6.3	0.068358	30.12	60.24	75.30
18.0	6.4	0.086042	23.93	47.86	59.83
18.0	6.5	0.108297	19.01	38.02	47.53
18.0	6.6	0.136299	15.11	30.21	37.77
18.0	6.7	0.171530	12.01	24.01	30.01
18.0	6.8	0.215847	9.54	19.08	23.85
18.0	6.9	0.271583	7.58	15.16	18.95
18.0	7.0	0.341662	6.03	12.05	15.07
18.0	7.1	0.429747	4.79	9.58	11.98
18.0	7.2	0.540417	3.81	7.62	9.53
18.0	7.3	0.679393	3.03	6.06	7.58
18.0	7.4	0.853802	2.41	4.82	6.03
18.0	7.5	1.072500	1.92	3.84	4.80
18.0	7.6	1.346457	1.53	3.06	3.82
18.0	7.7	1.689198	1.22	2.44	3.05
18.0	7.8	2.117311	0.97	1.94	2.43
18.0	7.9	2.650998	0.78	1.55	1.94
18.0	8.0	3.314652	0.62	1.24	1.55
18.0	8.1	4.137386	0.50	0.99	1.24
18.0	8.2	5.153449	0.40	0.80	1.00
18.0	8.3	6.402369	0.32	0.64	0.80
18.0	8.4	7.928659	0.26	0.52	0.65
18.0	8.5	9.780784	0.21	0.42	0.53
18.0	8.6	12.009131	0.17	0.34	0.43
18.0	8.7	14.662650	0.14	0.28	0.35
18.0	8.8	17.783981	0.12	0.23	0.29
18.0	8.9	21.403122	0.10	0.19	0.24
18.0	9.0	25.530090	0.08	0.16	0.20
18.0	9.1	30.147568	0.07	0.14	0.17
18.0	9.2	35.205383	0.06	0.12	0.15
18.0	9.3	40.618317	0.05	0.10	0.13
18.0	9.4	46.269226	0.05	0.09	0.11
18.0	9.5	52.017624	0.04	0.08	0.10
18.0	9.6	57.713058	0.04	0.07	0.09
18.0	9.7	63.210632	0.03	0.06	0.08
18.0	9.8	68.384949	0.03	0.06	0.08
18.0	9.9	73.140808	0.03	0.06	0.07
18.0	10.0	77.417435	0.03	0.05	0.07
18.0	10.1	81.188278	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
18.5	5.0	0.003558	578.77	1157.54	1446.93
18.5	5.1	0.004479	459.74	919.48	1149.35
18.5	5.2	0.005638	365.19	730.38	912.97
18.5	5.3	0.007098	290.09	580.17	725.21
18.5	5.4	0.008938	230.43	460.85	576.07
18.5	5.5	0.011249	183.04	366.08	457.60
18.5	5.6	0.014161	145.40	290.79	363.49
18.5	5.7	0.017827	115.50	230.99	288.74
18.5	5.8	0.022442	91.75	183.49	229.37
18.5	5.9	0.028251	72.88	145.76	182.20
18.5	6.0	0.035563	57.90	115.79	144.74
18.5	6.1	0.044768	46.00	91.99	114.98
18.5	6.2	0.056352	36.54	73.07	91.34
18.5	6.3	0.070933	29.03	58.05	72.57
18.5	6.4	0.089283	23.06	46.12	57.65
18.5	6.5	0.112378	18.32	36.64	45.81
18.5	6.6	0.141430	14.56	29.11	36.39
18.5	6.7	0.177984	11.57	23.14	28.92
18.5	6.8	0.223965	9.20	18.39	22.98
18.5	6.9	0.281792	7.31	14.61	18.27
18.5	7.0	0.354495	5.81	11.62	14.52
18.5	7.1	0.445873	4.62	9.23	11.54
18.5	7.2	0.560673	3.37	6.74	8.43
18.5	7.3	0.704822	2.92	5.84	7.30
18.5	7.4	0.885700	2.33	4.65	5.81
18.5	7.5	1.112477	1.85	3.70	4.63
18.5	7.6	1.396502	1.48	2.95	3.69
18.5	7.7	1.751756	1.18	2.35	2.94
18.5	7.8	2.195369	0.94	1.87	2.34
18.5	7.9	2.748181	0.75	1.50	1.87
18.5	8.0	3.435305	0.60	1.20	1.50
18.5	8.1	4.286656	0.48	0.96	1.20
18.5	8.2	5.337334	0.39	0.77	0.96
18.5	8.3	6.627704	0.31	0.62	0.78
18.5	8.4	8.203004	0.25	0.50	0.63
18.5	8.5	10.112186	0.21	0.41	0.51
18.5	8.6	12.405654	0.17	0.33	0.41
18.5	8.7	15.131721	0.14	0.27	0.34
18.5	8.8	18.331451	0.11	0.22	0.28
18.5	8.9	22.032166	0.10	0.19	0.23
18.5	9.0	26.239914	0.08	0.16	0.20
18.5	9.1	30.932434	0.07	0.13	0.17
18.5	9.2	36.053970	0.06	0.11	0.14
18.5	9.3	41.513794	0.05	0.10	0.12
18.5	9.4	47.190277	0.05	0.09	0.11
18.5	9.5	52.940353	0.04	0.08	0.10
18.5	9.6	58.613419	0.04	0.07	0.09
18.5	9.7	64.066788	0.03	0.06	0.08
18.5	9.8	69.179413	0.03	0.06	0.07
18.5	9.9	73.861420	0.03	0.05	0.07
18.5	10.0	78.057785	0.03	0.05	0.07
18.5	10.1	81.746918	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
19.0	5.0	0.003691	557.82	1115.64	1394.55
19.0	5.1	0.004647	443.10	886.19	1107.74
19.0	5.2	0.005850	351.97	703.94	879.92
19.0	5.3	0.007365	279.59	559.17	698.96
19.0	5.4	0.009271	222.09	444.17	555.21
19.0	5.5	0.011671	176.42	352.83	441.03
19.0	5.6	0.014693	140.14	280.27	350.34
19.0	5.7	0.018497	111.32	222.63	278.29
19.0	5.6	0.023285	88.43	176.85	221.07
19.0	5.9	0.029312	70.25	140.49	175.61
19.0	6.0	0.036899	55.80	111.60	139.50
19.0	6.1	0.046448	44.33	88.66	110.82
19.0	6.2	0.058468	35.22	70.43	88.04
19.0	6.3	0.073596	27.98	55.95	69.94
19.0	6.4	0.092633	22.23	44.45	55.57
19.0	6.5	0.116590	17.66	35.32	44.15
19.0	6.6	0.146734	14.03	28.06	35.08
19.0	6.7	0.184657	11.15	22.30	27.88
19.0	6.8	0.232358	8.86	17.72	22.15
19.0	6.9	0.292345	7.05	14.09	17.61
19.0	7.0	0.367762	5.60	11.20	14.00
19.0	7.1	0.462544	4.45	8.90	11.13
19.0	7.2	0.581611	3.54	7.08	8.85
19.0	7.3	0.731103	2.82	5.63	7.04
19.0	7.4	0.918663	2.24	4.48	5.60
19.0	7.5	1.153782	1.79	3.57	4.46
19.0	7.6	1.448197	1.42	2.84	3.55
19.0	7.7	1.816360	1.14	2.27	2.83
19.0	7.8	2.275956	0.91	1.81	2.26
19.0	7.9	2.848468	0.72	1.44	1.81
19.0	8.0	3.559750	0.58	1.16	1.45
19.0	8.1	4.440523	0.47	0.93	1.16
19.0	8.2	5.526737	0.37	0.74	0.93
19.0	8.3	6.859577	0.30	0.60	0.75
19.0	8.4	8.484982	0.24	0.48	0.61
19.0	8.5	10.452319	0.20	0.39	0.49
19.0	8.6	12.811934	0.16	0.32	0.40
19.0	8.7	15.611368	0.13	0.26	0.33
19.0	8.8	18.889954	0.11	0.22	0.27
19.0	8.9	22.672104	0.09	0.18	0.23
19.0	9.0	26.959808	0.08	0.15	0.19
19.0	9.1	31.725708	0.07	0.13	0.16
19.0	9.2	36.908401	0.06	0.11	0.14
19.0	9.3	42.411789	0.05	0.10	0.12
19.0	9.4	48.110046	0.04	0.08	0.11
19.0	9.5	53.857910	0.04	0.08	0.10
19.0	9.6	59.504974	0.04	0.07	0.09
19.0	9.7	64.911179	0.03	0.06	0.08
19.0	9.8	69.960052	0.03	0.06	0.07
19.0	9.9	74.567047	0.03	0.05	0.07
19.0	10.0	78.682816	0.03	0.05	0.07
19.0	10.1	82.290680	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
19.5	5.0	0.003829	537.70	1075.39	1344.23
19.5	5.1	0.004821	427.11	854.22	1067.77
19.5	5.2	0.006069	339.27	678.54	848.18
19.5	5.3	0.007640	269.50	538.99	673.74
19.5	5.4	0.009618	214.07	428.14	535.18
19.5	5.5	0.012108	170.05	340.10	425.12
19.5	5.6	0.015243	135.08	270.16	337.70
19.5	5.7	0.019189	107.30	214.60	268.25
19.5	5.8	0.024156	85.24	170.47	213.09
19.5	5.9	0.030409	67.71	135.42	169.28
19.5	6.0	0.038279	53.79	107.58	134.47
19.5	6.1	0.048186	42.73	85.46	106.83
19.5	6.2	0.060655	33.95	67.89	84.86
19.5	6.3	0.076348	26.97	53.94	67.42
19.5	6.4	0.096098	21.43	42.85	53.57
19.5	6.5	0.120950	17.03	34.05	42.56
19.5	6.6	0.152219	13.53	27.05	33.82
19.5	6.7	0.191556	10.75	21.50	26.87
19.5	6.8	0.241035	8.54	17.08	21.36
19.5	6.9	0.303255	6.79	13.58	16.97
19.5	7.0	0.381475	5.40	10.79	13.49
19.5	7.1	0.479775	4.29	8.58	10.73
19.5	7.2	0.603251	3.42	6.83	8.53
19.5	7.3	0.758262	2.72	5.43	6.79
19.5	7.4	0.952724	2.16	4.32	5.40
19.5	7.5	1.196454	1.72	3.44	4.30
19.5	7.6	1.501593	1.37	2.74	3.43
19.5	7.7	1.883069	1.10	2.19	2.73
19.5	7.8	2.359138	0.87	1.74	2.18
19.5	7.9	2.951945	0.70	1.39	1.74
19.5	8.0	3.688086	0.56	1.12	1.40
19.5	8.1	4.599098	0.45	0.89	1.12
19.5	8.2	5.721779	0.36	0.72	0.90
19.5	8.3	7.098123	0.29	0.58	0.73
19.5	8.4	8.774726	0.24	0.47	0.59
19.5	8.5	10.801306	0.19	0.38	0.48
19.5	8.6	13.228066	0.16	0.31	0.39
19.5	8.7	16.101639	0.13	0.25	0.32
19.5	8.8	19.459457	0.11	0.21	0.26
19.5	8.9	23.322845	0.09	0.18	0.22
19.5	9.0	27.689545	0.08	0.15	0.19
19.5	9.1	32.526993	0.07	0.13	0.16
19.5	9.2	37.768173	0.06	0.11	0.14
19.5	9.3	43.311752	0.05	0.09	0.12
19.5	9.4	49.027985	0.04	0.08	0.10
19.5	9.5	54.769760	0.04	0.07	0.09
19.5	9.6	60.387299	0.04	0.07	0.09
19.5	9.7	65.743530	0.03	0.06	0.08
19.5	9.8	70.726624	0.03	0.06	0.07
19.5	9.9	75.257629	0.03	0.05	0.07
19.5	10.0	79.292679	0.03	0.05	0.06
19.5	10.1	82.819885	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
20.0	5.0	0.003972	518.36	1036.72	1295.90
20.0	5.1	0.005001	411.75	823.50	1029.38
20.0	5.2	0.006295	327.07	654.14	817.68
20.0	5.3	0.007925	259.81	519.61	649.52
20.0	5.4	0.009977	206.38	412.75	515.94
20.0	5.5	0.012560	163.94	327.87	409.84
20.0	5.6	0.015811	130.22	260.44	325.56
20.0	5.7	0.019905	103.45	206.89	258.61
20.0	5.8	0.025057	82.17	164.34	205.43
20.0	5.9	0.031543	65.28	130.55	163.19
20.0	6.0	0.039707	51.86	103.71	129.64
20.0	6.1	0.049983	41.20	82.39	102.99
20.0	6.2	0.062916	32.73	65.45	81.82
20.0	6.3	0.079194	26.00	52.00	65.00
20.0	6.4	0.099679	20.66	41.31	51.64
20.0	6.5	0.125455	16.41	32.82	41.03
20.0	6.6	0.157887	13.04	26.08	32.60
20.0	6.7	0.198687	10.37	20.73	25.91
20.0	6.8	0.250003	8.24	16.47	20.59
20.0	6.9	0.314531	6.55	13.09	16.37
20.0	7.0	0.395649	5.21	10.41	13.01
20.0	7.1	0.497582	4.14	8.28	10.35
20.0	7.2	0.625611	3.29	6.58	8.23
20.0	7.3	0.786323	2.62	5.24	6.55
20.0	7.4	0.987909	2.09	4.17	5.21
20.0	7.5	1.240528	1.66	3.32	4.15
20.0	7.6	1.556730	1.32	2.64	3.31
20.0	7.7	1.951939	1.06	2.11	2.64
20.0	7.8	2.444984	0.84	1.68	2.11
20.0	7.9	3.058684	0.68	1.35	1.68
20.0	8.0	3.820394	0.54	1.08	1.35
20.0	8.1	4.762475	0.43	0.86	1.08
20.0	8.2	5.922563	0.35	0.69	0.87
20.0	8.3	7.343440	0.28	0.56	0.70
20.0	8.4	9.072329	0.23	0.45	0.57
20.0	8.5	11.159234	0.19	0.37	0.46
20.0	8.6	13.654114	0.15	0.30	0.38
20.0	8.7	16.602524	0.13	0.25	0.31
20.0	8.8	20.039825	0.10	0.20	0.26
20.0	8.9	23.984131	0.09	0.17	0.21
20.0	9.0	28.428741	0.07	0.14	0.18
20.0	9.1	33.335800	0.06	0.12	0.15
20.0	9.2	38.632690	0.06	0.11	0.13
20.0	9.3	44.213013	0.05	0.09	0.12
20.0	9.4	49.943390	0.04	0.08	0.10
20.0	9.5	55.675278	0.04	0.07	0.09
20.0	9.6	61.259903	0.04	0.07	0.08
20.0	9.7	66.563471	0.03	0.06	0.08
20.0	9.8	71.479034	0.03	0.06	0.07
20.0	9.9	75.933243	0.03	0.05	0.07
20.0	10.0	79.887543	0.03	0.05	0.06
20.0	10.1	83.334732	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
20.5	5.0	0.004120	499.78	999.56	1249.45
20.5	5.1	0.005186	397.00	793.99	992.49
20.5	5.2	0.006529	315.35	630.70	788.37
20.5	5.3	0.008220	250.50	500.99	626.24
20.5	5.4	0.010348	198.98	397.96	497.45
20.5	5.5	0.013027	158.06	316.12	395.15
20.5	5.6	0.016399	125.56	251.11	313.89
20.5	5.7	0.020644	99.74	199.47	249.34
20.5	5.8	0.025988	79.23	158.46	198.07
20.5	5.9	0.032715	62.94	125.87	157.34
20.5	6.0	0.041182	50.00	99.99	124.99
20.5	6.1	0.051840	39.72	79.44	99.30
20.5	6.2	0.065253	31.56	63.11	78.88
20.5	6.3	0.082135	25.07	50.14	62.67
20.5	6.4	0.103380	19.92	39.83	49.79
20.5	6.5	0.130113	15.83	31.65	39.56
20.5	6.6	0.163747	12.58	25.15	31.44
20.5	6.7	0.206057	9.99	19.98	24.98
20.5	6.8	0.259272	7.94	15.88	19.85
20.5	6.9	0.326185	6.31	12.62	15.78
20.5	7.0	0.410295	5.02	10.04	12.55
20.5	7.1	0.515982	3.99	7.98	9.98
20.5	7.2	0.648716	3.18	6.35	7.93
20.5	7.3	0.815314	2.53	5.05	6.31
20.5	7.4	1.024255	2.01	4.02	5.03
20.5	7.5	1.286050	1.60	3.20	4.00
20.5	7.6	1.613666	1.28	2.55	3.19
20.5	7.7	2.023028	1.02	2.03	2.54
20.5	7.8	2.533567	0.81	1.62	2.03
20.5	7.9	3.168780	0.65	1.30	1.62
20.5	8.0	3.956787	0.52	1.04	1.30
20.5	8.1	4.390778	0.42	0.83	1.04
20.5	8.2	6.129224	0.34	0.67	0.84
20.5	8.3	7.595678	0.27	0.54	0.68
20.5	8.4	9.377950	0.22	0.44	0.55
20.5	8.5	11.526245	0.18	0.36	0.45
20.5	8.6	14.090154	0.15	0.29	0.37
20.5	8.7	17.114044	0.12	0.24	0.30
20.5	8.8	20.631073	0.10	0.20	0.25
20.5	8.9	24.655853	0.09	0.17	0.21
20.5	9.0	29.177170	0.07	0.14	0.18
20.5	9.1	34.151794	0.06	0.12	0.15
20.5	9.2	39.501495	0.05	0.10	0.13
20.5	9.3	45.115051	0.05	0.09	0.11
20.5	9.4	50.855774	0.04	0.08	0.10
20.5	9.5	56.574005	0.04	0.07	0.09
20.5	9.6	62.122437	0.04	0.07	0.08
20.5	9.7	67.370834	0.03	0.06	0.08
20.5	9.8	72.217270	0.03	0.06	0.07
20.5	9.9	76.593903	0.03	0.05	0.07
20.5	10.0	80.467560	0.03	0.05	0.06
20.5	10.1	83.835434	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
21.0	5.0	0.004272	481.93	963.86	1204.83
21.0	5.1	0.005372	382.82	765.63	957.04
21.0	5.2	0.006771	304.09	608.17	760.21
21.0	5.3	0.008524	241.55	483.10	603.87
21.0	5.4	0.010731	191.88	383.75	479.68
21.0	5.5	0.013509	152.42	304.83	381.04
21.0	5.6	0.017006	121.07	242.14	302.68
21.0	5.7	0.021409	96.18	192.35	240.44
21.0	5.8	0.026951	76.40	152.80	191.00
21.0	5.9	0.033926	60.69	121.38	151.73
21.0	6.0	0.042707	48.21	96.42	120.53
21.0	6.1	0.053759	38.30	76.60	95.75
21.0	6.2	0.067669	30.43	60.85	76.07
21.0	6.3	0.085175	24.18	48.35	60.43
21.0	6.4	0.107205	19.21	38.41	48.02
21.0	6.5	0.134926	15.26	30.52	38.15
21.0	6.6	0.169802	12.13	24.25	30.31
21.0	6.7	0.213674	9.64	19.27	24.09
21.0	6.8	0.268851	7.66	15.32	19.15
21.0	6.9	0.338227	6.09	12.17	15.22
21.0	7.0	0.425429	4.84	9.68	12.10
21.0	7.1	0.534993	3.85	7.70	9.62
21.0	7.2	0.672584	3.06	6.12	7.65
21.0	7.3	0.845260	2.44	4.87	6.09
21.0	7.4	1.061793	1.94	3.88	4.85
21.0	7.5	1.333054	1.55	3.09	3.86
21.0	7.6	1.672440	1.23	2.46	3.08
21.0	7.7	2.096396	0.98	1.96	2.46
21.0	7.8	2.624954	0.79	1.57	1.96
21.0	7.9	3.282309	0.63	1.25	1.57
21.0	8.0	4.097354	0.50	1.00	1.26
21.0	8.1	5.104105	0.41	0.81	1.01
21.0	8.2	6.341866	0.33	0.65	0.81
21.0	8.3	7.854949	0.26	0.52	0.66
21.0	8.4	9.691668	0.21	0.42	0.53
21.0	8.5	11.902390	0.17	0.34	0.43
21.0	8.6	14.536221	0.14	0.28	0.35
21.0	8.7	17.636200	0.12	0.23	0.29
21.0	8.8	21.233032	0.10	0.19	0.24
21.0	8.9	25.337769	0.08	0.16	0.20
21.0	9.0	29.934448	0.07	0.14	0.17
21.0	9.1	34.974411	0.06	0.12	0.15
21.0	9.2	40.373978	0.05	0.10	0.13
21.0	9.3	46.017212	0.05	0.09	0.11
21.0	9.4	51.764450	0.04	0.08	0.10
21.0	9.5	57.465408	0.04	0.07	0.09
21.0	9.6	62.974472	0.03	0.06	0.08
21.0	9.7	68.165298	0.03	0.06	0.08
21.0	9.8	72.941116	0.03	0.06	0.07
21.0	9.9	77.239639	0.03	0.05	0.07
21.0	10.0	81.032928	0.03	0.05	0.06
21.0	10.1	84.322327	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
21.5	5.0	0.004430	464.78	929.55	1161.93
21.5	5.1	0.005577	369.19	738.37	922.97
21.5	5.2	0.007021	293.26	586.52	733.15
21.5	5.3	0.008839	232.95	465.90	582.37
21.5	5.4	0.011127	185.05	370.09	462.61
21.5	5.5	0.014008	146.99	293.98	367.47
21.5	5.6	0.017634	116.76	233.52	291.91
21.5	5.7	0.022199	92.75	185.50	231.88
21.5	5.8	0.027945	73.68	147.36	184.20
21.5	5.9	0.035178	58.53	117.06	146.33
21.5	6.0	0.044283	46.50	92.99	116.24
21.5	6.1	0.055742	36.94	73.87	92.34
21.5	6.2	0.070165	29.35	58.69	73.36
21.5	6.3	0.088137	23.32	46.63	58.28
21.5	6.4	0.111158	18.53	37.05	46.31
21.5	6.5	0.139900	14.72	29.43	36.79
21.5	6.6	0.176059	11.70	23.39	26.24
21.5	6.7	0.221544	9.30	18.59	23.23
21.5	6.8	0.278747	7.39	14.77	18.47
21.5	6.9	0.350669	5.87	11.74	14.68
21.5	7.0	0.441065	4.67	9.34	11.67
21.5	7.1	0.554633	3.71	7.42	9.28
21.5	7.2	0.697240	2.96	5.91	7.38
21.5	7.3	0.876190	2.35	4.70	5.87
21.5	7.4	1.100559	1.87	3.74	4.68
21.5	7.5	1.381583	1.49	2.98	3.73
21.5	7.6	1.733109	1.19	2.38	2.97
21.5	7.7	2.172104	0.95	1.89	2.37
21.5	7.8	2.719219	0.76	1.51	1.89
21.5	7.9	3.399357	0.61	1.21	1.51
21.5	8.0	4.242190	0.49	0.97	1.21
21.5	8.1	5.282571	0.39	0.78	0.97
21.5	8.2	6.560617	0.32	0.63	0.78
21.5	8.3	8.121366	0.26	0.51	0.63
21.5	8.4	10.013612	0.21	0.41	0.51
21.5	8.5	12.287778	0.17	0.33	0.42
21.5	8.6	14.992376	0.14	0.27	0.34
21.5	8.7	18.168961	0.12	0.23	0.28
21.5	8.8	21.845627	0.10	0.19	0.24
21.5	8.9	26.029648	0.08	0.16	0.20
21.5	9.0	30.700241	0.07	0.13	0.17
21.5	9.1	35.803253	0.06	0.11	0.14
21.5	9.2	41.249588	0.05	0.10	0.12
21.5	9.3	46.918915	0.05	0.09	0.11
21.5	9.4	52.668915	0.04	0.08	0.10
21.5	9.5	58.348969	0.04	0.07	0.09
21.5	9.6	63.815674	0.03	0.06	0.08
21.5	9.7	68.946701	0.03	0.06	0.07
21.5	9.8	73.650589	0.03	0.05	0.07
21.5	9.9	77.870651	0.03	0.05	0.07
21.5	10.0	81.583847	0.03	0.05	0.06
21.5	10.1	84.795624	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
22.0	5.0	0.004593	448.28	896.56	1120.71
22.0	5.1	0.005782	356.09	712.17	890.22
22.0	5.2	0.007279	282.86	565.71	707.14
22.0	5.3	0.009164	224.59	449.17	561.46
22.0	5.4	0.011536	178.48	356.95	446.19
22.0	5.5	0.014523	141.78	283.55	354.44
22.0	5.6	0.018283	112.62	225.24	281.55
22.0	5.7	0.023016	89.46	178.92	223.65
22.0	5.8	0.028973	71.07	142.13	177.67
22.0	5.9	0.036472	56.46	112.91	141.14
22.0	6.0	0.045911	44.85	89.69	112.12
22.0	6.1	0.057792	35.63	71.25	89.07
22.0	6.2	0.072745	28.31	56.61	70.76
22.0	6.3	0.091563	22.49	44.97	56.22
22.0	6.4	0.115243	17.87	35.73	44.67
22.0	6.5	0.145039	14.20	28.39	35.49
22.0	6.6	0.182525	11.28	22.56	28.20
22.0	6.7	0.229676	8.97	17.93	22.41
22.0	6.8	0.288973	7.13	14.25	17.81
22.0	6.9	0.363523	5.67	11.33	14.16
22.0	7.0	0.457217	4.51	9.01	11.26
22.0	7.1	0.574921	3.58	7.16	8.95
22.0	7.2	0.722706	2.85	5.70	7.12
22.0	7.3	0.908132	2.27	4.53	5.67
22.0	7.4	1.140587	1.81	3.61	4.51
22.0	7.5	1.431684	1.44	2.88	3.60
22.0	7.6	1.795724	1.15	2.29	2.87
22.0	7.7	2.250216	0.92	1.83	2.29
22.0	7.8	2.816441	0.73	1.46	1.83
22.0	7.9	3.520019	0.58	1.16	1.45
22.0	8.0	4.391410	0.47	0.94	1.17
22.0	8.1	5.466293	0.38	0.75	0.94
22.0	8.2	6.785608	0.31	0.61	0.76
22.0	8.3	8.395065	0.25	0.49	0.61
22.0	8.4	10.343902	0.20	0.40	0.50
22.0	8.5	12.682508	0.16	0.32	0.41
22.0	8.6	15.458677	0.14	0.27	0.33
22.0	8.7	18.712311	0.11	0.22	0.28
22.0	8.8	22.468750	0.09	0.18	0.23
22.0	8.9	26.731308	0.08	0.15	0.19
22.0	9.0	31.474213	0.07	0.13	0.16
22.0	9.1	36.637843	0.06	0.11	0.14
22.0	9.2	42.127838	0.05	0.10	0.12
22.0	9.3	47.819626	0.05	0.09	0.11
22.0	9.4	53.568604	0.04	0.08	0.10
22.0	9.5	59.224274	0.04	0.07	0.09
22.0	9.6	64.645706	0.03	0.06	0.08
22.0	9.7	69.714920	0.03	0.06	0.07
22.0	9.8	74.345734	0.03	0.05	0.07
22.0	9.9	78.486984	0.03	0.05	0.07
22.0	10.0	82.120483	0.03	0.05	0.06
22.0	10.1	85.255554	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
22.5	5.0	0.004761	432.43	864.86	1081.08
22.5	5.1	0.005994	343.50	686.99	858.74
22.5	5.2	0.007546	272.86	545.71	682.13
22.5	5.3	0.009500	216.74	433.48	541.85
22.5	5.4	0.011959	172.17	344.33	430.42
22.5	5.5	0.015055	136.76	273.52	341.90
22.5	5.6	0.018953	108.64	217.27	271.59
22.5	5.7	0.023859	86.30	172.60	215.75
22.5	5.8	0.030035	68.56	137.11	171.38
22.5	5.9	0.037809	54.46	108.92	136.15
22.5	6.0	0.047594	43.26	86.52	108.16
22.5	6.1	0.059909	34.37	68.74	85.92
22.5	6.2	0.075410	27.31	54.61	68.26
22.5	6.3	0.094916	21.69	43.38	54.23
22.5	6.4	0.119463	17.24	34.47	43.09
22.5	6.5	0.150348	13.70	27.39	34.24
22.5	6.6	0.189203	10.88	21.76	27.21
22.5	6.7	0.238076	8.65	17.30	21.62
22.5	6.8	0.299535	6.88	13.75	17.18
22.5	6.9	0.376800	5.47	10.93	13.66
22.5	7.0	0.473900	4.35	8.69	10.86
22.5	7.1	0.595872	3.46	6.91	8.64
22.5	7.2	0.749002	2.75	5.50	6.87
22.5	7.3	0.941111	2.19	4.37	5.47
22.5	7.4	1.181907	1.74	3.48	4.36
22.5	7.5	1.483391	1.39	2.78	3.47
22.5	7.6	1.860331	1.11	2.21	2.77
22.5	7.7	2.330788	0.89	1.77	2.21
22.5	7.8	2.916684	0.71	1.41	1.76
22.5	7.9	3.644359	0.71	1.41	1.13
22.5	8.0	4.545082	0.46	0.91	1.13
22.5	8.1	5.655359	0.37	0.73	0.91
22.5	8.2	7.016913	0.30	0.59	0.73
22.5	8.3	8.676126	0.24	0.47	0.59
22.5	8.4	10.682600	0.19	0.38	0.48
22.5	8.5	13.086604	0.16	0.31	0.39
22.5	8.6	15.935098	0.13	0.26	0.32
22.5	8.7	19.266144	0.11	0.21	0.27
22.5	8.8	23.102173	0.09	0.18	0.22
22.5	8.9	27.442337	0.08	0.15	0.19
22.5	9.0	32.255875	0.07	0.13	0.16
22.5	9.1	37.477615	0.06	0.11	0.14
22.5	9.2	43.008026	0.05	0.10	0.12
22.5	9.3	48.718628	0.04	0.08	0.11
22.5	9.4	54.462875	0.04	0.08	0.09
22.5	9.5	60.090790	0.04	0.07	0.09
22.5	9.6	65.464188	0.03	0.06	0.08
22.5	9.7	70.469666	0.03	0.06	0.07
22.5	9.8	75.026413	0.03	0.05	0.07
22.5	9.9	79.088684	0.03	0.05	0.07
22.5	10.0	82.642990	0.03	0.05	0.06
22.5	10.1	85.702408	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
23.0	5.0	0.004935	417.19	834.38	1042.97
23.0	5.1	0.006213	331.39	662.78	828.47
23.0	5.2	0.007822	263.24	526.47	658.09
23.0	5.3	0.009847	209.10	418.20	522.75
23.0	5.4	0.012396	166.10	332.20	415.25
23.0	5.5	0.015605	131.94	263.88	329.85
23.0	5.6	0.019645	104.81	209.62	262.02
23.0	5.7	0.024731	83.26	166.51	208.14
23.0	5.8	0.031132	66.14	132.27	165.34
23.0	5.9	0.039189	52.54	105.08	131.35
23.0	6.0	0.049332	41.74	83.47	104.34
23.0	6.1	0.062097	33.16	66.31	82.89
23.0	6.2	0.078162	26.34	52.68	65.86
23.0	6.3	0.098381	20.93	41.86	52.32
23.0	6.4	0.123822	16.63	33.26	41.57
23.0	6.5	0.155833	13.21	26.42	33.03
23.0	6.6	0.196102	10.50	21.00	26.25
23.0	6.7	0.246753	8.35	16.69	20.86
23.0	6.8	0.310445	6.63	13.26	16.58
23.0	6.9	0.390513	5.27	10.54	13.18
23.0	7.0	0.491128	4.19	8.38	10.48
23.0	7.1	0.617508	3.34	6.67	8.34
23.0	7.2	0.776154	2.65	5.30	6.63
23.0	7.3	0.975160	2.11	4.22	5.28
23.0	7.4	1.224560	1.68	3.36	4.20
23.0	7.5	1.536755	1.34	2.68	3.35
23.0	7.6	1.926989	1.07	2.14	2.67
23.0	7.7	2.413888	0.85	1.70	2.17
23.0	7.8	3.020025	0.68	1.36	1.70
23.0	7.9	3.772481	0.55	1.09	1.36
23.0	8.0	4.703325	0.44	0.87	1.09
23.0	8.1	5.849887	0.35	0.70	0.88
23.0	8.2	7.254682	0.29	0.57	0.71
23.0	8.3	8.964696	0.23	0.46	0.57
23.0	8.4	11.029845	0.19	0.37	0.47
23.0	8.5	13.500188	0.15	0.30	0.38
23.0	8.6	16.421677	0.13	0.25	0.31
23.0	8.7	19.830444	0.11	0.21	0.26
23.0	8.8	23.745773	0.09	0.17	0.22
23.0	8.9	28.162582	0.08	0.15	0.18
23.0	9.0	33.044922	0.06	0.12	0.16
23.0	9.1	38.322144	0.06	0.11	0.13
23.0	9.2	43.889694	0.05	0.09	0.12
23.0	9.3	49.615448	0.04	0.08	0.10
23.0	9.4	55.351318	0.04	0.07	0.09
23.0	9.5	60.948120	0.04	0.07	0.08
23.0	9.6	66.270889	0.03	0.06	0.08
23.0	9.7	71.210876	0.03	0.06	0.08
23.0	9.8	75.692673	0.03	0.05	0.07
23.0	9.9	79.675934	0.03	0.05	0.06
23.0	10.0	83.151749	0.03	0.05	0.06
23.0	10.1	86.136505	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
23.5	5.0	0.005115	402.54	805.07	1006.33
23.5	5.1	0.005439	319.75	639.50	799.37
23.5	5.2	0.008107	253.99	507.98	634.97
23.5	5.3	0.010205	201.76	403.51	504.39
23.5	5.4	0.012847	160.27	320.53	400.66
23.5	5.5	0.016173	127.31	254.61	318.27
23.5	5.6	0.020360	101.13	202.26	252.82
23.5	5.7	0.025631	80.34	160.67	200.83
23.5	5.8	0.032265	63.82	127.63	159.54
23.5	5.9	0.040616	50.70	101.39	126.74
23.5	6.0	0.051127	40.27	80.54	100.68
23.5	6.1	0.064355	32.00	63.99	79.88
23.5	6.2	0.081006	25.42	50.83	63.54
23.5	6.3	0.101959	20.20	40.39	40.49
23.5	6.4	0.128325	16.05	32.09	40.11
23.5	6.5	0.161497	12.75	25.50	31.87
23.5	6.6	0.203228	10.13	20.26	25.33
23.5	6.7	0.255714	8.05	16.10	20.13
23.5	6.8	0.321712	6.40	12.80	16.00
23.5	6.9	0.404673	5.09	10.18	12.72
23.5	7.0	0.508919	4.05	8.09	10.11
23.5	7.1	0.639847	3.22	6.43	8.04
23.5	7.2	0.804187	2.56	5.12	6.40
23.5	7.3	1.010305	2.04	4.07	5.09
23.5	7.4	1.268580	1.62	3.24	4.05
23.5	7.5	1.591817	1.30	2.59	3.23
23.5	7.6	1.995750	1.03	2.06	2.58
23.5	7.7	2.499581	0.83	1.65	2.06
23.5	7.8	3.126546	0.66	1.32	1.65
23.5	7.9	3.904475	0.53	1.05	1.32
23.5	8.0	4.866241	0.43	0.85	1.06
23.5	8.1	6.049997	0.34	0.68	0.85
23.5	8.2	7.499009	0.28	0.55	0.69
23.5	8.3	9.260873	0.22	0.44	0.56
23.5	8.4	11.385717	0.18	0.36	0.45
23.5	8.5	13.923285	0.15	0.29	0.37
23.5	8.6	16.918427	0.12	0.24	0.30
23.5	8.7	20.405136	0.10	0.20	0.25
23.5	8.8	24.399399	0.09	0.17	0.21
23.5	8.9	28.891724	0.07	0.14	0.18
23.5	9.0	33.840912	0.06	0.12	0.15
23.5	9.1	39.170898	0.05	0.10	0.13
23.5	9.2	44.772247	0.05	0.09	0.11
23.5	9.3	50.509476	0.04	0.08	0.10
23.5	9.4	56.233337	0.04	0.07	0.09
23.5	9.5	61.795914	0.04	0.07	0.08
23.5	9.6	67.065598	0.03	0.06	0.08
23.5	9.7	71.938416	0.03	0.06	0.07
23.5	9.8	76.344620	0.03	0.05	0.07
23.5	9.9	80.248871	0.03	0.05	0.06
23.5	10.0	83.646835	0.03	0.05	0.06
23.5	10.1	86.558090	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
24.0	5.0	0.005301	388.44	776.88	971.10
24.0	5.1	0.006673	308.55	617.10	771.38
24.0	5.2	0.008401	245.10	490.19	612.74
24.0	5.3	0.010576	194.69	389.38	486.73
24.0	5.4	0.013314	154.66	309.31	386.63
24.0	5.5	0.016760	122.85	245.70	307.13
24.0	5.6	0.021099	97.59	195.17	343.97
24.0	5.7	0.026561	77.52	155.04	193.80
24.0	5.8	0.033435	61.58	123.16	153.95
24.0	5.9	0.042089	48.92	97.84	122.30
24.0	6.0	0.052981	38.86	77.72	97.16
24.0	6.1	0.066690	30.88	61.75	77.19
24.0	6.2	0.083943	24.53	49.06	61.32
24.0	6.3	0.105655	19.49	38.97	48.72
24.0	6.4	0.132975	15.49	30.97	38.71
24.0	6.5	0.167348	12.31	24.61	30.76
24.0	6.6	0.210587	9.78	19.55	24.44
24.0	6.7	0.264969	9.72	19.43	15.54
24.0	6.8	0.333346	6.18	12.35	15.44
24.0	6.9	0.419296	4.91	9.82	12.88
24.0	7.0	0.527289	3.91	7.81	9.76
24.0	7.1	0.662912	3.11	6.21	7.76
24.0	7.2	0.833125	2.47	4.94	6.18
24.0	7.3	1.046583	1.97	3.93	4.92
24.0	7.4	1.314008	1.67	3.33	4.17
24.0	7.5	1.648628	1.25	2.50	3.12
24.0	7.6	2.066672	1.00	1.99	2.49
24.0	7.7	2.587934	0.80	1.59	1.99
24.0	7.8	3.236329	0.64	1.27	1.59
24.0	7.9	4.040434	0.51	1.02	1.27
24.0	8.0	5.033935	0.41	0.82	1.02
24.0	8.1	6.255799	0.33	0.66	0.82
24.0	8.2	7.750040	0.27	0.53	0.66
24.0	8.3	9.564775	0.22	0.43	0.54
24.0	8.4	11.750319	0.18	0.35	0.44
24.0	8.5	14.355982	0.15	0.29	0.36
24.0	8.6	17.425369	0.12	0.24	0.30
24.0	8.7	20.990173	0.10	0.20	0.25
24.0	8.8	25.062897	0.08	0.16	0.21
24.0	8.9	29.629486	0.07	0.14	0.17
24.0	9.0	34.643478	0.06	0.12	0.15
24.0	9.1	40.023392	0.05	0.10	0.13
24.0	9.2	45.655167	0.05	0.09	0.11
24.0	9.3	51.400253	0.04	0.08	0.10
24.0	9.4	57.108551	0.04	0.07	0.09
24.0	9.5	62.633820	0.03	0.06	0.08
24.0	9.6	67.848038	0.03	0.06	0.08
24.0	9.7	72.652328	0.03	0.06	0.07
24.0	9.8	76.982300	0.03	0.05	0.07
24.0	9.9	80.807755	0.03	0.05	0.06
24.0	10.0	84.128571	0.03	0.05	0.06
24.0	10.1	86.967438	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
24.5	5.0	0.005492	374.89	749.77	937.21
24.5	5.1	0.006914	297.79	595.57	744.46
24.5	5.2	0.008705	236.55	473.09	591.36
24.5	5.3	0.010958	187.90	375.79	469.74
24.5	5.4	0.013795	149.26	298.51	373.14
24.5	5.5	0.017366	118.57	237.13	296.41
24.5	5.6	0.021862	94.18	188.36	235.46
24.5	5.7	0.027521	74.82	149.63	187.04
24.5	5.8	0.034644	59.43	118.86	148.58
24.5	5.9	0.043610	47.22	94.43	118.03
24.5	6.0	0.054896	27.51	55.01	68.77
24.5	6.1	0.069100	29.80	59.59	74.49
24.5	6.2	0.086976	23.68	47.35	59.18
24.5	6.3	0.109471	18.81	37.62	47.02
24.5	6.4	0.137777	14.95	29.89	37.36
24.5	6.5	0.173389	11.88	23.75	29.69
24.5	6.6	0.218186	9.44	18.87	23.59
24.5	6.7	0.274524	7.50	15.00	18.75
24.5	6.8	0.345359	5.96	11.92	14.90
24.5	6.9	0.434392	4.74	9.48	11.85
24.5	7.0	0.546253	3.77	7.54	9.42
24.5	7.1	0.686719	3.00	6.00	7.50
24.5	7.2	0.862993	2.39	4.77	5.96
24.5	7.3	1.084020	1.89	3.78	4.73
24.5	7.4	1.360878	1.51	3.02	3.78
24.5	7.5	1.707226	1.21	2.41	3.02
24.5	7.6	2.139808	0.96	1.92	2.41
24.5	7.7	2.679011	0.77	1.54	1.92
24.5	7.8	3.349437	0.62	1.23	1.54
24.5	7.9	4.180434	0.49	0.98	1.23
24.5	8.0	5.206492	0.40	0.79	0.99
24.5	8.1	6.467390	0.32	0.64	0.80
24.5	8.2	8.007854	0.26	0.51	0.64
24.5	8.3	9.876494	0.21	0.42	0.52
24.5	8.4	12.123717	0.17	0.34	0.42
24.5	8.5	14.798297	0.14	0.28	0.35
24.5	8.6	17.942429	0.12	0.23	0.29
24.5	8.7	21.585373	0.10	0.19	0.24
24.5	8.8	25.735962	0.08	0.16	0.20
24.5	8.9	30.375473	0.07	0.13	0.17
24.5	9.0	35.422133	0.06	0.12	0.15
24.5	9.1	40.879059	0.05	0.10	0.13
24.5	9.2	46.537796	0.05	0.09	0.11
24.5	9.3	52.287094	0.04	0.08	0.10
24.5	9.4	57.976410	0.04	0.07	0.09
24.5	9.5	63.461395	0.03	0.06	0.08
24.5	9.6	68.617966	0.03	0.06	0.08
24.5	9.7	73.352432	0.03	0.06	0.07
24.5	9.8	77.605713	0.03	0.05	0.07
24.5	9.9	81.352692	0.03	0.05	0.06
24.5	10.0	84.597168	0.03	0.05	0.06
24.5	10.1	87.364792	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
25.0	5.0	0.005690	361.85	723.69	904.61
25.0	5.1	0.007164	287.43	574.85	718.57
25.0	5.2	0.009018	228.32	456.63	570.79
25.0	5.3	0.011353	181.36	362.72	453.41
25.0	5.4	0.014292	144.07	288.13	360.16
25.0	5.5	0.017992	114.44	228.88	286.10
25.0	5.6	0.022649	90.91	181.81	227.27
25.0	5.7	0.028512	72.22	144.43	180.54
25.0	5.8	0.035892	57.37	114.73	143.42
25.0	5.9	0.045181	45.57	91.14	113.93
25.0	6.0	0.056873	36.21	72.41	90.51
25.0	6.1	0.071588	28.76	57.52	71.90
25.0	6.2	0.090107	22.85	45.70	57.13
25.0	6.3	0.113412	18.16	36.31	45.39
25.0	6.4	0.142735	14.43	28.85	36.06
25.0	6.5	0.179626	11.46	22.92	28.66
25.0	6.6	0.226030	9.11	18.22	22.77
25.0	6.7	0.284389	7.24	14.48	18.10
25.0	6.8	0.357760	5.76	11.51	14.39
25.0	6.9	0.449976	4.58	9.15	11.44
25.0	7.0	0.565827	3.64	7.28	9.10
25.0	7.1	0.711290	2.90	5.79	7.24
25.0	7.2	0.893814	2.31	4.61	5.76
25.0	7.3	1.122645	1.84	3.67	4.59
25.0	7.4	1.409228	1.46	2.92	3.65
25.0	7.5	1.767661	1.17	2.33	2.91
25.0	7.6	2.215213	0.93	1.86	2.32
25.0	7.7	2.772880	0.74	1.48	1.86
25.0	7.8	3.465960	0.60	1.19	1.49
25.0	7.9	4.324570	0.48	0.95	1.19
25.0	8.0	5.384014	0.38	0.76	0.96
25.0	8.1	6.684872	0.31	0.62	0.77
25.0	8.2	8.272555	0.25	0.50	0.62
25.0	8.3	10.195118	0.20	0.40	0.50
25.0	8.4	12.505975	0.17	0.33	0.41
25.0	8.5	15.250261	0.14	0.27	0.34
25.0	8.6	18.469604	0.11	0.22	0.28
25.0	8.7	22.190613	0.09	0.18	0.23
25.0	8.8	26.418381	0.08	0.15	0.19
25.0	8.9	31.129364	0.07	0.13	0.17
25.0	9.0	36.266373	0.06	0.11	0.14
25.0	9.1	41.737366	0.05	0.10	0.12
25.0	9.2	47.419617	0.05	0.09	0.11
25.0	9.3	53.169495	0.04	0.08	0.10
25.0	9.4	58.836441	0.04	0.07	0.09
25.0	9.5	64.278351	0.03	0.06	0.08
25.0	9.6	69.375259	0.03	0.06	0.07
25.0	9.7	74.038696	0.03	0.05	0.07
25.0	9.8	78.214920	0.03	0.05	0.07
25.0	9.9	81.883789	0.03	0.05	0.06
25.0	10.0	85.052856	0.03	0.05	0.06
25.0	10.1	87.750458	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
25.5	5.0	0.005895	349.30	698.60	873.25
25.5	5.1	0.007421	277.46	554.92	693.66
25.5	5.2	0.009342	220.40	440.80	551.00
25.5	5.3	0.011761	175.08	350.15	437.69
25.5	5.4	0.014805	139.07	278.14	347.68
25.5	5.5	0.018638	110.48	220.95	276.18
25.5	5.6	0.023463	87.76	175.51	219.39
25.5	5.7	0.029536	69.71	139.42	174.28
25.5	5.8	0.037181	55.38	110.76	138.45
25.5	5.9	0.046803	43.99	87.98	109.98
25.5	6.0	0.058915	34.95	69.90	87.37
25.5	6.1	0.074158	27.77	55.53	69.41
25.5	6.2	0.093341	22.06	44.12	55.15
25.5	6.3	0.117480	17.53	35.05	43.82
25.5	6.4	0.147854	13.93	27.85	34.81
25.5	6.5	0.186066	11.07	22.13	27.66
25.5	6.6	0.234130	8.80	17.59	21.99
25.5	6.7	0.294573	6.99	13.98	17.47
25.5	6.8	0.370562	5.56	11.11	13.89
25.5	6.9	0.466062	4.42	8.83	11.04
25.5	7.0	0.586030	3.52	7.03	8.78
25.5	7.1	0.736649	2.80	5.59	6.99
25.5	7.2	0.925619	2.23	4.45	5.56
25.5	7.3	1.162498	1.77	3.54	4.43
25.5	7.4	1.459105	1.41	2.82	3.53
25.5	7.5	1.829988	1.13	2.25	2.81
25.5	7.6	2.292950	0.90	1.79	2.24
25.5	7.7	2.869612	0.72	1.43	1.79
25.5	7.8	3.585978	0.58	1.15	1.44
25.5	7.9	4.472943	0.46	0.92	1.15
25.5	8.0	5.566621	0.37	0.74	0.92
25.5	8.1	6.908379	0.30	0.60	0.75
25.5	8.2	8.544285	0.24	0.48	0.60
25.5	8.3	10.523791	0.20	0.39	0.49
25.5	8.4	12.897219	0.16	0.32	0.40
25.5	8.5	15.711929	0.13	0.26	0.33
25.5	8.6	19.006866	0.11	0.22	0.27
25.5	8.7	22.805847	0.09	0.18	0.23
25.5	8.8	27.109985	0.08	0.15	0.19
25.5	8.9	31.890854	0.07	0.13	0.16
25.5	9.0	37.085846	0.06	0.11	0.14
25.5	9.1	42.597839	0.05	0.10	0.12
25.5	9.2	48.300125	0.04	0.08	0.11
25.5	9.3	54.047043	0.04	0.08	0.10
25.5	9.4	59.688293	0.04	0.07	0.09
25.5	9.5	65.084381	0.03	0.06	0.08
25.5	9.6	70.119766	0.03	0.06	0.07
25.5	9.7	74.711121	0.03	0.05	0.07
25.5	9.8	78.810196	0.03	0.05	0.07
25.5	9.9	82.401337	0.03	0.05	0.06
25.5	10.0	85.495926	0.03	0.05	0.06
25.5	10.1	88.124725	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
26.0	5.0	0.006106	337.23	674.46	843.07
26.0	5.1	0.007686	267.88	535.75	669.69
26.0	5.2	0.009676	212.79	425.57	531.96
26.0	5.3	0.012182	169.03	338.05	422.57
26.0	5.4	0.015335	134.27	268.53	335.67
26.0	5.5	0.019305	106.66	213.31	266.64
26.0	5.6	0.024302	84.73	169.45	211.81
26.0	5.7	0.030593	67.31	134.61	168.26
26.0	5.8	0.03851	53.47	106.93	133.66
26.0	5.9	0.048478	42.48	84.95	106.18
26.0	6.0	0.061022	33.74	67.48	84.35
26.0	6.1	0.076810	26.81	53.61	67.02
26.0	6.2	0.096678	21.30	42.59	53.24
26.0	6.3	0.121680	16.92	33.84	42.30
26.0	6.4	0.153138	13.45	26.89	33.61
26.0	6.5	0.192713	10.69	21.37	26.71
26.0	6.6	0.242490	8.49	16.98	21.23
26.0	6.7	0.305084	6.75	13.50	16.87
26.0	6.8	0.383775	5.37	10.73	13.41
26.0	6.9	0.482664	4.27	8.53	10.66
26.0	7.0	0.606878	3.39	6.78	8.48
26.0	7.1	0.762815	2.70	5.40	6.75
26.0	7.2	0.958433	2.15	4.30	5.37
26.0	7.3	1.203606	1.17	2.34	2.93
26.0	7.4	1.510541	1.37	2.73	3.41
26.0	7.5	1.894248	1.09	2.17	2.72
26.0	7.6	2.373075	0.87	1.73	2.17
26.0	7.7	2.969275	0.70	1.39	1.73
26.0	7.8	3.709571	0.56	1.11	1.39
26.0	7.9	4.625638	0.45	0.89	1.11
26.0	8.0	5.754405	0.36	0.71	0.89
26.0	8.1	7.138002	0.29	0.58	0.72
26.0	8.2	8.823131	0.24	0.47	0.58
26.0	8.3	10.859558	0.19	0.38	0.47
26.0	8.4	13.297468	0.16	0.31	0.39
26.0	8.5	16.183289	0.13	0.25	0.32
26.0	8.6	19.554169	0.11	0.21	0.26
26.0	8.7	23.430878	0.09	0.17	0.22
26.0	8.8	27.810471	0.08	0.15	0.19
26.0	8.9	32.659515	0.07	0.13	0.16
26.0	9.0	37.910049	0.06	0.11	0.14
26.0	9.1	43.459930	0.05	0.09	0.12
26.0	9.2	49.178741	0.04	0.08	0.10
26.0	9.3	54.919159	0.04	0.07	0.09
26.0	9.4	60.531509	0.04	0.07	0.09
26.0	9.5	65.879257	0.03	0.06	0.08
26.0	9.6	70.851349	0.03	0.06	0.07
26.0	9.7	75.369766	0.03	0.05	0.07
26.0	9.8	79.391556	0.03	0.05	0.06
26.0	9.9	82.905533	0.03	0.05	0.06
26.0	10.0	85.926590	0.03	0.05	0.06
26.0	10.1	88.487869	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
26.5	5.0	0.006323	325.62	651.23	814.04
26.5	5.1	0.007961	258.65	517.30	646.63
26.5	5.2	0.010022	205.46	410.91	513.64
26.5	5.3	0.012616	163.21	326.41	408.01
26.5	5.4	0.015882	129.64	259.28	324.11
26.5	5.5	0.019994	102.99	205.97	257.46
26.5	5.6	0.025169	81.81	163.61	204.52
26.5	5.7	0.031684	64.99	129.97	162.46
26.5	5.8	0.039884	51.63	103.25	129.06
26.5	5.9	0.050206	41.01	82.02	102.53
26.5	6.0	0.063197	32.58	65.16	81.45
26.5	6.1	0.079547	25.89	51.77	64.77
26.5	6.2	0.100124	20.57	41.13	51.41
26.5	6.3	0.126015	16.34	32.68	40.85
26.5	6.4	0.158592	12.99	25.97	32.46
26.5	6.5	0.199573	10.32	20.63	25.79
26.5	6.6	0.251118	8.20	16.40	20.50
26.5	6.7	0.315933	6.52	13.03	16.29
26.5	6.8	0.397410	5.18	10.36	12.95
26.5	6.9	0.499794	4.12	8.24	10.30
26.5	7.0	0.628390	3.28	6.55	8.19
26.5	7.1	0.789810	2.61	5.21	6.52
26.5	7.2	0.992281	2.08	4.15	5.19
26.5	7.3	1.246005	1.65	3.30	4.13
26.5	7.4	1.563581	1.32	2.63	3.29
26.5	7.5	1.960491	1.05	2.10	2.63
26.5	7.6	2.455644	0.84	1.68	2.10
26.5	7.7	3.071936	0.67	1.34	1.68
26.5	7.8	3.836813	0.54	1.07	1.34
26.5	7.9	4.782745	0.43	0.86	1.08
26.5	8.0	5.947464	0.35	0.69	0.87
26.5	8.1	7.373846	0.28	0.56	0.70
26.5	8.2	9.109190	0.23	0.45	0.57
26.5	8.3	11.203529	0.19	0.37	0.46
26.5	8.4	13.706773	0.15	0.30	0.38
26.5	8.5	16.664352	0.13	0.25	0.31
26.5	8.6	20.111389	0.10	0.20	0.26
26.5	8.7	24.065536	0.09	0.17	0.21
26.5	8.8	28.519577	0.07	0.14	0.18
26.5	8.9	33.434998	0.06	0.12	0.15
26.5	9.0	38.738480	0.06	0.11	0.13
26.5	9.1	44.323044	0.05	0.09	0.11
26.5	9.2	50.054916	0.04	0.08	0.10
26.5	9.3	55.785309	0.04	0.07	0.09
26.5	9.4	61.365692	0.04	0.07	0.08
26.5	9.5	66.662674	0.03	0.06	0.08
26.5	9.6	71.569870	0.03	0.06	0.07
26.5	9.7	76.014664	0.03	0.05	0.07
26.5	9.8	79.959122	0.03	0.05	0.06
26.5	9.9	83.396561	0.03	0.05	0.06
26.5	10.0	86.345108	0.03	0.05	0.06
26.5	10.1	88.840073	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
27.0	5.0	0.006548	314.44	628.87	786.09
27.0	5.1	0.008244	249.77	499.54	624.43
27.0	5.2	0.010378	198.41	396.81	496.01
27.0	5.3	0.013064	157.61	315.21	394.01
27.0	5.4	0.016447	125.20	250.39	312.98
27.0	5.5	0.020704	99.45	198.90	248.62
27.0	5.6	0.026064	79.00	158.00	197.50
27.0	5.7	0.032810	62.76	125.51	156.89
27.0	5.8	0.041301	49.85	99.70	124.63
27.0	5.9	0.051990	39.61	79.21	99.01
27.0	6.0	0.055442	31.46	62.92	78.66
27.0	6.1	0.082373	25.00	49.99	62.49
27.0	6.2	0.103676	19.86	39.72	49.65
27.0	6.3	0.130489	15.78	31.56	39.45
27.0	6.4	0.164221	12.54	25.08	31.35
27.0	6.5	0.206653	9.97	19.93	24.91
27.0	6.6	0.260022	7.92	15.84	19.80
27.0	6.7	0.327127	6.30	12.59	15.74
27.0	6.8	0.411480	5.00	10.01	12.51
27.0	6.9	0.517470	3.98	7.96	9.95
27.0	7.0	0.650584	3.17	6.33	7.91
27.0	7.1	0.817658	2.52	5.04	6.30
17.0	7.2	1.027194	2.01	4.01	5.01
27.0	7.3	1.289728	1.60	3.19	3.99
27.0	7.4	1.618265	1.27	2.54	3.18
27.0	7.5	2.028773	1.02	2.03	2.54
27.0	7.6	2.540725	0.81	1.62	2.03
27.0	7.7	3.177673	0.65	1.29	1.62
27.0	7.8	3.967802	0.52	1.04	1.30
27.0	7.9	4.944363	0.42	0.83	1.04
27.0	8.0	6.145899	0.34	0.67	0.84
27.0	8.1	7.616018	0.27	0.54	0.68
27.0	8.2	9.402570	0.22	0.44	0.55
27.0	8.3	11.555795	0.18	0.36	0.45
27.0	8.4	14.125226	0.15	0.29	0.36
27.0	8.5	17.155151	0.12	0.24	0.30
27.0	8.6	20.678513	0.10	0.20	0.25
27.0	8.7	24.709671	0.09	0.17	0.21
27.0	8.8	29.237015	0.07	0.14	0.18
27.0	8.9	34.216904	0.06	0.12	0.15
27.0	9.0	39.570679	0.05	0.10	0.13
27.0	9.1	45.186737	0.05	0.09	0.11
27.0	9.2	50.928116	0.04	0.08	0.10
27.0	9.3	56.645111	0.04	0.07	0.09
27.0	9.4	62.190536	0.04	0.07	0.08
27.0	9.5	67.434448	0.03	0.06	0.08
27.0	9.6	72.275299	0.03	0.06	0.07
27.0	9.7	76.645752	0.03	0.05	0.07
27.0	9.8	80.513031	0.03	0.05	0.06
27.0	9.9	83.874603	0.03	0.05	0.06
27.0	10.0	86.751801	0.03	0.05	0.06
27.0	10.1	89.181763	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
27.5	5.0	0.006780	303.68	607.36	759.20
27.5	5.1	0.008536	241.23	482.45	603.06
27.5	5.2	0.010745	191.62	383.23	479.04
27.5	5.3	0.013527	152.21	304.42	380.53
27.5	5.4	0.017029	120.91	241.82	302.27
27.5	5.5	0.021438	96.05	192.09	240.12
27.5	5.6	0.026987	76.30	152.59	190.74
27.5	5.7	0.033972	60.61	121.22	151.52
27.5	5.8	0.042764	48.15	96.29	120.37
27.5	5.9	0.053831	38.25	76.50	95.62
27.5	6.0	0.067760	30.39	60.77	75.97
27.5	6.1	0.085289	24.14	48.28	60.35
27.5	6.2	0.107349	19.18	38.36	47.95
27.5	6.3	0.135107	15.24	30.48	38.10
27.5	6.4	0.170029	12.11	24.22	30.27
27.5	6.5	0.213960	9.63	19.25	24.06
27.5	6.6	0.269210	7.65	15.30	19.12
27.5	6.7	0.338678	6.08	12.16	15.20
27.5	6.8	0.425997	4.84	9.67	12.08
27.5	6.9	0.535707	3.85	7.69	9.61
27.5	7.0	0.673480	3.06	6.11	7.64
27.5	7.1	0.846384	2.43	4.86	6.08
27.5	7.2	1.063202	1.94	3.87	4.84
27.5	7.3	1.334816	1.54	3.08	3.86
27.5	7.4	1.674644	1.23	2.46	3.07
27.5	7.5	2.099146	0.98	1.96	2.45
27.5	7.6	2.628379	0.79	1.57	1.96
27.5	7.7	3.286564	0.63	1.25	1.57
27.5	7.8	4.102623	0.50	1.00	1.25
27.5	7.9	5.110600	0.40	0.80	1.01
27.5	8.0	6.349829	0.33	0.65	0.81
27.5	8.1	7.864645	0.26	0.51	0.65
27.5	8.2	9.703393	0.21	0.42	0.53
27.5	8.3	11.916437	0.17	0.34	0.43
27.5	8.4	14.552863	0.14	0.28	0.35
27.5	8.5	17.655670	0.12	0.23	0.29
27.5	8.6	21.255447	0.10	0.19	0.24
27.5	8.7	25.363129	0.08	0.16	0.20
27.5	8.8	29.962555	0.07	0.14	0.17
27.5	8.9	35.004883	0.06	0.12	0.15
27.5	9.0	40.406219	0.05	0.10	0.13
27.5	9.1	46.050476	0.05	0.09	0.11
27.5	9.2	51.797897	0.04	0.08	0.10
27.5	9.3	57.498138	0.04	0.07	0.09
27.5	9.4	63.005722	0.03	0.06	0.08
27.5	9.5	68.194382	0.03	0.06	0.08
27.5	9.6	72.967560	0.03	0.06	0.07
27.5	9.7	77.263199	0.03	0.05	0.07
27.5	9.8	81.053482	0.03	0.05	0.06
27.5	9.9	84.340027	0.03	0.05	0.06
27.5	10.0	87.146835	0.03	0.06	0.06
27.5	10.1	89.513153	0.03	0.05	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
28.0	5.0	0.007020	293.32	586.64	733.31
28.0	5.1	0.008837	233.00	466.00	582.50
28.0	5.2	0.011125	185.08	370.16	462.71
28.0	5.3	0.014005	147.02	294.04	367.55
28.0	5.4	0.017630	116.79	233.57	291.97
28.0	5.5	0.022194	92.77	185.54	231.93
28.0	5.6	0.027939	73.70	147.39	184.24
28.0	5.7	0.035171	58.54	117.08	146.36
28.0	5.8	0.044274	46.51	93.01	116.27
28.0	5.9	0.055731	36.95	73.89	92.36
28.0	6.0	0.070150	29.35	58.70	73.38
28.0	6.1	0.088298	23.32	46.64	58.30
28.0	6.2	0.111135	18.53	37.05	46.32
28.0	6.3	0.139870	14.72	29.44	36.80
28.0	6.4	0.176022	11.70	23.39	29.24
28.0	6.5	0.214980	9.30	18.59	23.24
28.0	6.6	0.278689	7.39	14.78	18.47
28.0	6.7	0.350595	5.87	11.74	14.68
28.0	6.8	0.440972	4.67	9.34	11.67
28.0	6.9	0.554517	3.72	7.43	9.28
28.0	7.0	0.697094	2.96	5.91	7.38
28.0	7.1	0.876007	2.35	4.70	5.88
28.0	7.2	1.100329	1.87	3.74	4.68
28.0	7.3	1.381295	1.49	2.98	3.73
28.0	7.4	1.732750	1.19	2.38	2.97
28.0	7.5	2.171657	0.95	1.90	2.37
28.0	7.6	2.718662	0.76	1.51	1.89
28.0	7.7	3.398664	0.61	1.21	1.51
28.0	7.8	4.241334	0.49	0.97	1.21
28.0	7.9	5.281515	0.39	0.78	0.79
28.0	8.0	6.559324	0.32	0.63	0.78
28.0	8.1	8.119794	0.26	0.51	0.63
28.0	8.2	10.011713	0.21	0.41	0.51
28.0	8.3	12.285508	0.17	0.33	0.42
28.0	8.4	14.989691	0.14	0.27	0.34
28.0	8.5	18.165817	0.12	0.23	0.28
28.0	8.6	21.842026	0.10	0.19	0.24
28.0	8.7	26.025589	0.08	0.16	0.20
28.0	8.8	30.695755	0.07	0.13	0.17
28.0	8.9	35.798401	0.06	0.11	0.14
28.0	9.0	41.244476	0.05	0.10	0.12
28.0	9.1	46.913666	0.05	0.09	0.11
28.0	9.2	52.663651	0.04	0.08	0.10
28.0	9.3	58.343842	0.04	0.07	0.09
28.0	9.4	63.810791	0.03	0.06	0.08
28.0	9.5	68.942215	0.03	0.06	0.07
28.0	9.6	73.646400	0.03	0.05	0.07
28.0	9.7	77.867020	0.03	0.05	0.06
28.0	9.8	81.580673	0.03	0.05	0.06
28.0	9.9	84.792877	0.03	0.05	0.06
28.0	10.0	87.530563	0.03	0.05	0.06
28.0	10.1	89.834488	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
28.5	5.0	0.007267	283.35	566.70	708.38
28.5	5.1	0.009148	225.08	450.16	562.70
28.5	5.2	0.011516	178.79	357.58	446.98
28.5	5.3	0.014498	142.02	284.04	355.06
28.5	5.4	0.018251	112.82	225.63	282.04
28.5	5.5	0.022975	89.62	179.24	224.05
28.5	5.6	0.028922	71.19	142.38	177.98
28.5	5.7	0.036408	56.56	113.11	141.38
28.5	5.8	0.045831	44.93	89.85	112.31
28.5	5.9	0.057691	35.69	71.38	89.23
28.5	6.0	0.072617	28.36	56.71	70.89
28.5	6.1	0.091403	22.53	45.05	56.32
28.5	6.2	0.115042	17.90	35.79	44.74
28.5	6.3	0.144786	14.22	28.44	35.55
28.5	6.4	0.182206	11.30	22.60	28.25
28.5	6.5	0.229276	11.23	22.45	17.96
28.5	6.6	0.288469	7.14	14.27	17.84
28.5	6.7	0.362889	5.68	11.35	14.18
28.5	6.8	0.456420	4.51	9.02	11.28
28.5	6.9	0.573920	3.59	7.17	8.97
28.5	7.0	0.721450	2.86	5.71	7.13
28.5	7.1	0.906556	2.27	4.54	5.68
28.5	7.2	1.138612	1.81	3.62	4.52
28.5	7.3	1.429214	1.44	2.88	3.60
28.5	7.4	1.792637	1.15	2.30	2.87
28.5	7.5	2.246367	0.92	1.83	2.29
28.5	7.6	2.811650	0.73	1.46	1.83
28.5	7.7	3.514070	0.59	1.17	1.46
28.5	7.8	4.384057	0.47	0.94	1.17
28.5	7.9	5.457245	0.38	0.75	0.94
28.5	8.0	6.774529	0.31	0.61	0.76
28.5	8.1	8.381602	0.25	0.49	0.61
28.5	8.2	10.327665	0.20	0.40	0.50
28.5	8.3	12.663119	0.16	0.32	0.41
28.5	8.4	15.435796	0.14	0.27	0.33
28.5	8.5	18.685669	0.11	0.22	0.28
28.5	8.6	22.438232	0.09	0.18	0.23
28.5	8.7	26.696976	0.08	0.15	0.19
28.5	8.8	31.436417	0.07	0.13	0.16
28.5	8.9	36.597183	0.06	0.11	0.14
28.5	9.0	42.085129	0.05	0.10	0.12
28.5	9.1	47.775894	0.05	0.09	0.11
28.5	9.2	53.525009	0.04	0.08	0.10
28.5	9.3	59.181961	0.04	0.07	0.09
28.5	9.4	64.605637	0.03	0.06	0.08
28.5	9.5	69.677902	0.03	0.06	0.07
28.5	9.6	74.312271	0.03	0.05	0.07
28.5	9.7	78.457321	0.03	0.05	0.07
28.5	9.8	82.094757	0.03	0.05	0.06
28.5	9.9	85.233505	0.03	0.05	0.06
28.5	10.0	87.903183	0.03	0.05	0.06
28.5	10.1	90.145950	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
29.0	5.0	0.007521	273.75	547.50	684.38
29.0	5.1	0.009469	217.45	434.90	543.63
29.0	5.2	0.011920	172.74	345.47	431.83
29.0	5.3	0.015006	137.21	274.42	243.03
29.0	5.4	0.018891	109.00	217.99	272.49
29.0	5.5	0.023781	86.58	173.16	216.46
29.0	5.6	0.029936	68.78	137.56	171.95
29.0	5.7	0.037685	54.64	109.27	136.59
29.0	5.8	0.047438	43.41	86.81	108.51
29.0	5.9	0.059713	34.48	68.96	86.20
29.0	6.0	0.075162	27.40	54.79	68.48
29.0	6.1	0.094605	21.77	43.53	54.41
29.0	6.2	0.119072	17.29	34.58	43.23
29.0	6.3	0.149856	13.74	27.48	34.35
29.0	6.4	0.188584	10.92	21.84	27.30
29.0	6.5	0.237297	8.68	17.35	21.69
29.0	6.6	0.298556	6.90	13.79	17.24
29.0	6.7	0.375569	5.48	10.96	13.71
29.0	6.8	0.472353	4.36	8.72	10.90
29.0	6.9	0.593929	3.47	6.93	8.67
29.0	7.0	0.746564	2.76	5.51	6.89
29.0	7.1	0.938053	2.20	4.39	5.49
29.0	7.2	1.178076	1.75	3.49	4.37
29.0	7.3	1.478599	1.39	2.78	3.48
29.0	7.4	1.854343	1.11	2.22	2.78
29.0	7.5	2.323322	0.89	1.77	2.22
29.0	7.6	2.907394	0.71	1.42	1.77
29.0	7.7	3.632839	0.57	1.13	1.42
29.0	7.8	4.530850	0.46	0.91	1.14
29.0	7.9	5.637854	0.37	0.73	0.91
29.0	8.0	6.995508	0.30	0.59	0.74
29.0	8.1	9.650138	0.24	0.48	0.60
29.0	8.2	10.651302	0.19	0.38	0.48
29.0	8.3	13.049294	0.16	0.31	0.39
29.0	8.4	15.891136	0.13	0.26	0.32
29.0	8.5	19.215103	0.11	0.21	0.27
29.0	8.6	23.043854	0.09	0.18	0.22
29.0	8.7	27.376968	0.08	0.15	0.19
29.0	8.8	32.184128	0.07	0.13	0.16
29.0	8.9	37.400681	0.06	0.11	0.14
29.0	9.0	42.927536	0.05	0.09	0.12
29.0	9.1	48.636551	0.04	0.08	0.11
29.0	9.2	54.381378	0.04	0.07	0.09
29.0	9.3	60.011963	0.04	0.07	0.09
29.0	9.4	65.389893	0.03	0.06	0.08
29.0	9.5	70.401245	0.03	0.06	0.07
29.0	9.6	74.964783	0.03	0.05	0.07
29.0	9.7	79.034256	0.03	0.05	0.07
29.0	9.8	82.595856	0.03	0.05	0.06
29.0	9.9	85.662155	0.03	0.05	0.06
29.0	10.0	88.264999	0.03	0.05	0.06
29.0	10.1	90.447968	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
29.5	5.0	0.007784	264.51	529.01	661.26
29.5	5.1	0.009800	210.11	420.22	525.27
29.5	5.2	0.012337	166.90	333.80	417.25
29.5	5.3	0.015530	132.58	265.15	331.41
29.5	5.4	0.019551	105.32	210.63	263.29
29.5	5.5	0.024612	83.66	167.32	209.15
29.5	5.6	0.030982	66.46	132.91	166.14
29.5	5.7	0.039001	52.79	105.58	131.98
29.5	5.8	0.049095	41.94	83.88	104.85
29.5	5.9	0.061799	33.32	66.63	83.29
29.5	6.0	0.077788	26.47	52.94	66.17
29.5	6.1	0.097909	21.03	42.06	52.57
29.5	6.2	0.123229	16.71	33.42	41.77
29.5	6.3	0.155086	13.28	26.55	33.19
29.5	6.4	0.195163	10.55	21.10	26.38
29.5	6.5	0.245571	8.39	16.77	20.96
29.5	6.6	0.308959	6.67	13.33	16.66
29.5	6.7	0.388645	5.30	10.59	13.24
29.5	6.8	0.488783	4.21	8.42	10.53
29.5	6.9	0.614562	3.35	6.70	8.38
29.5	7.0	0.772458	2.67	5.33	6.66
29.5	7.1	0.970525	2.12	4.24	5.30
29.5	7.2	1.218754	1.69	3.38	4.22
29.5	7.3	1.529491	1.35	2.69	3.36
29.5	7.4	1.917917	1.08	2.15	2.68
29.5	7.5	2.402580	0.86	1.71	2.14
29.5	7.6	3.005965	0.69	1.37	1.71
29.5	7.7	3.755054	0.55	1.10	1.37
29.5	7.8	4.681808	0.44	0.88	1.10
29.5	7.9	5.823449	0.36	0.71	0.88
29.5	8.0	7.222376	0.29	0.57	0.71
29.5	8.1	8.925508	0.23	0.46	0.58
29.5	8.2	10.982720	0.19	0.37	0.47
29.5	8.3	13.444097	0.16	0.31	0.38
29.5	8.4	16.355743	0.13	0.25	0.31
29.5	8.5	19.754059	0.11	0.21	0.26
29.5	8.6	23.658768	0.09	0.17	0.22
29.5	8.7	28.065338	0.08	0.15	0.18
29.5	8.8	32.938553	0.06	0.12	0.16
29.5	8.9	38.208481	0.06	0.11	0.13
29.5	9.0	43.771255	0.05	0.09	0.12
29.5	9.1	49.495163	0.04	0.08	0.10
29.5	9.2	55.232361	0.04	0.07	0.09
29.5	9.3	60.833557	0.04	0.07	0.08
29.5	9.4	66.163269	0.03	0.06	0.08
29.5	9.5	71.112122	0.03	0.06	0.07
29.5	9.6	75.604034	0.03	0.05	0.07
29.5	9.7	79.597916	0.03	0.05	0.06
29.5	9.8	83.084213	0.03	0.05	0.06
29.5	9.9	86.078949	0.03	0.05	0.06
29.5	10.0	88.616196	0.03	0.05	0.06
29.5	10.1	90.740692	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
30.0	5.0	0.008055	255.60	511.20	639.01
30.0	5.1	0.010141	203.04	406.07	507.59
30.0	5.2	0.012766	161.28	322.56	403.20
30.0	5.3	0.016071	128.12	256.23	320.29
30.0	5.4	0.020232	101.77	203.54	254.43
30.0	5.5	0.025469	80.85	161.69	202.11
30.0	5.6	0.032062	64.22	128.44	160.55
30.0	5.7	0.040360	51.02	102.03	127.54
30.0	5.8	0.050804	40.53	81.05	101.32
30.0	5.9	0.063950	32.20	64.39	80.49
30.0	6.0	0.080495	25.58	51.16	63.95
30.0	6.1	0.101316	20.32	40.64	50.81
30.0	6.2	0.127516	16.15	32.29	40.37
30.0	6.3	0.160480	12.83	25.66	32.08
30.0	6.4	0.201949	10.20	20.39	25.49
30.0	6.5	0.254105	8.10	16.20	20.26
30.0	6.6	0.319688	6.44	12.88	16.10
30.0	6.7	0.402130	5.12	10.24	12.80
30.0	6.8	0.505725	4.07	8.14	10.18
30.0	6.9	0.635837	3.24	6.48	8.10
30.0	7.0	0.799154	2.58	5.15	6.44
30.0	7.1	1.003996	2.05	4.10	5.13
30.0	7.2	1.260677	1.64	3.27	4.08
30.0	7.3	1.581934	1.30	2.60	3.25
30.0	7.4	1.983410	1.04	2.08	2.60
30.0	7.5	2.484203	0.83	1.66	2.07
30.0	7.6	3.107435	0.66	1.32	1.66
30.0	7.7	3.880799	0.53	1.06	1.33
30.0	7.8	4.837026	0.43	0.85	1.06
30.0	7.9	6.014127	0.34	0.68	0.86
30.0	8.0	7.455229	0.28	0.55	0.69
30.0	8.1	9.207829	0.23	0.45	0.56
30.0	8.2	11.322022	0.18	0.36	0.45
30.0	8.3	13.847612	0.15	0.30	0.37
30.0	8.4	16.829651	0.12	0.24	0.31
30.0	8.5	20.302551	0.13	0.25	0.20
30.0	8.6	24.282852	0.09	0.17	0.21
30.0	8.7	28.761871	0.07	0.14	0.18
30.0	8.8	33.699371	0.06	0.12	0.15
30.0	8.9	39.020203	0.05	0.10	0.13
30.0	9.0	44.615799	0.05	0.09	0.11
30.0	9.1	50.351303	0.04	0.08	0.10
30.0	9.2	56.077530	0.04	0.07	0.09
30.0	9.3	61.646408	0.04	0.07	0.08
30.0	9.4	66.925613	0.03	0.06	0.08
30.0	9.5	71.810486	0.03	0.06	0.07
30.0	9.6	76.230133	0.03	0.05	0.07
30.0	9.7	80.148407	0.03	0.05	0.06
30.0	9.8	83.560059	0.03	0.05	0.06
30.0	9.9	86.484268	0.03	0.06	0.06
30.0	10.0	88.957123	0.03	0.05	0.06
30.0	10.1	91.024506	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
30.5	5.0	0.008335	247.03	494.05	617.56
30.5	5.1	0.010493	196.23	392.45	490.56
30.5	5.2	0.013210	155.87	311.74	389.68
30.5	5.3	0.016629	123.82	247.63	309.54
30.5	5.4	0.020934	98.36	196.71	245.89
30.5	5.5	0.026353	78.13	156.26	195.33
30.5	5.6	0.033174	62.07	124.13	155.17
30.5	5.7	0.041760	49.31	98.61	123.26
30.5	5.8	0.052567	39.17	78.34	97.72
30.5	5.9	0.066169	31.12	62.23	77.79
30.5	6.0	0.083288	24.72	49.44	61.80
30.5	6.1	0.104831	19.64	39.28	49.10
30.5	6.2	0.131938	15.61	31.21	39.01
30.5	6.3	0.166043	12.40	24.80	31.00
30.5	6.4	0.208946	9.86	19.71	24.64
30.5	6.5	0.262905	7.83	15.66	19.58
30.5	6.6	0.330751	6.23	12.45	15.56
30.5	6.7	0.416034	4.95	9.90	12.37
30.5	6.8	0.523192	3.94	7.87	9.84
30.5	6.9	0.657768	3.13	6.26	7.83
30.5	7.0	0.826671	2.49	4.98	6.23
30.5	7.1	1.038492	1.98	3.96	4.96
30.5	7.2	1.303879	1.58	3.16	3.95
30.5	7.3	1.635961	1.26	2.52	3.15
30.5	7.4	2.050861	1.01	2.01	2.51
30.5	7.5	2.568241	0.80	1.60	2.00
30.5	7.6	3.211861	0.64	1.28	1.60
30.5	7.7	4.010138	0.52	1.03	1.28
30.5	7.8	4.996576	0.41	0.82	1.03
30.5	7.9	6.209970	0.33	0.66	0.83
30.5	8.0	7.694166	0.27	0.53	0.67
30.5	8.1	9.497165	0.22	0.43	0.54
30.5	8.2	11.669252	0.18	0.35	0.44
30.5	8.3	14.259844	0.15	0.29	0.36
30.5	8.4	17.312820	0.12	0.24	0.30
30.5	8.5	20.860413	0.10	0.20	0.25
30.5	8.6	24.915894	0.08	0.16	0.21
30.5	8.7	29.466248	0.07	0.14	0.17
30.5	8.8	34.466156	0.06	0.12	0.15
30.5	8.9	39.835312	0.05	0.10	0.13
30.5	9.0	45.460678	0.05	0.09	0.11
30.5	9.1	51.204346	0.04	0.08	0.10
30.5	9.2	56.916367	0.04	0.07	0.09
30.5	9.3	62.450104	0.03	0.06	0.08
30.5	9.4	67.676727	0.03	0.06	0.08
30.5	9.5	72.496216	0.03	0.06	0.07
30.5	9.6	76.843018	0.03	0.05	0.07
30.5	9.7	80.685883	0.03	0.05	0.06
30.5	9.8	84.023605	0.03	0.05	0.06
30.5	9.9	86.878296	0.03	0.05	0.06
30.5	10.0	89.287994	0.03	0.05	0.06
30.5	10.1	91.299438	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
31.0	5.0	0.008624	238.77	477.53	596.91
31.0	5.1	0.010855	189.66	379.32	474.15
31.0	5.2	0.013667	150.66	301.31	376.64
31.0	5.3	0.017205	119.68	239.35	299.19
31.0	5.4	0.021659	95.07	190.13	237.67
31.0	5.5	0.027265	75.52	151.04	188.80
31.0	5.6	0.034322	59.99	119.98	149.98
31.0	5.7	0.043208	47.66	95.31	119.14
31.0	5.8	0.054386	37.86	75.72	94.65
31.0	5.9	0.068458	30.08	60.15	75.19
31.0	6.0	0.086168	23.90	47.79	59.74
31.0	6.1	0.108454	18.99	37.97	47.46
31.0	6.2	0.136497	15.09	30.17	37.71
31.0	6.3	0.171779	11.99	23.97	29.97
31.0	6.4	0.216161	9.53	19.05	23.81
31.0	6.5	0.271978	7.57	15.14	18.93
31.0	6.6	0.342158	6.02	12.03	15.04
31.0	6.7	0.430370	4.79	9.57	11.96
31.0	6.8	0.541200	3.81	7.61	9.51
31.0	6.9	0.680376	3.03	6.05	7.57
31.0	7.0	0.855035	2.41	4.82	6.02
31.0	7.1	1.074045	1.92	3.83	4.79
31.0	7.2	1.348392	1.53	3.05	3.82
31.0	7.3	1.691618	1.22	2.43	3.04
31.0	7.4	2.120331	0.97	1.94	2.43
31.0	7.5	2.654758	0.78	1.55	1.94
31.0	7.6	3.319324	0.62	1.24	1.55
31.0	7.7	4.143165	0.50	0.99	1.24
31.0	7.8	5.160566	0.40	0.80	1.00
31.0	7.9	6.411096	0.32	0.64	0.80
31.0	8.0	7.939289	0.26	0.52	0.65
31.0	8.1	9.793642	0.21	0.42	0.53
31.0	8.2	12.024528	0.17	0.34	0.43
31.0	8.3	14.680882	0.12	0.24	0.35
31.0	8.4	17.805283	0.12	0.23	0.29
31.0	8.5	21.427628	0.10	0.19	0.24
31.0	8.6	25.557770	0.08	0.16	0.20
31.0	8.7	30.178238	0.07	0.14	0.17
31.0	8.8	35.238602	0.06	0.12	0.15
31.0	8.9	40.653442	0.05	0.10	0.13
31.0	9.0	46.305405	0.05	0.09	0.11
31.0	9.1	52.053955	0.04	0.08	0.10
31.0	9.2	57.748596	0.04	0.07	0.09
31.0	9.3	63.244446	0.03	0.06	0.08
31.0	9.4	68.416458	0.03	0.06	0.08
31.0	9.5	73.169388	0.03	0.06	0.07
31.0	9.6	77.442886	0.03	0.05	0.07
31.0	9.7	81.210541	0.03	0.05	0.06
31.0	9.8	84.475037	0.03	0.05	0.06
31.0	9.9	87.261337	0.03	0.05	0.06
31.0	10.0	89.609085	0.02	0.04	0.06
31.0	10.1	91.565887	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
31.5	5.0	0.008921	230.81	461.61	577.01
31.5	5.1	0.011231	183.34	366.68	458.35
31.5	5.2	0.014138	145.64	291.27	364.09
31.5	5.3	0.017798	115.69	231.37	289.22
31.5	5.4	0.022405	91.90	183.79	229.74
31.5	5.5	0.028205	73.00	146.00	182.50
31.5	5.6	0.035505	57.99	115.98	144.98
31.5	5.7	0.044694	46.07	92.14	115.17
31.5	5.8	0.056260	36.60	73.19	91.49
31.5	5.9	0.070817	29.08	58.15	72.69
31.5	6.0	0.089137	23.10	46.20	57.75
31.5	6.1	0.112191	18.35	36.70	45.88
31.5	6.2	0.141199	14.58	29.16	36.46
31.5	6.3	0.177693	11.59	23.17	28.97
31.5	6.4	0.223599	9.21	18.42	23.02
31.5	6.5	0.281332	7.32	14.64	18.30
31.5	6.6	0.353917	5.82	11.63	14.54
31.5	6.7	0.445147	4.63	9.25	11.56
31.5	6.8	0.559761	3.68	7.36	9.20
31.5	6.9	0.703676	2.93	5.85	7.32
31.5	7.0	0.884263	2.33	4.66	5.82
31.5	7.1	1.110678	1.86	3.71	4.63
31.5	7.2	1.394248	1.48	2.95	3.69
31.5	7.3	1.748939	1.18	2.35	2.94
31.5	7.4	2.191854	0.94	1.88	2.35
31.5	7.5	2.743806	0.75	1.50	1.88
31.5	7.6	3.429874	0.60	1.20	1.50
31.5	7.7	4.279941	0.48	0.96	1.20
31.5	7.8	5.329062	0.39	0.77	0.97
31.5	7.9	6.617578	0.31	0.62	0.78
31.5	8.0	8.190682	0.25	0.50	0.63
31.5	8.1	10.097303	0.21	0.41	0.51
31.5	8.2	12.387861	0.17	0.33	0.42
31.5	8.3	15.110692	0.14	0.27	0.34
31.5	8.4	18.306946	0.11	0.22	0.28
31.5	8.5	22.004028	0.10	0.19	0.23
31.5	8.6	26.208206	0.08	0.16	0.20
31.5	8.7	30.897461	0.07	0.13	0.17
31.5	8.8	36.016220	0.06	0.11	0.14
31.5	8.9	41.474030	0.05	0.10	0.12
31.5	9.0	47.149445	0.05	0.09	0.11
31.5	9.1	52.899521	0.04	0.08	0.10
31.5	9.2	58.573669	0.04	0.07	0.09
31.5	9.3	64.029068	0.03	0.06	0.08
31.5	9.4	69.144516	0.03	0.06	0.07
31.5	9.5	73.829758	0.03	0.05	0.07
31.5	9.6	78.029724	0.03	0.05	0.07
31.5	9.7	81.722458	0.03	0.05	0.06
31.5	9.8	84.914551	0.03	0.05	0.06
31.5	9.9	87.633484	0.03	0.05	0.06
31.5	10.0	89.920532	0.02	0.04	0.06
31.5	10.1	91.824081	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
32.0	5.0	0.009228	223.14	446.27	557.84
32.0	5.1	0.011617	177.25	354.49	443.12
32.0	5.2	0.014624	140.80	281.59	351.99
32.0	5.3	0.018410	111.85	223.69	279.61
32.0	5.4	0.023175	88.85	177.69	222.11
32.0	5.5	0.029174	70.58	141.15	176.44
32.0	5.6	0.036725	56.07	112.13	140.16
32.0	5.7	0.046230	44.54	89.08	111.35
32.0	5.8	0.058193	35.38	70.76	88.46
32.0	5.9	0.073250	28.11	56.22	70.27
32.0	6.0	0.092198	22.33	44.66	55.83
32.0	6.1	0.116043	17.75	35.49	44.36
32.0	6.2	0.146045	14.10	28.20	35.25
32.0	6.3	0.183790	11.20	22.40	28.01
32.0	6.4	0.231268	8.91	17.81	22.26
32.0	6.5	0.290974	7.08	14.15	17.69
32.0	6.6	0.366038	5.63	11.25	14.06
32.0	6.7	0.460378	4.47	8.94	11.18
32.0	6.8	0.578891	3.56	7.11	8.89
32.0	6.9	0.727689	2.82	5.64	7.05
32.0	7.0	0.914383	2.25	4.50	5.63
32.0	7.1	1.148418	1.79	3.58	4.48
32.0	7.2	1.441484	1.43	2.86	3.57
32.0	7.3	1.807971	1.14	2.28	2.85
32.0	7.4	2.265492	0.91	1.82	2.27
32.0	7.5	2.835449	0.73	1.45	1.82
32.0	7.6	3.543597	0.58	1.16	1.45
32.0	7.7	4.420560	0.47	0.93	1.16
32.0	7.8	5.502172	0.38	0.75	0.94
32.0	7.9	6.829521	0.30	0.60	0.75
32.0	8.0	8.448449	0.25	0.49	0.61
32.0	8.1	10.408270	0.20	0.39	0.49
32.0	8.2	12.759358	0.16	0.32	0.40
32.0	8.3	15.549354	0.13	0.26	0.33
32.0	8.4	18.817810	0.11	0.22	0.27
32.0	8.5	22.589554	0.09	0.18	0.23
32.0	8.6	26.867065	0.08	0.15	0.19
32.0	8.7	31.623672	0.07	0.13	0.16
32.0	8.8	36.798676	0.06	0.11	0.14
32.0	8.9	42.296677	0.05	0.10	0.12
32.0	9.0	47.992355	0.04	0.08	0.11
32.0	9.1	53.740707	0.04	0.08	0.10
32.0	9.2	59.391327	0.04	0.07	0.09
32.0	9.3	64.803757	0.03	0.06	0.08
32.0	9.4	69.860855	0.03	0.06	0.07
32.0	9.5	74.477539	0.03	0.05	0.07
32.0	9.6	78.603592	0.03	0.05	0.07
32.0	9.7	82.221909	0.03	0.05	0.06
32.0	9.8	85.342361	0.03	0.05	0.06
32.0	9.9	87.995087	0.03	0.05	0.06
32.0	10.0	90.222748	0.02	0.04	0.06
32.0	10.1	92.074280	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
32.5	5.0	0.009544	215.75	431.49	539.36
32.5	5.1	0.012014	171.38	342.75	428.44
32.5	5.2	0.015125	136.14	272.27	340.33
32.5	5.3	0.019040	108.14	216.28	270.35
32.5	5.4	0.023969	85.90	171.80	214.76
32.5	5.5	0.030173	68.24	136.48	170.60
32.5	5.6	0.037983	54.21	108.42	135.52
32.5	5.7	0.047813	43.07	86.13	107.66
32.5	5.8	0.060186	34.21	68.42	85.53
32.5	5.9	0.075757	27.18	54.36	67.95
32.5	6.0	0.095354	21.60	43.19	53.98
32.5	6.1	0.120013	17.16	34.31	42.89
32.5	6.2	0.151041	13.63	27.26	34.08
32.5	6.3	0.190075	10.83	21.66	27.08
32.5	6.4	0.239172	8.61	17.22	21.52
32.5	6.5	0.300913	6.84	13.68	17.11
32.5	6.6	0.378531	5.44	10.88	13.60
32.5	6.7	0.476075	4.33	8.65	10.81
32.5	6.8	0.598605	3.44	6.88	8.60
32.5	6.9	0.752431	2.74	5.47	6.84
32.5	7.0	0.945412	2.18	4.35	5.44
32.5	7.1	1.187294	1.74	3.47	4.34
32.5	7.2	1.490131	1.38	2.76	3.45
32.5	7.3	1.868753	1.10	2.20	2.75
32.5	7.4	2.341290	0.88	1.76	2.20
32.5	7.5	2.929744	0.70	1.40	1.76
32.5	7.6	3.660556	0.56	1.12	1.41
32.5	7.7	4.565091	0.45	0.90	1.13
32.5	7.8	5.679964	0.36	0.72	0.91
32.5	7.9	7.047002	0.29	0.58	0.73
32.5	8.0	8.712663	0.24	0.47	0.59
32.5	8.1	10.726603	0.19	0.38	0.48
32.5	8.2	13.139053	0.16	0.31	0.39
32.5	8.3	15.996848	0.13	0.26	0.32
32.5	8.4	19.337830	0.11	0.21	0.27
32.5	8.5	23.184036	0.09	0.18	0.22
32.5	8.6	27.534073	0.08	0.15	0.19
32.5	8.7	32.356522	0.07	0.13	0.16
32.5	8.8	37.585526	0.06	0.11	0.14
32.5	8.9	43.120895	0.05	0.09	0.12
32.5	9.0	48.833618	0.04	0.08	0.11
32.5	9.1	54.576996	0.04	0.07	0.09
32.5	9.2	60.201126	0.04	0.07	0.09
32.5	9.3	65.568161	0.03	0.06	0.08
32.5	9.4	70.565308	0.03	0.06	0.07
32.5	9.5	75.112503	0.03	0.05	0.07
32.5	9.6	79.164688	0.03	0.05	0.07
32.5	9.7	82.708954	0.03	0.05	0.06
32.5	9.8	85.758774	0.03	0.05	0.06
32.5	9.9	88.346436	0.03	0.05	0.06
32.5	10.0	90.515884	0.02	0.04	0.06
32.5	10.1	92.316650	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
33.0	5.0	0.009870	208.62	417.24	521.55
33.0	5.1	0.012425	165.72	331.44	414.30
33.0	5.2	0.015641	131.64	263.28	329.10
33.0	5.3	0.019690	104.57	209.14	261.42
33.0	5.4	0.024787	83.07	166.13	207.67
33.0	5.5	0.031203	65.99	131.97	164.97
33.0	5.6	0.039280	52.42	104.84	131.05
33.0	5.7	0.049445	41.64	83.28	104.11
33.0	5.8	0.062239	33.08	66.16	82.70
33.0	5.9	0.078342	26.28	52.56	65.71
33.0	6.0	0.098607	20.88	41.76	52.20
33.0	6.1	0.124107	16.59	33.18	41.48
33.0	6.2	0.156191	13.18	26.36	32.96
33.0	6.3	0.196553	10.48	20.95	26.19
33.0	6.4	0.247319	8.33	16.65	20.81
33.0	6.5	0.311156	6.62	13.23	16.54
33.0	6.6	0.391407	5.26	10.52	13.15
33.0	6.7	0.492252	4.19	8.37	10.46
33.0	6.8	0.618919	3.33	6.65	8.32
33.0	6.9	0.777925	2.65	5.29	6.62
33.0	7.0	0.977380	2.11	4.21	5.27
33.0	7.1	1.227341	1.68	3.35	4.19
33.0	7.2	1.540233	1.34	2.67	3.34
33.0	7.3	1.931334	1.07	2.13	2.67
33.0	7.4	2.419306	0.85	1.70	2.13
33.0	7.5	3.026760	0.68	1.36	1.70
33.0	7.6	3.780829	0.55	1.09	1.36
33.0	7.7	4.713633	0.44	0.87	1.09
33.0	7.8	5.862552	0.35	0.70	0.88
33.0	7.9	7.270148	0.29	0.57	0.71
33.0	8.0	8.983456	0.23	0.46	0.57
33.0	8.1	11.052402	0.19	0.37	0.47
33.0	8.2	13.527022	0.15	0.30	0.38
33.0	8.3	16.453232	0.13	0.25	0.31
33.0	8.4	19.866989	0.11	0.21	0.26
33.0	8.5	23.787399	0.09	0.17	0.22
33.0	8.6	28.209076	0.07	0.14	0.18
33.0	8.7	33.095749	0.06	0.12	0.16
33.0	8.8	38.376450	0.06	0.11	0.13
33.0	8.9	43.946274	0.05	0.09	0.12
33.0	9.0	49.672867	0.04	0.08	0.10
33.0	9.1	55.408051	0.04	0.07	0.09
33.0	9.2	61.002792	0.04	0.07	0.08
33.0	9.3	66.322205	0.03	0.06	0.08
33.0	9.4	71.257919	0.03	0.06	0.07
33.0	9.5	75.734940	0.03	0.05	0.07
33.0	9.6	79.713120	0.03	0.05	0.06
33.0	9.7	83.183868	0.03	0.05	0.06
33.0	9.8	86.163895	0.03	0.05	0.06
33.0	9.9	88.687698	0.03	0.05	0.06
33.0	10.0	90.800262	0.02	0.04	0.06
33.0	10.1	92.551483	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
33.5	5.0	0.010205	201.76	403.51	504.39
33.5	5.1	0.012847	160.27	320.53	400.66
33.5	5.2	0.016173	127.31	254.61	318.27
33.5	5.3	0.020360	101.13	202.26	252.82
33.5	5.4	0.025631	80.34	160.67	200.83
33.5	5.5	0.032265	63.82	127.63	159.54
33.5	5.6	0.040616	50.70	101.39	126.74
33.5	5.7	0.051127	40.27	80.54	100.68
33.5	5.8	0.064356	32.00	63.99	79.98
33.5	5.9	0.081006	25.42	50.83	63.54
33.5	6.0	0.101959	20.20	40.39	50.49
33.5	6.1	0.128325	16.05	32.09	40.11
33.5	6.2	0.161497	12.75	25.50	31.87
33.5	6.3	0.203228	10.13	20.26	25.33
33.5	6.4	0.255714	8.05	16.10	20.13
33.5	6.5	0.321712	6.40	12.80	16.00
33.5	6.6	0.404673	5.09	10.18	12.72
33.5	6.7	0.508919	4.05	8.09	10.11
33.5	6.8	0.639847	3.22	6.43	8.04
33.5	6.9	0.804187	2.56	5.12	6.40
33.5	7.0	1.010305	2.04	4.07	5.09
33.5	7.1	1.268580	1.63	3.25	4.06
33.5	7.2	1.591817	1.30	2.59	3.23
33.5	7.3	1.995750	1.03	2.06	2.58
33.5	7.4	2.499581	0.83	1.65	2.06
33.5	7.5	3.126546	0.66	1.32	1.65
33.5	7.6	3.904475	0.53	1.05	1.32
33.5	7.7	4.866241	0.43	0.85	1.06
33.5	7.8	6.049997	0.34	0.68	0.85
33.5	7.9	7.499099	0.28	0.55	0.69
33.5	8.0	9.260873	0.22	0.44	0.56
33.5	8.1	11.385717	0.18	0.36	0.45
33.5	8.2	13.923285	0.15	0.29	0.37
33.5	8.3	16.918427	0.12	0.24	0.30
33.5	8.4	20.405136	0.10	0.20	0.25
33.5	8.5	24.399399	0.09	0.17	0.21
33.5	8.6	28.891724	0.07	0.14	0.18
33.5	8.7	33.840912	0.06	0.12	0.15
33.5	8.8	39.170898	0.05	0.10	0.13
33.5	8.9	44.772247	0.05	0.09	0.11
33.5	9.0	50.509476	0.04	0.08	0.10
33.5	9.1	56.233337	0.04	0.07	0.09
33.5	9.2	61.745914	0.04	0.07	0.08
33.5	9.3	67.065598	0.03	0.06	0.08
33.5	9.4	71.938416	0.03	0.06	0.07
33.5	9.5	76.344620	0.03	0.05	0.07
33.5	9.6	80.248871	0.03	0.05	0.06
33.5	9.7	83.646835	0.03	0.05	0.06
33.5	9.8	86.558090	0.03	0.05	0.06
33.5	9.9	89.019135	0.03	0.05	0.06
33.5	10.0	91.076050	0.02	0.04	0.06
33.5	10.1	92.778900	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
34.0	5.0	0.010552	195.14	390.27	487.84
34.0	5.1	0.013283	155.01	310.01	387.52
34.0	5.2	0.016722	123.13	246.26	307.83
34.0	5.3	0.021051	97.81	195.62	244.53
34.0	5.4	0.026500	77.70	155.40	194.25
34.0	5.5	0.033359	61.72	123.44	154.31
34.0	5.6	0.041993	49.03	98.06	122.58
34.0	5.7	0.052860	35.95	71.90	89.88
34.0	5.8	0.066538	30.95	61.89	77.36
34.0	5.9	0.083752	24.59	49.17	61.46
34.0	6.0	0.105414	19.53	39.06	48.83
34.0	6.1	0.132672	15.52	31.04	38.80
34.0	6.2	0.166966	12.33	24.66	30.83
34.0	6.3	0.210107	9.83	19.66	24.50
34.0	6.4	0.264365	7.79	15.58	19.47
34.0	6.5	0.332588	6.19	12.38	15.43
34.0	6.6	0.418343	4.92	9.84	12.30
34.0	6.7	0.526092	3.91	7.82	9.78
34.0	6.8	0.661408	3.12	6.23	7.78
34.0	6.9	0.831239	2.48	4.95	6.19
34.0	7.0	1.044218	1.97	3.94	4.93
34.0	7.1	1.311047	1.57	3.14	3.93
34.0	7.2	1.644924	1.25	2.50	3.13
34.0	7.3	2.062051	1.00	2.00	2.50
34.0	7.4	2.582178	0.80	1.59	1.99
34.0	7.5	3.229177	0.64	1.27	1.59
34.0	7.6	4.031580	0.51	1.02	1.28
34.0	7.7	5.023016	0.41	0.82	1.02
34.0	7.8	6.242409	0.33	0.66	0.82
34.0	7.9	7.733712	0.27	0.53	0.67
34.0	8.0	9.545019	0.22	0.43	0.54
34.0	8.1	11.726635	0.18	0.35	0.44
34.0	8.2	14.327899	0.15	0.29	0.36
34.0	8.3	17.392502	0.12	0.24	0.30
34.0	8.4	20.952286	0.10	0.20	0.25
34.0	8.5	25.019989	0.08	0.16	0.21
34.0	8.6	29.581848	0.07	0.14	0.17
34.0	8.7	34.591751	0.06	0.12	0.15
34.0	8.8	39.968536	0.05	0.10	0.13
34.0	8.9	45.598434	0.05	0.09	0.11
34.0	9.0	51.343140	0.04	0.08	0.10
34.0	9.1	57.052567	0.04	0.07	0.09
34.0	9.2	62.580292	0.03	0.06	0.08
34.0	9.3	67.798126	0.03	0.06	0.08
34.0	9.4	72.606857	0.03	0.06	0.07
34.0	9.5	76.941742	0.03	0.05	0.07
34.0	9.6	80.772324	0.03	0.05	0.06
34.0	9.7	84.097992	0.03	0.05	0.06
34.0	9.8	86.941544	0.03	0.05	0.06
34.0	9.9	89.341019	0.03	0.05	0.06
34.0	10.0	91.343506	0.02	0.04	0.06
34.0	10.1	92.999252	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
34.5	5.1	0.013732	149.94	299.88	374.85
34.5	5.2	0.017287	119.11	238.21	297.76
34.5	5.3	0.021762	94.61	189.22	236.53
34.5	5.4	0.027396	75.16	150.31	187.89
34.5	5.5	0.034487	59.71	119.41	149.26
34.5	5.6	0.043412	47.43	94.86	118.57
34.5	5.7	0.054646	37.68	75.36	94.20
34.5	5.8	0.068786	29.94	59.87	74.83
34.5	5.9	0.086581	23.78	47.56	59.45
34.5	6.0	0.108974	18.90	37.79	47.24
34.5	6.1	0.137151	15.01	30.02	37.53
34.5	6.2	0.172602	11.93	23.86	29.82
34.5	6.3	0.217195	9.48	18.96	23.70
34.5	6.4	0.273279	7.54	15.07	18.84
34.5	6.5	0.343794	5.99	11.98	14.97
34.5	6.6	0.432425	4.76	9.52	11.90
34.5	6.7	0.543782	3.79	7.57	9.47
34.5	6.8	0.683617	3.01	6.02	7.53
34.5	6.9	0.859101	2.40	4.79	5.99
34.5	7.0	1.079143	1.91	3.81	4.77
34.5	7.1	1.354773	1.52	3.04	3.80
34.5	7.2	1.699593	1.21	2.42	3.03
34.5	7.3	2.130283	0.97	1.93	2.42
34.5	7.4	2.667152	0.77	1.54	1.93
34.5	7.5	3.334712	0.62	1.23	1.54
34.5	7.6	4.162210	0.50	0.99	1.24
34.5	7.7	5.184038	0.40	0.79	0.99
34.5	7.8	6.439870	0.32	0.64	0.80
34.5	7.9	7.974337	0.26	0.52	0.65
34.5	8.0	9.835993	0.21	0.42	0.52
34.5	8.1	12.075234	0.17	0.34	0.43
34.5	8.2	14.740912	0.14	0.28	0.35
34.5	8.3	17.875412	0.12	0.23	0.29
34.5	8.4	21.508301	0.10	0.19	0.24
34.5	8.5	25.648911	0.08	0.16	0.20
34.5	8.6	30.279144	0.07	0.14	0.17
34.5	8.7	35.347870	0.06	0.12	0.15
34.5	8.8	40.768936	0.05	0.10	0.13
34.5	8.9	46.424393	0.05	0.09	0.11
34.5	9.0	52.173355	0.04	0.08	0.10
34.5	9.1	57.865295	0.04	0.07	0.09
34.5	9.2	63.355606	0.03	0.06	0.08
34.5	9.3	68.519730	0.03	0.06	0.08
34.5	9.4	73.263199	0.03	0.06	0.07
34.5	9.5	77.526367	0.03	0.05	0.07
34.5	9.6	81.283447	0.03	0.05	0.06
34.5	9.7	84.537689	0.03	0.05	0.06
34.5	9.8	87.314392	0.03	0.05	0.06
34.5	9.9	89.653519	0.02	0.04	0.06
34.5	10.0	91.602768	0.02	0.04	0.06
34.5	10.1	93.212631	0.02	0.04	0.06

Temp °C	pH	Unionized %	Allowable Concentration 0.02	0.04	0.05
35.0	5.0	0.011276	182.61	365.21	456.51
35.0	5.1	0.014195	145.05	290.10	362.63
35.0	5.2	0.017870	115.23	230.45	288.06
35.0	5.3	0.022496	91.53	183.06	228.82
35.0	5.4	0.028318	72.71	145.42	181.77
35.0	5.5	0.035648	57.76	115.52	144.40
35.0	5.6	0.044874	45.89	91.77	114.71
35.0	5.7	0.056487	36.45	72.90	91.13
35.0	5.8	0.071102	28.96	57.92	72.40
35.0	5.9	0.089495	23.01	46.01	57.52
35.0	6.0	0.112642	18.28	36.56	45.70
35.0	6.1	0.141766	14.53	29.05	36.31
35.0	6.2	0.178407	11.54	23.08	28.85
35.0	6.3	0.224497	9.17	18.34	22.73
35.0	6.4	0.282461	7.29	14.58	18.22
35.0	6.5	0.355337	5.80	11.59	14.49
35.0	6.6	0.446931	4.61	9.21	11.52
35.0	6.7	0.562002	3.67	7.33	9.16
35.0	6.8	0.706490	2.92	5.83	7.29
35.0	6.9	0.887792	2.32	4.64	5.80
35.0	7.0	1.115099	1.85	3.69	4.62
35.0	7.1	1.399783	1.47	2.94	3.68
35.0	7.2	1.755857	1.17	2.34	2.93
35.0	7.3	2.200486	0.94	1.87	2.34
35.0	7.4	2.754550	0.75	1.49	1.87
35.0	7.5	3.443210	0.60	1.19	1.49
35.0	7.6	4.296433	0.48	0.96	1.20
35.0	7.7	5.349375	0.39	0.77	0.96
35.0	7.8	6.642450	0.31	0.62	0.77
35.0	7.9	8.220946	0.25	0.50	0.63
35.0	8.0	10.133842	0.21	0.41	0.51
35.0	8.1	12.431543	0.17	0.33	0.41
35.0	8.2	15.162315	0.14	0.27	0.34
35.0	8.3	18.367111	0.11	0.22	0.28
35.0	8.4	22.073074	0.10	0.19	0.23
35.0	8.5	26.286011	0.08	0.16	0.20
35.0	8.6	30.983322	0.07	0.13	0.17
35.0	8.7	36.108871	0.06	0.11	0.14
35.0	8.8	41.571594	0.05	0.10	0.12
35.0	8.9	47.249603	0.05	0.09	0.11
35.0	9.0	52.999649	0.04	0.08	0.10
35.0	9.1	58.671143	0.04	0.07	0.09
35.0	9.2	64.121552	0.03	0.06	0.08
35.0	9.3	69.230164	0.03	0.06	0.07
35.0	9.4	73.907333	0.03	0.05	0.07
35.0	9.5	78.098480	0.03	0.05	0.07
35.0	9.6	81.782364	0.03	0.05	0.06
35.0	9.7	84.965958	0.03	0.05	0.06
35.0	9.8	87.676941	0.03	0.05	0.06
35.0	9.9	89.956940	0.02	0.04	0.06
35.0	10.0	91.854248	0.02	0.04	0.06
35.0	10.1	93.419327	0.02	0.04	0.06

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

WATER POLLUTION CONTROL PROGRAM

TOXIC POLLUTANT CRITERIA

Chapter 74:51:01

APPENDIX B

SEE: § 74:51:01:55

Source: 19 SDR 111, effective January 31, 1993; transferred from Chapter 74:03:02, Appendix C, July 1, 1996; transferred from Chapter 74:51:01, Appendix A, 24 SDR 10, effective July 20, 1997; 25 SDR 98, effective January 27, 1998.

SOUTH DAKOTA SURFACE WATER QUALITY STANDARDS [1]

FOR TOXIC POLLUTANTS - ARSD 74:51:01

Pollutant	Human Health Value Concentrations in ug/L Use 1[3] / Uses 2-3-4-5-6[4]	Aquatic Life Value Concentrations in ug/L Uses 2-3-4-5-6 Acute (CMC)/ Chronic (CCC)	Pollutant	Human Health Value Concentrations in ug/L Use 1[3] / Uses 2-3-4-5-6[4]	Aquatic Life Value Concentrations in ug/L Uses 2-3-4-5-6 Acute(CMC)/ Chronic (CCC)
Acenaphthene	1,200/2,700		Cadmium	-/-	3.7[9]/1.0[9]
Acenaphthylene (PAH)[6]	-/-	-/-	Carbon Tetrachloride[5] (Tetrachloromethane)	0.25/4.4	-/-
Acrolein	320/780	-/-	Chlordane[5]	0.00057/0.00059	2.4/0.0043
Acrylonitrile[5]	0.059/0.66	-/-	Chlorine	-/-	19/11
Aldrin[5]	0.00013/0.00014	3.0/-	Chlorobenzene (monochlorobenzene)	680/21,000	-/-
Anthracene (PAH)[6]	9,600/110,000	-/-	Chlorodibromomethane (HM)[6]	0.41/34	-/-
Antimony	14/4,300	-/-	Chloroform (HM)[5] (Trichloromethane)	5.7/470	-/-
Arsenic[5]	0.018/0.14	360/190	2-Chloronaphthalene	1,700/4,300	
Asbestos[5]	7,000,000 fibers/L	-/-	2-Chlorophenol	120/400	
BHC (alpha)[5] (Hexachlorocyclohexane-alpha)	0.0039/0.013	-/-	Chromium(III)	-/-	550[9]/180[9]
BHC (beta)[5] (Hexachlorocyclohexane-beta)	0.014/0.046	-/-	Chromium(VI)	-/-	15/10
BHC (gamma) (Lindane)[5] (Hexachlorocyclohexane-gamma)	0.019/0.063	2.0/0.08	Chrysene (PAH)[5]	0.0028/0.031	-/-
Benzene[5]	1.2/71	-/-	Copper	1,300/-	17[9]/11[9]
Benzidine[5]	0.00012/0.00054	-/-	Cyanide (weak acid dissociable)	700/220,000	22/5.2
Benzo (a) Anthracene (PAH)[5] (1,2 Benzanthracene)	0.0028/0.031	-/-	4,4'-DDD[5]	0.00083/ 0.00084	-/-
Benzo (a) Pyrene (PAH)[5] (3,4 Benzopyrene)	0.0028/0.031	-/-	4,4'-DDE[5]	0.00059/ 0.00059	-/-
Benzo (b) Fluoroanthene (PAH)[5] (3,4 Benzofluoroanthene)	0.0028/0.031	-/-	4,4'-DDT[5][7]	0.00059/ 0.00059	1.1/0.001
Benzo (k) Fluoroanthene (PAH)[5] (11,12 - Benzofluoroanthene)	0.0028/0.031	-/-	Dibenzo (a,h) Anthracene (PAH)[C] (1,2,5,6-Dibenzanthracene)	0.0028/0.031	-/-
Benzo (g,h,i) Perylene (PAH)[6] (1,12 Benzoperylene)	-/-	-/-	1,2 Dichlorobenzene	2,700/17,000	-/-
Beryllium[5]	-/-	-/-	1,3 & 1,4-Dichlorobenzene	400/2,600	-/-
Bis (2-chloroethyl) Ether[5]	0.031/1.4	-/-	3,3'-Dichlorobenzidine[5]	0.04/0.077	-/-
Bis (2-chloroisopropyl) Ether	1,400/170,000	-/-	Dichlorobromomethane (HM)[6]	0.27/22	-/-
Bis (2-ethylhexyl) Phthalate[5]	1.8/5.9	-/-	1,2-Dichloroethane[5]	0.38/99	-/-
Bromoform (HM)[6] (Tribromomethane)	4.3/360	-/-	1,1-Dichloroethylene[5]	0.057/3.2	-/-
Butyl Benzene Phthalate	3,000/5,200		2,4-Dichlorophenol	93/790	-/-

SOUTH DAKOTA SURFACE WATER QUALITY STANDARDS [1]

FOR TOXIC POLLUTANTS - ARSD 74:51:01 (Continued)

Pollutant	Human Health Value Concentrations in ug/L Use 1[3] / Uses 2-3-4-5-6[4]	Aquatic Life Value Concentrations in ug/L Uses 2-3-4-5-6 Acute (CMC)/ Chronic (CCC)	Pollutant	Human Health Value Concentrations in ug/L Use 1[3] / Uses 2-3-4-5-6[4]	Aquatic Life Value Concentrations in ug/L Uses 2-3-4-5-6 Acute (CMC) Chronic (CCC)
1,2-Dichloropropane	0.52/39		Mercury	0.14/0.15	2.1/0.012[10]
1,3-Dichloropropylene, Cis & Trans (1,3-Dichloropropene)	10/1,700	-/-	Methyl Bromide (HM) (Bromomethane)	48/4,000	-/-
Dieldrin[5]	0.00014/0.00014	2.5/0.0019	Methyl Chloride (HM)[6] (Chloromethane)	-/-	-/-
Diethyl Phthalate	23,000/120,000	-/-	Methylene Chloride (HM)[5](Dichloromethane)	4.7/1,600	-/-
2,4-Dimethylphenol	540/2,300		N-Nitrosodimethylamine[5]	0.00069/8.1	-/-
Dimethyl Phthalate	313,000/2,900,000	-/-	N-Nitrosodi-n-Propylamide	0.005/1.4	
Di-n-butyl Phthalate	2,700/12,000	-/-	N-Nitrosodiphenylamine[5]	5.0/16.0	-/-
4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)	13.4/765	-/-	Nickel	610/4,600	1,400[9]/160[9]
2,4-Dinitrophenol	70/14,000	-/-	Nitrobenzene	17/1,900	-/-
Dioxin (2,3,7,8-TCDD)[5]	0.000000013/ 0.000000014	-/-	PCB-1016, 1221, 1232, 1242, 1248, 1254, 1260 (Arochlor 1016, 1221, 1232, 1242, 1248, 1254, 1260)[2][5][7]	0.000044/ 0.000045	-/0.014
1,2-Diphenylhydrazine[5]	0.040/0.54	-/-	Pentachlorophenol	0.28/8.2	20[8]/13[8]
2,4-Dinitrotoluene[5]	0.11/9.1	-/-	Phenanthrene (PAH)[6]	-/-	-/-
Endosulfan (alpha & beta)	0.93/2.0	0.22/0.056	Phenol	21,000/4,600,000	-/-
Endosulfan Sulfate	0.93/2.0	-/-	Pyrene (PAH)[6]	960/11,000	-/-
Endrin	0.76/0.81	0.18/0.0023	Selenium[7]	-/-	20/5
Endrin aldehyde	0.76/0.81	-/-	Silver	-/-	3.4[9]/-
Ethylbenzene	3,100/29,000	-/-	1,1,2,2-Tetrachloroethane[5]	0.17/11	-/-
Fluoranthene	300/370	-/-	Tetrachloroethylene[6]	0.8/8.85	-/-
Fluorene (PAH)[6]	1,300/14,000	-/-	Thallium	1.7/6.3	-/-
Heptachlor[5]	0.00021/0.00021	0.52/0.0038	Toluene	6,800/200,000	-/-
Heptachlor epoxide[5]	0.00010/0.00011	0.52/0.0038	Toxaphene[5]	0.00073/0.00075	0.73/0.0002
Hexachlorobenzene[5]	0.00075/0.00077	-/-	1,2-Trans-Dichloroethylene	700/-	
Hexachlorobutadiene[5]	0.44/50	-/-	1,1,1-Trichloroethane	-/-	-/-
Hexachlorocyclopentadiene	240/17,000	-/-	1,1,2-Trichloroethane[5]	0.60/42	-/-
Hexachloroethane[5]	1.9/8.9	-/-	Trichloroethylene[6]	2.7/81	-/-
Indeno (1,2,3-c,d) pyrene (PAH)(c)	0.0028/0.0311	-/-	2,4,6-Trichlorophenol[5]	2.1/6.5	-/-
Isophorone[5]	8.4/600	-/-	Vinyl chloride[5] (Chloroethylene)	2.0/525	-/-
Lead	-/-	65[9]/2.5[9]	Zinc	-/-	110[9]/100[9]

SOUTH DAKOTA
Surface Water Quality Standards[1]
for Toxic Pollutants

(1) The aquatic life values for arsenic, cadmium, chromium (III), chromium (VI), copper, lead, mercury (acute), nickel, selenium, silver and zinc given in this document refer to the dissolved amount of each substance unless otherwise noted. All surface water discharge permit effluent limits for metals shall be expressed and measured in accordance with § 74:52:03:16.

(2) Apply to the beneficial uses as designated but do not supersede those standards for certain toxic pollutants as previously established in §§ 74:51:01:31, 74:51:01:32, 74:51:01:44 to 74:51:01:54, inclusive, and §§ 74:51:01:56 and 74:51:01:57.

(3) Based on two routes of exposure - ingestion of contaminated aquatic organisms and drinking water.

(4) Based on one route of exposure - ingestion of contaminated aquatic organisms only.

(5) Substance classified as a carcinogen with the value based on an incremental risk of one additional instance of cancer in one million persons (10^{-6}).

(6) Chemicals which are not individually classified as carcinogens but which are contained within a class of chemicals with carcinogenicity as the basis for the criteria derivation for that class of chemicals; an individual carcinogenicity assessment for these chemicals is pending.

(7) Also applies to all waters of the state.

(8) pH-dependent criteria. Value given is an example only and is based on a pH of 7.8. Criteria for each case must be calculated using the following equation taken from Quality Criteria for Water 1986 (Gold Book):

Pentachlorophenol (PCP), ug/L

Chronic = $e^{[1.005(pH) - 5.290]}$ Acute = $e^{[1.005(pH) - 4.830]}$

(9) Hardness-dependent criteria in ug/L. Value given is an example only and is based on a $CaCO_3$ hardness of 100 mg/L. Criteria for each case must be calculated using the following equations taken from Quality Criteria for Water 1986 (Gold Book):

Cadmium, ug/L

Chronic = $(*0.909)e^{(0.7852[\ln(\text{hardness})]-3.490)}$ Acute = $(*0.944)e^{(1.128[\ln(\text{hardness})]-3.828)}$

*Conversion factors are hardness-dependent. The values shown are with a hardness of 100 mg/L as calcium carbonate ($CaCO_3$). Conversion factors (CF) for any hardness can be calculated using the following equations:

Chronic: CF = 1.101672 - [(ln hardness)(0.041838)]
Acute: CF = 1.136672 - [(ln hardness)(0.041838)]

Chromium (III), ug/L

Chronic = $(0.860)e^{(0.8190[\ln(\text{hardness})]+1.561)}$ Acute = $(0.316)e^{(0.8190[\ln(\text{hardness})]+3.688)}$

Copper, ug/L

Chronic = $(0.960)e^{(0.8545[\ln(\text{hardness})]-1.465)}$ Acute = $(0.960)e^{(0.9422[\ln(\text{hardness})]-1.464)}$

Lead, ug/L

Chronic = $(*0.791)e^{(1.273[\ln(\text{hardness})]-4.705)}$ Acute = $(*0.791)e^{(1.273[\ln(\text{hardness})]-1.460)}$

*Conversion factors are hardness-dependent. The values shown are with a hardness of 100 mg/L as calcium carbonate ($CaCO_3$). Conversion factors (CF) for any hardness can be calculated using the following equations:

Acute and Chronic: CF = 1.46203 - [(ln hardness)(0.145712)]

Nickel, ug/L

Chronic = $(0.997)e^{(0.8460[\ln(\text{hardness})]+1.1645)}$

Acute = $(0.998)e^{(0.8460[\ln(\text{hardness})]+3.3612)}$

Silver, ug/L

Acute = $(0.85)e^{(1.72[\ln(\text{hardness})]-6.52)}$

Zinc, ug/L

Chronic = $(0.986)e^{(0.8473[\ln(\text{hardness})]+0.7614)}$

Acute = $(0.978)e^{(0.8473[\ln(\text{hardness})]+0.8604)}$

(10) These criteria are based on the total-recoverable fraction of the metal.

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

WATER POLLUTION CONTROL PROGRAM

APPROVED TEST PROCEDURES

Chapter 74:51:01

APPENDIX C
(Repealed)

SEE: § 74:51:01:22

Source: 10 SDR 145, effective July 1, 1984; 16 SDR 196, effective May 23, 1990; 19 SDR 111, effective January 31, 1993; transferred from Chapter 74:03:02, Appendix B, July 1, 1996; transferred from Chapter 74:51:01, Appendix B and repealed.